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EPA Superfund Record of Decision:

South 8th Street Landfill (O. U. 1), West Memphis, AR 9/29/94

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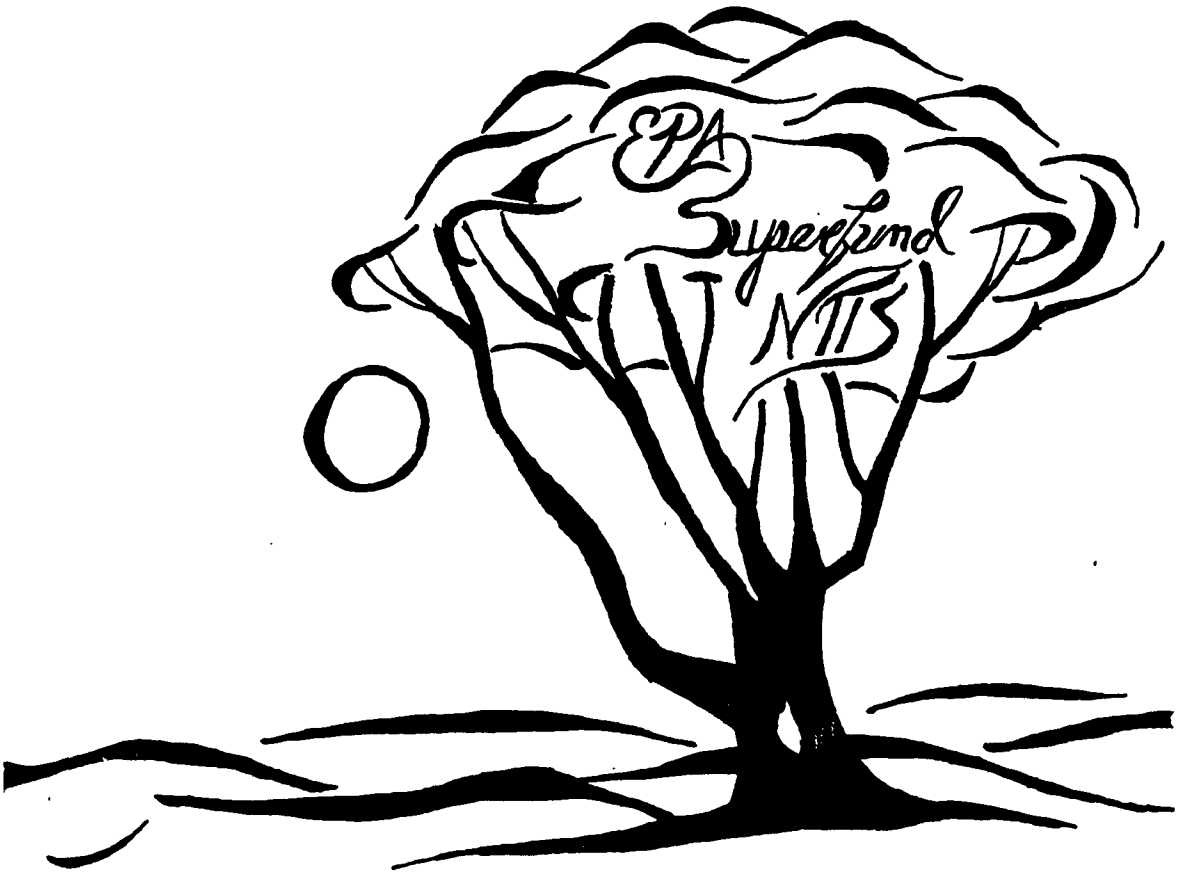
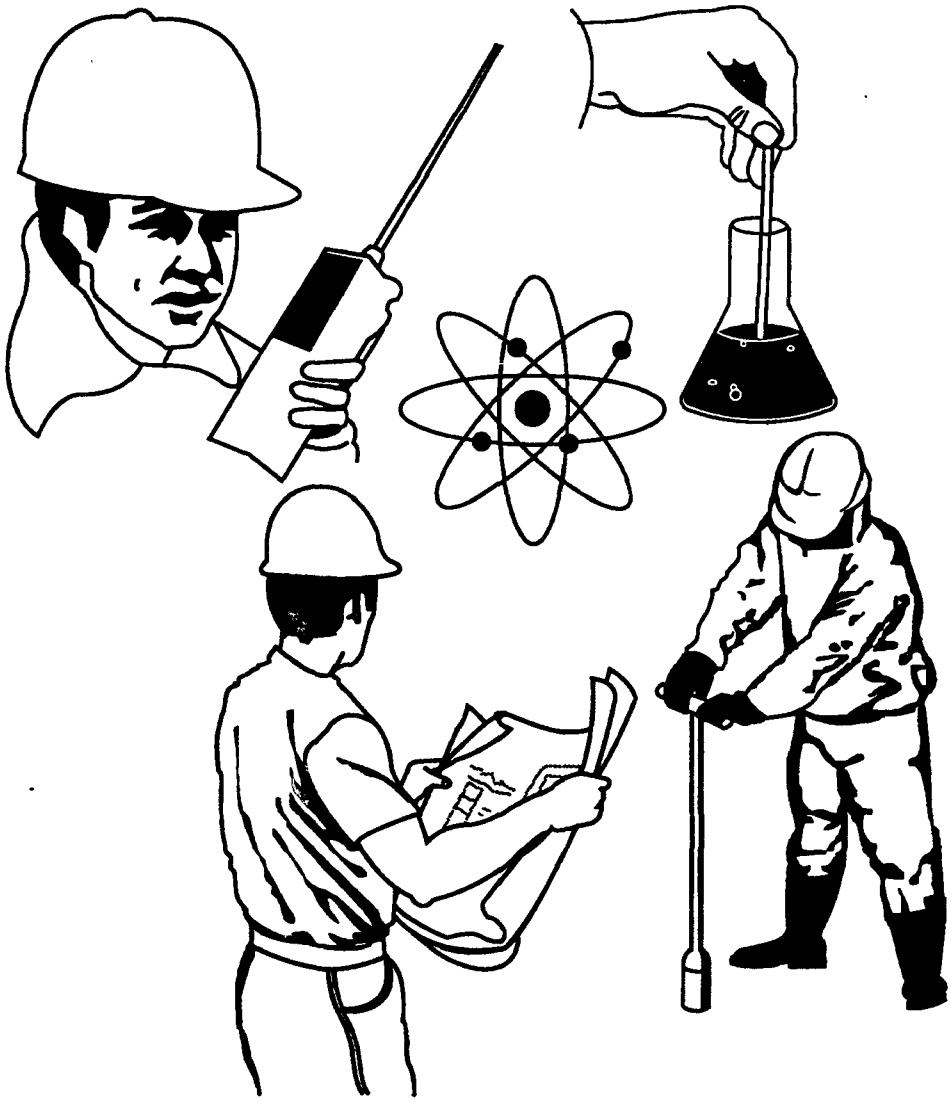


RECORD OF DECISION

South 8th Street Landfill

West Memphis, Arkansas



U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, Texas 75202

Statement of Basis

SOUTH 8TH STREET LANDFILL SUPERFUND SITE
RECORD OF DECISION
DECLARATION

STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT IS MET AND FIVE-YEAR REVIEW IS REQUIRED

SITE NAME AND LOCATION

South 8th Street Landfill Superfund Site
West Memphis, AR

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the South 8th Street Superfund Site (hereinafter "site"), in West Memphis, Arkansas, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), 42 U.S.C. §9601 et seq., and to the extent practicable, the National Contingency Plan ("NCP"). This decision is based on the Administrative Record for this site.

The State of Arkansas concurs on the selected remedy.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE REMEDY

The site is being handled as two operable units: a source control operable unit, which is addressed by this ROD, and a groundwater operable unit, which will be addressed in a separate ROD at a later date. The principal concerns to be addressed at the site are contaminated sludges and contaminated soil and debris. The major components of the selected remedy include:

- Excavation of an estimated 22,000 cubic yards of contaminated sludge, soil and debris.

- Treatment of contaminated water generated during the excavation of the contaminated material.

- Pretreatment of the contaminated material as necessary to facilitate material handling operations.

- Separation and cleansing of contaminated debris and disposal of same in a Subtitle D landfill located offsite.

- Backfill of the areas that are excavated with clean soil.

- Treatment of the contaminated sludges and soils in the oily sludge pit via stabilization/solidification technology.

- Disposal of treated sludge and contaminated soil in a Subtitle D landfill located offsite.

- Placement of a natural soil cover that complies with the State of Arkansas Solid Waste Management Code over the former disposal areas.

- Installation of appropriate erosion control features to minimize operation and maintenance of the soil cover.

- Placement of deed notifications to ensure that any future landowners will be notified that the land was a former Superfund site and has been cleaned up in accordance with CERCLA.

- Groundwater monitoring.

- Long-term operation and maintenance.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy satisfies the statutory preference for treatment that reduces toxicity, mobility or volume as a principal element of the remedy. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

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

Allyn M Davis

for Jane N. Saginaw
Regional Administrator
U.S. Environmental Protection Agency
Region 6

9/29/94
Date

CONCURRENCE FOR THE

SOUTH 8TH STREET LANDFILL SITE
RECORD OF DECISION

for Walter L. Sutton, Jr., Regional Counsel
Office of Regional Counsel

Allyn M. Davis, Director
Hazardous Waste Management Division

CONCURRENCE FOR THE

SOUTH 8TH STREET LANDFILL SITE
RECORD OF DECISION

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DECISION SUMMARY

I. SITE NAME, LOCATION AND DESCRIPTION

The South 8th Street Landfill site (site) is located adjacent to the Mississippi River in West Memphis, Crittenden County, Arkansas, as shown on Figure 1. The site, which is approximately 30 acres, is situated in the Mississippi River floodplain between the river and the St. Francis Levee. The site is sub-divided into three separate disposal areas, Areas 1, 2 and 3, and an oily sludge pit area located in Area 2. Figure 2 provides a graphical description of each of the relevant areas.

Area 1 primarily consists of a former municipal waste landfill. The remaining fill portions of Area 2, not associated with the large oily sludge pit, consist primarily of industrial waste, and Area 3 consists of several smaller municipal and industrial waste disposal areas.

Because the site lies within the flood protection levees of the Mississippi River, it is not unlikely for the site to flood between the months of November through July. During the past 11 years of record, the site was inundated on 14 different occasions, the earliest time of the year occurring on November 25, 1985, and the latest occurring on June 13, 1983, and June 13, 1990.

An HRS package was prepared in August 1991 (E&E 1991). The site was proposed for listing on the National Priorities List (NPL) as the "West Memphis Landfill Site" on February 7, 1992 (57 Fed. Reg. 4,827). The site was subsequently listed as final on the NPL as the "South 8th Street Landfill Site" on October 14, 1992 (57 Fed. Reg. 47,184).

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The South 8th Street Landfill site was first brought to the attention of the United States Government in 1979 in the Eckhardt Survey conducted by the House Congressional Sub-Committee on Interstate Commerce and Transportation. In this survey, the landfill was listed as the West Memphis Landfill site, South 8th Street.

Aerial photographs indicate that the site was used as a series of borrow pits and for disposal of waste and/or other materials since the 1950s. Most of the early disposal activities appear to have been conducted on a 2.61 acre parcel of land leased by Mr. W.M. Gurley from the W.L. Johnson Company. Gurley Refining Company (GRC) used the site for the disposal of waste sludge from its waste oil re-refining operation located on the land side of the St. Francis Levee just west of the site. The waste in the pit has

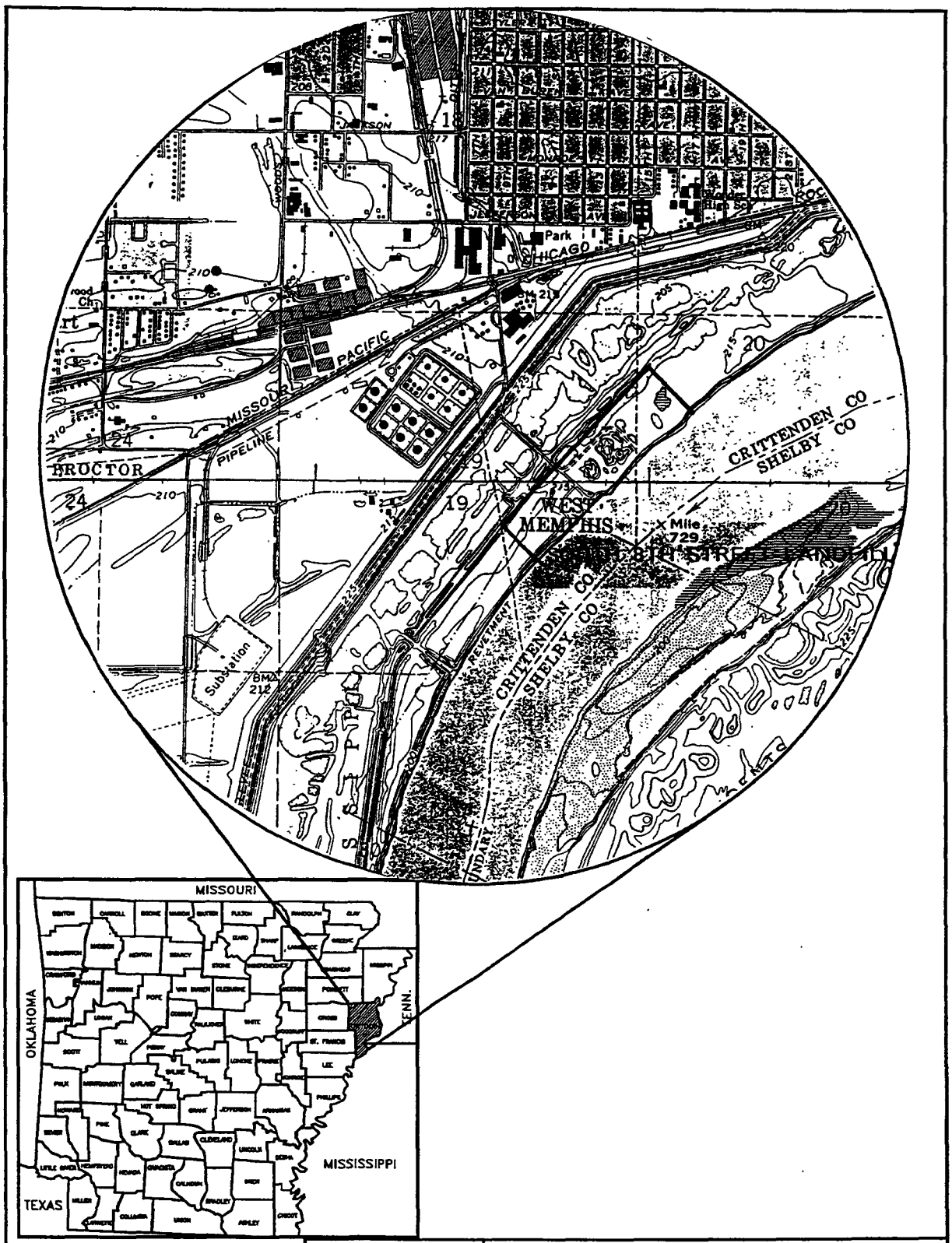

FIGURE 1
SITE LOCATION MAP
RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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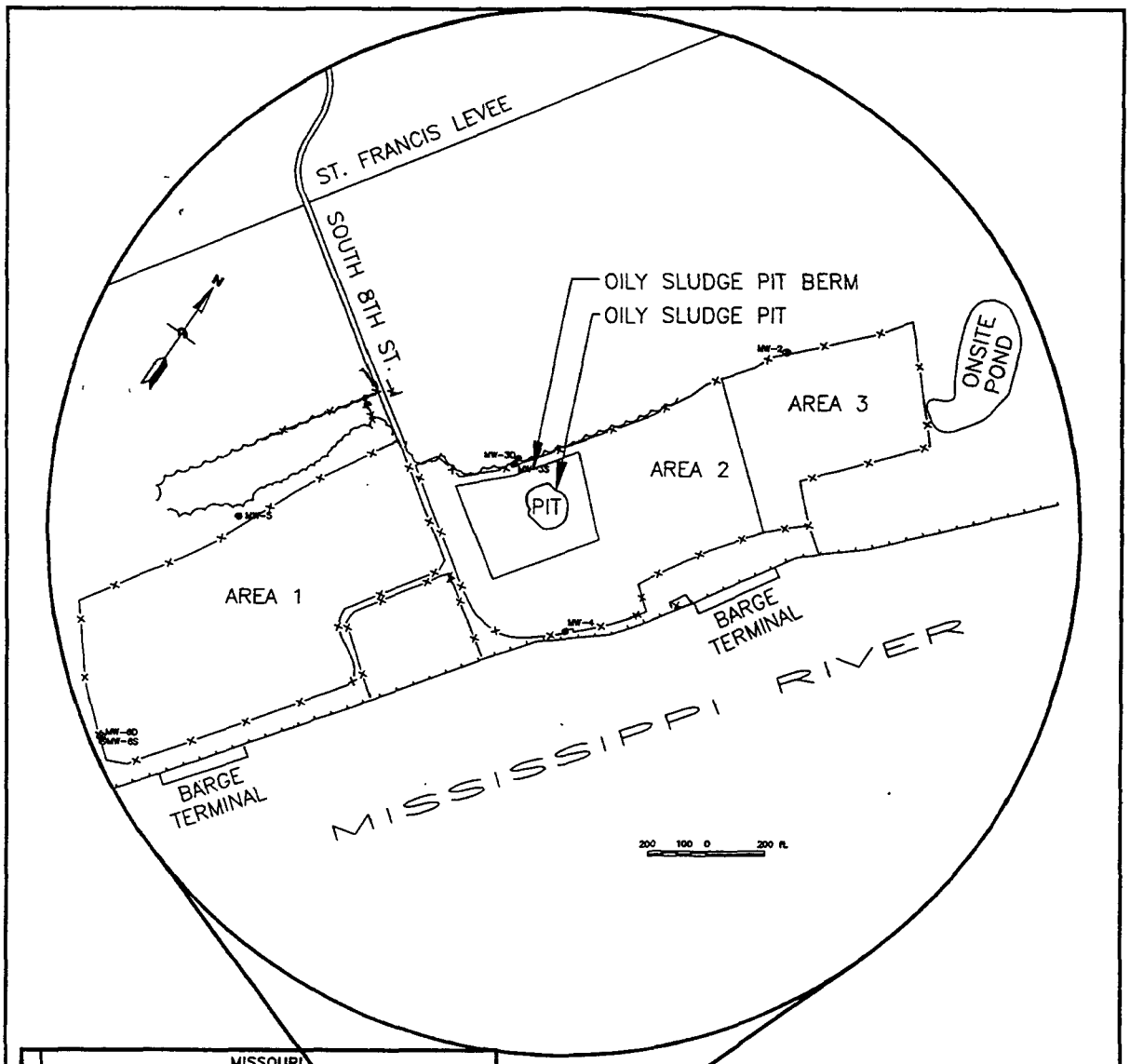

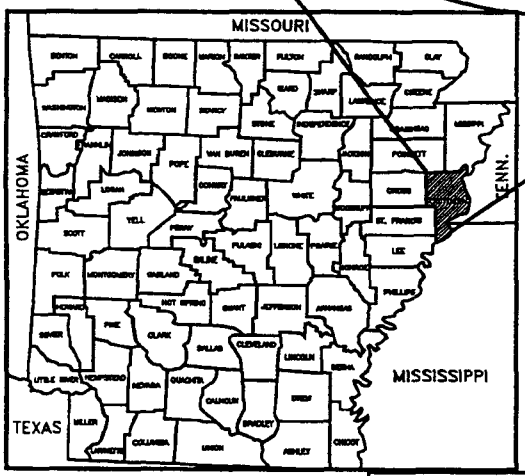

FIGURE 2

SITE MAP
RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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physical and chemical properties that are similar to waste from waste oil reclamation processes.

The first EPA investigation of the site was conducted in August, 1981. Samples were not collected, but drums and other surface anomalies such as stained soils and settlement depressions were discovered. The EPA Field Investigation Team (FIT) contractor conducted a soil boring investigation on March 22, 1982. Four borings were drilled in a north-south direction across the landfill. Lithology was determined to be sands and clays. Alluvial groundwater was estimated to be 8 to 20 feet below ground surface. Ammonia and cyanide were detected in the boring samples.

The FIT sampled the pits in March 1982 and June 1986. Polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and benzene, toluene, ethylbenzene and xylene (BTEX) were detected in the samples obtained by the FIT.

EPA conducted additional air monitoring in November 1986 and collected additional pit samples in January 1987. PAHs, PCBs, and BTEX again were detected.

The FIT conducted an extensive sampling inspection in February, 1988 that included pit, surface soil, and surface water sampling. Pesticides were detected in the pits as well as in surface soil samples. Heavy metals were detected in surface water samples. Sludge pit samples contained PAHs, PCBs and BTEX.

In October, 1988, follow-up air monitoring was conducted which detected air emissions of organic compounds including ethylbenzene, xylenes, alkanes and PAHs.

Other than the soil boring investigation and a one-time surface soil sampling event, the EPA sampling efforts focused in and around the pit area. Therefore, the extent of site contamination was not ascertained prior to the RI/FS.

A Hazard Ranking System (HRS) package was prepared in August, 1991. The site was proposed on the National Priorities List (NPL) as the "West Memphis Landfill site" on February 7, 1992. The site was listed final on the NPL as the "South 8th Street Landfill site" on October 14, 1992.

EPA issued a General Notice Letter/Information Request to 25 Potentially Responsible Parties (PRPs) on February 7, 1992. EPA evaluated the responses received and subsequently issued Special Notice Letters to 26 PRPs on March 18, 1992. Additional PRPs were added to the list of PRPs based on information received from some of the other PRPs who responded to the February 7, 1992 Information Request.

EPA issued a Unilateral Administrative Order (Order) to the PRPs (with the exception of the City of West Memphis) on May 23, 1992. The Order required the PRPs to construct a fence around the former disposal areas and to investigate the large oily sludge pit. Construction of the fence was completed in July 1992. Although the PRPs initially undertook the pit investigation on August 31, 1992, EPA took over the pit investigation in September, 1992.

The RI/FS negotiation moratorium ended on May 23, 1992, with none of the PRPs volunteering to perform the RI/FS. Subsequently, EPA performed the RI/FS.

EPA's contractor commenced the pit characterization on September 16, 1992. After it became apparent that the pit could not be removed prior to the impending flood season, EPA constructed a berm around the oily sludge pit under EPA's time-critical removal authority to minimize the spread of contamination that could result from flooding of the site. EPA also determined that it would remove the pit under EPA's non-time critical removal authority to address the primary threat at the site.

EPA mobilized to the site on October 19, 1992, and constructed a 1,600 linear foot berm around the oily sludge pit to a height that would protect the pit from a typical flood at the site. Construction of the berm was completed on November 4, 1992. EPA subsequently directed the ARCS contractor to mobilize on December 1, 1992, to complete the investigation of the large oily sludge pit. The investigation was completed on December 8, 1992.

EPA issued Special Notice Waiver Letters for preparation of an EE/CA (dated January 7, 1993) to the PRPs on January 15, 1993. The PRPs were offered the opportunity to prepare the EE/CA and informed that an Administrative Order on Consent could be negotiated under an expedited schedule. None of the PRPs expressed an interest in preparing the EE/CA, so EPA continued its preparation of the EE/CA.

In May 1993, EPA re-evaluated the feasibility of completing a non-time critical removal during the 1993 dry season. After reviewing the schedule that would have to be met to complete the work prior to the beginning of the flood season, EPA determined that an action could not be completed until after the next flood season. Therefore, EPA determined that the most efficient manner to address the oily sludge pit was to include the actions to address the pit as part of the remedial action to address the entire site.

EPA issued the Proposed Plan for the site on July 27, 1993. The Proposed Plan identified organic treatment, stabilization and off-site disposal of the treated oily sludge pit waste at a Subtitle D Landfill, and a natural soil cover for the landfill areas as EPA's preferred remedy. The extended public comment period for the Proposed Plan closed on September 24, 1993. EPA's response to

public comments is contained in the Responsiveness Summary portion of the ROD.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The requirements of CERCLA Sections 113(k)(2)(B)(i-v) and 117, 42 U.S.C. §§ 9613(k)(2)(B)(i-v) and 9617, were met during the remedy selection process.

EPA met with officials of the City of West Memphis in January 1992 to discuss the site and the Superfund process and to answer any questions the City might have. EPA personnel also interviewed a local store owner and staff from the county health department to discuss citizen concerns about the potential danger posed by the site.

A fact sheet summarizing the Superfund process and the status of activities at the site was mailed to the local citizens and other interested parties on April 3, 1992. The fact sheet also invited the public to attend a "Citizens Scoping Meeting" that was conducted on April 16, 1992. At the scoping meeting, EPA described the Superfund process and the specific plans to investigate the site, and solicited input from the attendees on other areas of the site that they felt needed to be investigated.

EPA regularly met with members of the local community and news media throughout the conduct of response activities at the site. EPA provided reports on progress at the site and addressed issues related to potential alternatives to address risk at the site.

The RI/FS Reports and Proposed Plan for the South 8th Street Superfund site were released to the Public on July 27, 1993. The documents were made available to the public in the Administrative Record File in the noted information repositories: West Memphis Public Library, West Memphis, Arkansas; Arkansas Department of Pollution Control and Ecology, Little Rock, Arkansas; and the U.S. Environmental Protection Agency Region 6 Library, Dallas, Texas. A summary of the Proposed Plan and the notice of availability of these documents and Administrative Record File was published in the *West Memphis Evening Times*. In addition, the Proposed Plan of Action for the site was mailed to all parties on the mailing list and other identified parties on July 26, 1993.

The EPA held a public comment period regarding the RI/FS, Proposed Plan and Administrative Record from July 27, 1993, through August 26, 1993. During this initial public comment period, a formal public meeting was held at 7:00 pm, on August 17, 1993, at the West Memphis Neighborhood Center located at the intersection of 13th Street and Polk Street. Representatives of EPA presented the conclusions of the RI and risk assessment, the remedial alternatives evaluated for the oily sludge pit and landfill areas

of the site, and EPA's preferred alternatives to address the risk at the site. The public comment period was extended through September 25, 1993, in response to a request by the City of West Memphis. The extension was announced through a newspaper advertisement in the *West Memphis Evening Times*.

EPA's response to all the comments received during this 60-day public comment period, either written or verbally expressed at the public meeting, is included in the Responsiveness Summary. The Responsiveness Summary is included as part of the ROD.

This decision document presents the selected remedial action for the South 8th Street Superfund site, in West Memphis, Arkansas, chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act and, to the extent practicable, the National Contingency Plan ("NCP"). The decision for the site is based on the Administrative Record. An index for the Administrative Record is included as Appendix #1 to the ROD.

IV. SCOPE AND ROLE OF RESPONSE ACTION

The Proposed Plan addressed the site as one operable unit and presented EPA's preferred final remedy for the entire site. This ROD does not address the entire site as one operable unit. Specifically, EPA has reevaluated the site data and has determined that the data is insufficient to determine whether or not the contaminated groundwater at the site presents a threat to human health and the environment. In addition, EPA currently has insufficient information to conduct a proper evaluation of potential remedial alternatives for the groundwater if it was determined to present a risk to the public health and the environment. Therefore, EPA has deferred its remedial decision with respect to the groundwater until more information is gathered concerning the nature and extent of groundwater contamination and the characteristics of the local aquifer.

The overall primary remedial objective that is addressed in this ROD is the reduction or elimination of the actual and/or potential risks associated with the oily sludge pit and the landfill areas. The studies undertaken at the South 8th Street Landfill site have identified both principal threats and low level risks that must be addressed.

In general, EPA associates principal threats with "hot spots" (e.g., liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials). The oily sludge pit and its ancillary contaminated soil and debris have been identified as principal threat wastes at the site because these wastes, if left unaddressed, would continue to present an acute threat to the public health and the environment. In addition, the sludges and contaminated soil and debris, if left unaddressed, also will

continue to present potential long-term threats to the environment (migration of contaminants during flood events and leaching to groundwater), and to human health through direct exposure (ingestion, dermal contact, and inhalation) and the ingestion of crops grown in contaminated soil.

EPA generally associates low level threats with sources of contamination that could be kept in place by engineering controls (such as capping) and that pose a low health risk. For example, the landfill contents are considered a low-level risk because of the lower potential for these areas to impact human health and environment through direct contact or long-term exposure in the environment.

The specific remedial objectives to address the principal and low-level threats at the South 8th Street Landfill have been defined by EPA for both the oily sludge pit area and the landfill areas.

The remedial action objectives for the oily sludge pit area are as follows:

Oily Sludge Pit Area

1. Prevent current and future direct contact with the highly corrosive wastes.

2. Prevent current and future direct contact, ingestion, and inhalation of contaminants in the waste and ancillary contaminated soil and debris.

3. Prevent the future migration of contaminants from the oily sludge pit area to other areas both on and off the site which may result from site flooding.

4. Prevent the potential for future migration of contaminants to the groundwater at concentrations above appropriate action levels.

The remedial action objectives for the landfill areas are as follows:

Landfill Areas

1. Prevent direct contact with and ingestion of the landfill contents.

2. Ensure that contaminants present in the landfill do not migrate into the groundwater at concentrations above appropriate action levels.

The subsequent sections of this document explain how EPA investigated the site and selected a remedy that will accomplish

the remedial action objectives.

V. SITE CHARACTERISTICS

- *Summary*

The primary objectives of the RI were to locate "hot spots" on the site and determine the extent of contamination in the surface soil, subsurface soil, surface water and groundwater with a reasonable level of certainty. With the exception of the groundwater, these objectives were met. The groundwater data collected during the RI was not sufficient to render any conclusions regarding whether or not contaminated groundwater at the site presents a threat to human health and the environment or what actions may be taken to address any such threats. Another investigation of the groundwater at the site will be conducted in the future to address this concern. Immediate actions to abate any potential risk associated with the groundwater (other than removal of the oily sludge pit, the primary source of site contamination) are not currently necessary because the groundwater at the site is not currently used by humans.

As previously discussed, the site consists of approximately 30 acres that is further subdivided into three separate areas that have been identified as Area 1, 2 and 3 (Figure 2). The northwestern portion of the site also contains a large pond. The total area studied during the RI was approximately 48 acres and included several areas located adjacent to the site that were specified as part of the site in the HRS, but were later found not to pose a risk to the public health and the environment. Hence, these additional areas are no longer included within the site boundaries.

In general, EPA believes that all site hot spots have been located with a reasonable level of certainty. The only hot spot identified at the site is the 3.5-acre oily sludge pit. The 16 acres of former landfill were found to be contaminated enough to present a low level threat, but were not so contaminated as to constitute a principal threat or "hot spot" when compared to the pit threat. Site surface soils and sediments were found to contain low levels of contaminants that do not present a threat to the public health and the environment. Likewise, no contaminants were found in the pond surface water at levels that present a threat to the public health and the environment.

- *Detailed Discussion of Characteristics*

Topography

The topography of the landfill has been altered by excavation and backfilling activities over a period of many years. However, the landfill is generally flat with numerous depressions that make up

the pits, ponds and other former areas of waste disposal. Elevations on the landfill range from approximately 206 to 220 feet above mean sea level (m.s.l.). The landfill is flanked on the south and east by the Mississippi River and on the north and west by the St. Francis Levee.

The oily sludge pit surface is at an elevation of approximately 212 m.s.l.. The land mass immediately surrounding the oily sludge pit within the perimeter containment berm (approximately 3.5 acres less the area of the oily sludge pit) ranges in elevation from 210 to 215 feet m.s.l. The perimeter containment berm was constructed in November 1992 to an elevation of approximately 217 feet m.s.l. to prevent stormwater runon and minimize flood water intrusion onto the oily sludge pit, and to contain stormwater runoff within the oily sludge pit.

Land Use

The site is in an industrial zoned area. There are currently no residential or industrial populations within the site boundaries. Land use immediately adjacent to the landfill consists of industrial/petroleum storage facilities. Residential areas are located within approximately one-half mile northwest of the landfill. Also, a Recreational Vehicle (RV) park is located immediately adjacent and to the north of the site. The RV park is generally occupied from late April or early May (depending upon the flood season) until mid-November. The RV park currently is separated from the site by a fence. Two barge terminals are located on the banks of the river at the midpoint and southeast portions of the landfill. Although security fences have been erected around most of the landfill, including the oily sludge pit, the public still is able to access the site via the banks of the Mississippi River. Based upon reports from the landowner, trespassing and private fishing were common prior to EPA's involvement at the landfill. EPA continued to observe public traffic in and around the landfill during field investigation activities in the fall of 1992.

Climate

The area in which the site is located has an average annual temperature of 62° F with an average temperature in January of 42° F and in July of 81° F. The average humidity at the site is 57%, with an average annual precipitation of 51 inches, including 5 inches of frozen precipitation. During the non-flood season (July through November), rainfall averages about 3.6 inches per month at an average temperature of 70° F within a range of 51° to 82° F.

According to data collected during various site studies, the predominant wind direction in February was southeast to southwest with an average wind speed of approximately 4 miles per hour. In

October, temperatures ranged from 47° F to 71° F, with wind directions varying from the west northwest to the east northeast at 1 to 3 miles per hour. Surface wind information was received for the area from the National Weather Service, and is shown on Figure 3. For the 25 years of record, wind direction is primarily from the south (49%), at an average speed of 8 miles per hour.

Surface Hydrology

In general, rainfall is retained within the site boundaries rather than being drained into adjacent water bodies. Collected rainfall runoff either infiltrates readily into the sandy clay type soils or evaporates. No surface water discharge has been observed from the site.

An abandoned storm sewer traverses the site, flowing from the levee toward the river. Though a sediment sample was collected at the outfall to the river, water was not observed to discharge from the line, even during extended periods of localized rain. During high river stages, this outfall is periodically underwater.

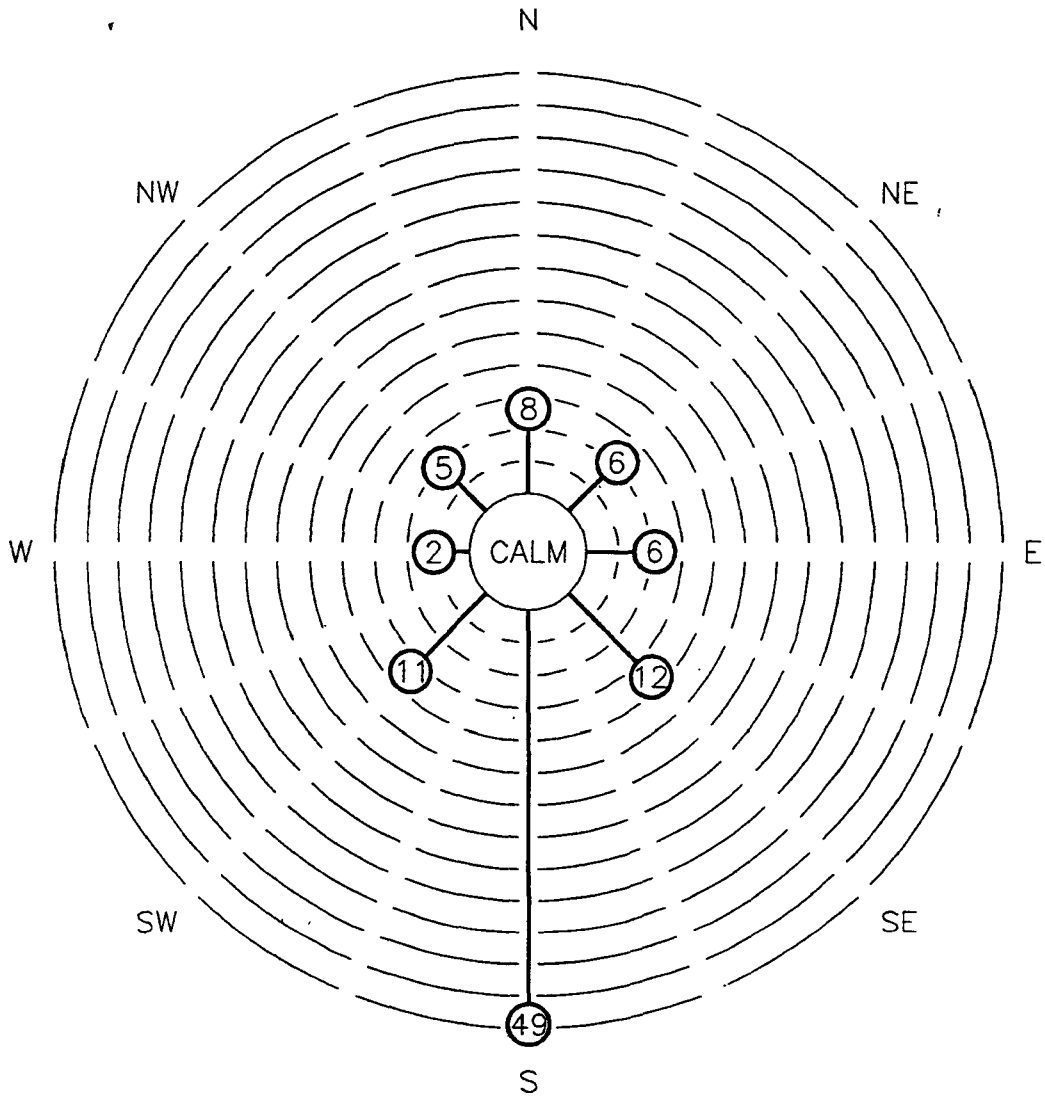
The site lies within the flood protection levees of the Mississippi River, and may be subject to inundation on an annual basis. For the 11 years of record, the site was inundated on 14 different occasions, the earliest time of inundation occurring on November 25, 1985, and the latest occurring on June 13, 1983 and June 13, 1990.

Figure 4 presents the compilation of the site flood occurrences for the years of record. The days of the year for this figure, 0-365 days, correspond to September 1 to August 31, and were adjusted to show the entire flood season on one graph. The mean flood day (if the site floods in any given flood season) would most probably occur on March 20. One standard deviation from the mean flood day (67% confidence level) indicates that if a flood occurs in any given flood season, there is a 67% confidence level that the flood would occur between January 24 and May 17, or 57 days either side of the mean flood day. Two standard deviations from the mean flood day (95% confidence level) indicates that if a flood occurs in any given flood season, there is a 95% confidence level that the flood would occur between November 27 and July 13, or 114 days either side of the mean flood day.

Hydrogeology

The geologic sequence encountered during the exploratory drilling conformed to the regional geology of the Mississippi embayment. The Quaternary sediments present at the site depict the classical coarsening downward geologic sequence, representing the lateral migration of point bars in a meandering and mature fluvial system.

SURFACE WIND ROSE (DIRECTION) %
1951 – 1977



PERIOD OF REPORT
YEAR(S) ANALYZED: 1951 – 1977
MONTHS: JAN. – DEC.
HOURS OF DAY: 0000 – 2300

FIGURE 3
RECORD OF DECISION
WINDROSE 1951 – 1971
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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Locally, there is a floodplain clay deposit at the surface. This unit is typical of an overbank mud deposit, formed by flooding. This clay unit was identified in the areas that had not been previously excavated for landfill disposal, and ranged in thickness from 5 to 15 feet. The clay is very dense, very low plasticity, with minor amounts of organics and gravels.

Below this clay unit, the sediments are predominantly clayey silts with minor amounts of sand and gravel down to approximately 20 to 30 feet, where the sediment grades into fine sand. These sediments are predominantly rounded quartz grains in a grayish clay matrix.

The alluvial sands continue coarsening downward, and gravel content increases with depth. There are abundant thin peat lens laminae present throughout the section, representing backswamp type flood events where the organic matter has been silted over and decayed. A basal graveliferous unit was identified in each of the deep borings, at depths ranging from approximately 100 to 130 feet.

The Jackson Clay (Tertiary-upper Eocene) is a local confining unit that underlies the Quaternary alluvium and the unconfined surface aquifer. The clay is very dense, greenish-gray to brownish-gray, very low plasticity and well lithofied (e.g., almost shale). The depth of the Jackson Clay ranges from approximately 120 feet to 145 feet beneath the landfill.

Groundwater levels in the monitoring wells installed during the remedial investigation were measured on October 8, 1992 and again on December 3, 1992. The influence of the Mississippi River on the groundwater flow direction beneath the site is very apparent. During October 1992, at the end of the dry season, the elevation of the river was 186.21 feet (m.s.l.). The groundwater flow was directly toward the river to the southeast of the site, and with discharge into the river.

During December 1992, the water level of the Mississippi River had risen significantly to 206.71 feet (m.s.l.). At this time, the groundwater flow was in the opposite direction away from the river and directed inland. The river appeared to be recharging the alluvial aquifer.

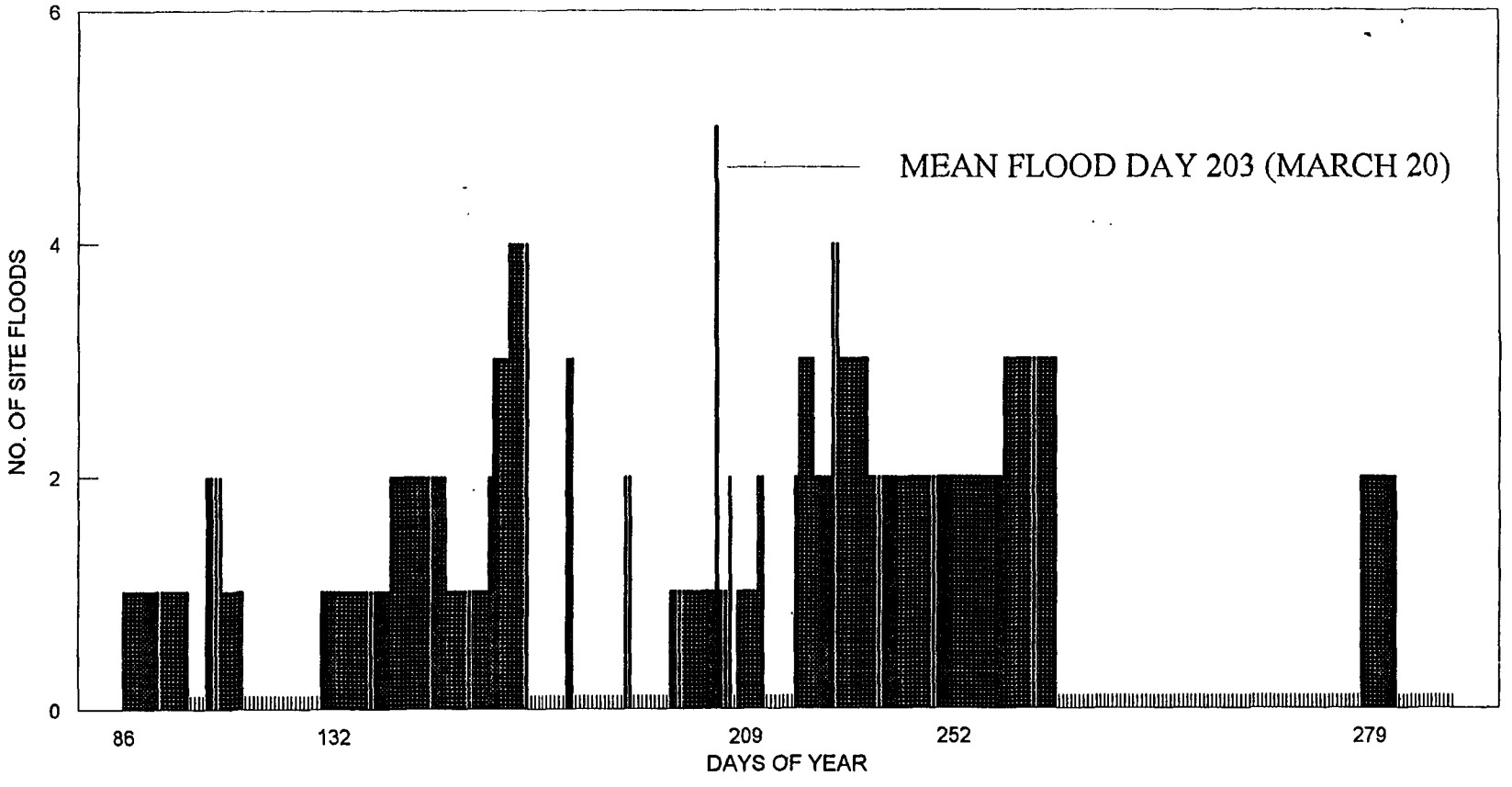
Oily Sludge Pit

Field investigation of the oily sludge pit was conducted by the EPA to determine the nature and extent of the pit wastes and the pit's ancillary contaminated soil and debris and to characterize the risk the pit area posed to human health and the environment. The investigation program was performed in three phases as described below:

1. Exploratory trenching to define the perimeter of the contaminated media;

FIGURE 4

1982 - 1992 SITE FLOOD OCCURANCES



MISSISSIPPI RIVER GAGE AT MEMPHIS, TENN.
DAYS 0-365 CORRESPOND TO SEPT.1 - AUG.31

2. Phase 1 sampling and analysis of the oily sludge pit; and

3. Phase 2 sampling and analysis of the oily sludge pit.

Each of the sampling episodes is described below.

Exploratory Trenching. Exploratory trenches were excavated around the oily sludge pit to locate the extent of subsurface contamination associated with the pit. The locations for the oily sludge pit area exploratory trenches are shown on Figure 5. The RI/FS contains an extensive discussion of the methodology utilized during the performance of the oily sludge pit area exploratory trenching activities.

Phase 1 & 2 Pit Sampling. Sampling of the oily sludge pit was conducted to determine the chemical/physical characteristics of the sludge, and the horizontal and vertical extent of sludge within the visible pit area. A total of 13 boring locations were established as shown on Figure 6. The RI/FS contains an extensive discussion of the methodology utilized during the performance of the Phase 1 and 2 Pit Sampling activities.

Results of Field Investigation. The following sections present the results of the laboratory analytical testing performed on samples extracted during the field investigation. The data gathered during the investigation were subjected to a validation process. The validation process is used to inform data users of data quality and limitations. The data met the quality objectives that were determined for the project in the RI/FS Work Plan.

Municipal and/or industrial type waste material was encountered in 12 of the 18 exploratory trenches. Oily waste was identified in 6 of the trenches (SP-1, SP-2, SP-5, SP-14, SP-15 and SP-16). In SP-10, a layer of black soil was encountered. In 2 of the trenches, SP-1 and SP-2, the oily waste was observed to be flowing or seeping into the excavated trench. In the remaining trenches, the soils and/or waste materials were observed to be stained. A hydrocarbon odor was detected in all of the contaminated trenches.

Samples from trenches SP-1, SP-3, SP-7, SP-10, SP-13 and TR6.1, SP-1 and SP-10 were all contaminated with Acetone, Toluene, Xylenes, Naphthalene, 2-Methylnaphthalene, Phenanthrene, and bis(2-Ethylhexl)phthalate in the part-per-million range. The primary inorganic contaminant detected was lead.

As discussed previously, sampling of the oily sludge pit occurred in two phases. Phase 1 sampling included a total of 13 samples obtained from five different boreholes (PB-1 through PB-5). At each borehole, the bottom of the pit appeared to be reached. This conclusion was based upon the color of material encountered (light to medium brown versus the black oily sludge) and the consistency

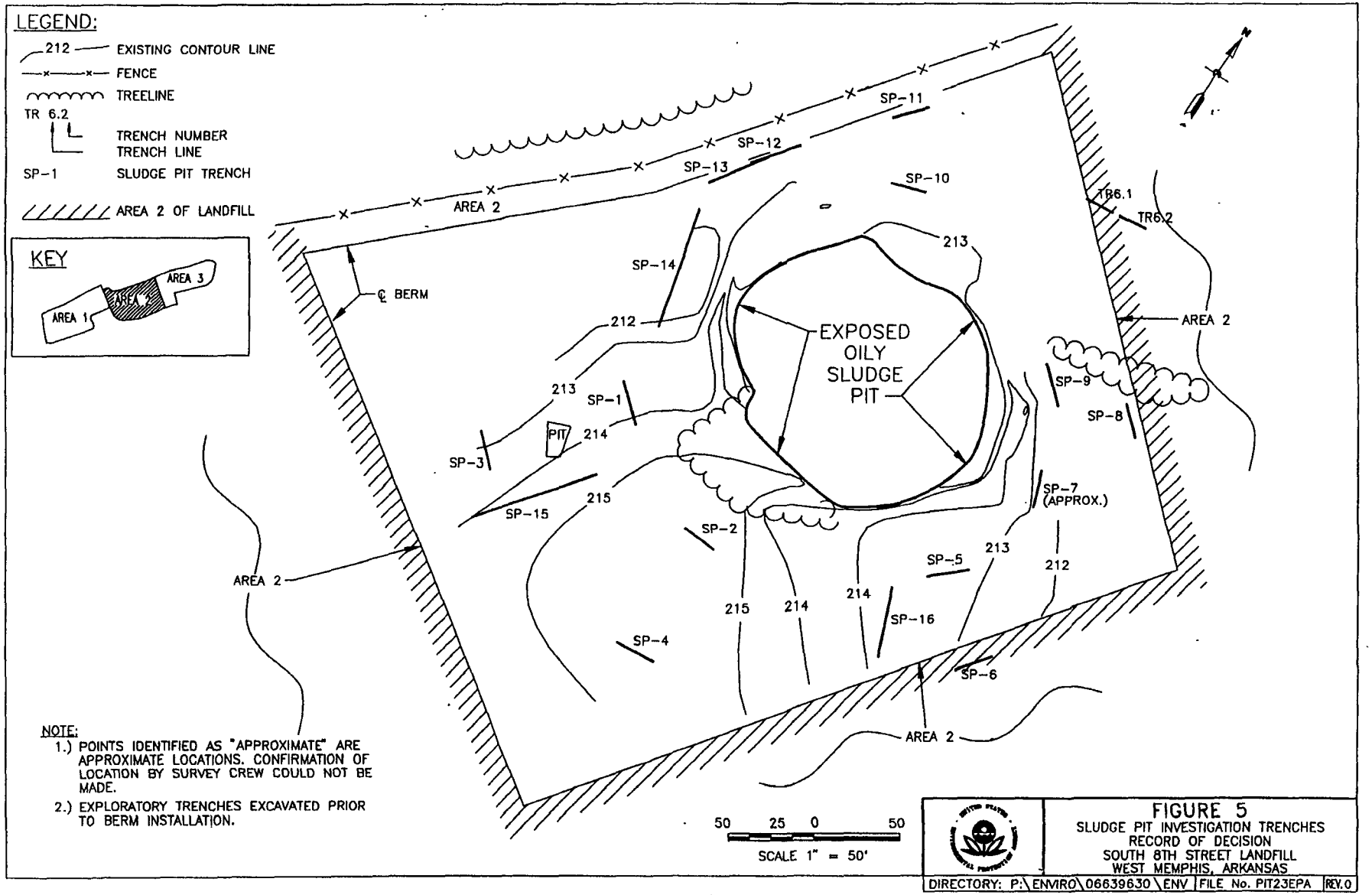


FIGURE 5

SLUDGE PIT INVESTIGATION TRENCHES
RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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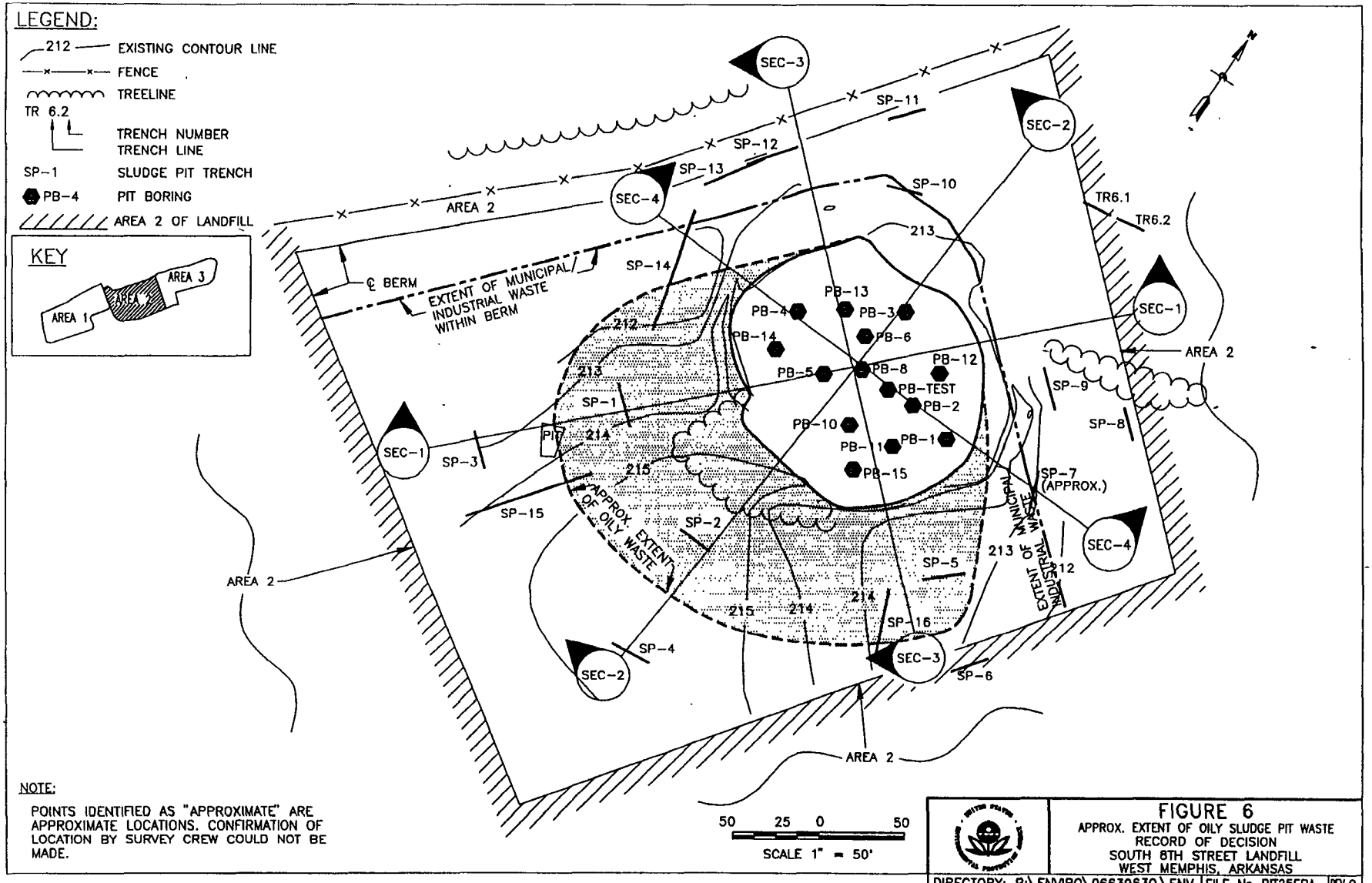

NOTE:

POINTS IDENTIFIED AS "APPROXIMATE" ARE APPROXIMATE LOCATIONS. CONFIRMATION OF LOCATION BY SURVEY CREW COULD NOT BE MADE.

FIGURE 6

APPROX. EXTENT OF OILY SLUDGE PIT WASTE
RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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(stiff silty clay versus moist very plastic sludge) of the material. Identification of "layers" within each borehole was primarily based on moisture content and consistency of the waste materials. Two (2) layers were identified in borings PB-1 and PB-5. Three (3) layers were identified in borings PB-2 through PB-4. Each of the observed layers was analyzed separately according to the grouping of the appropriate type of contaminant. Results of analysis of the various "layers" within each boring indicate a relatively consistent waste material within the oily sludge pit.

Due to the consistency of the Phase 1 analytical results, Phase 2 sampling and analysis was streamlined to analyze borehole composite waste samples for treatability parameters only and to further define the vertical limits of the oily sludge pit. Eight (8) borings (PB-6, PB-8, PB-10, PB-11, PB-12, PB-13, PB-14 and PB-15) were performed during Phase 2 sampling. PB-14 and PB-15 were selectively placed within the pit for further definition of the oily sludge pit boundaries. Analytical results obtained from composite samples from each of the boreholes were found to be consistent with the Phase 1 results. The pit waste analytical results are summarized in the charts located at the end of this section.

The oily sludge pit also was tested for dioxin in the event an off-site disposal facility would need to know whether or not the waste contained dioxin. The test results confirmed the presence of octa dioxin isomers in the waste. Since the octa isomer is less toxic than the tetra isomer, the results were adjusted to account for this difference and reported as 2,3,7,8 - TCDD (i.e., tetra dioxin isomer) equivalents.

For the Organic and Inorganic TCLP Parameters, several volatiles, semi-volatiles, herbicides, dioxin/furan, and metals were detected; however, only lead exceeded the TCLP limit (5 mg/kg) in 7 of the 13 samples analyzed at concentrations ranging from 5.4 to 16 mg/kg.

In addition to the oily sludge samples, two "clay" samples were extracted from PB-12 and PB-14 from below the oily sludge. PB-12 and PB-14 were relatively shallow boreholes (approximately 6-10 feet deep), and the sampling team was able to drive the outer steel casing into the "clay" so that the pit base material could be sampled. A summary of the clay sample results is also provided in the tables located at the end of this section.

The bottoms of boreholes (naturally appearing materials) for PB-10 and PB-15 were not reached. In PB-10, at a depth of approximately 17 feet below the surface of the pit, a physical obstruction was encountered consisting of brick or rock-like material; therefore, the hole was abandoned. In PB-15, the material consisted of a stiff material (consistency of a clay but still black in color). At the 18-foot depth mark, manual hand augering techniques could not advance the sampling further. Naturally appearing soils were

reached in the remaining boreholes.

The approximate horizontal extent of the oily sludge pit and its ancillary contaminated soil and debris is shown on Figure 6. The cross sections identified in Figure 6 are displayed in Figures 7 through 10, and a cross section key is included as Appendix C. The sections show the oily sludge pit to be greater than 18 feet deep with an average depth of 12 feet. Therefore, the estimated volume of the oily sludge pit and the contaminated soil and debris is approximately 10,000 and 12,000 cubic yards, respectively.

TABLE 1
OILY SLUDGE PIT AREA
VOLATILE ORGANIC COMPOUNDS

TABLE 1	
COMPOUND	RANGE OF CONCENTRATIONS (ug/kg)
Acetone	2,300 - 7,200
Benzene	130 - 1,000
Bromomethane	180 - 750
2 - Butanone	2,300 - 7,600
Chlorobenzene	190
Chloroethane	330 - 12,000
Chloromethane	830 - 1,100
1,2 - Dichloroethane	130 - 540
1,2 - Dichloropropane	130
Ethylbenzene	620 - 7,600
2 - Hexanone	1,100
Methylene Chloride	740
Tetrachloroethane	110 - 3,300
Trichloroethane	85 - 700
Xylene	3,800 - 33,000

TABLE 2
OILY SLUDGE PIT AREA
SEMIVOLATILE ORGANIC COMPOUNDS

TABLE 2	
COMPOUND	RANGE OF CONCENTRATIONS (ug/kg)
Anthracene	15,000 - 65,000
Bis(2-Ethylhexyl)phthalate	4,300 - 58,000

TABLE 2	
COMPOUND	RANGE OF CONCENTRATIONS (ug/kg)
Diethylphthalate	610 - 4,100
Methylnapthalene	46,000 - 100,000
Naphthalene	33,000 - 94,000
Phenanthrene	15,000 - 66,000
Pentachlorophenol	13,000 - 45,000
Phenol	18,000 - 100,000

TABLE 3
OILY SLUDGE PIT AREA
PESTICIDES/PCBs

TABLE 3	
COMPOUND	RANGE OF CONCENTRATIONS (ug/kg)
Arochlor-1254	14,000
2,4-D	6,100
2,4,5-T	2,900
Guthion	1,000 - 9,900
Coumaphos	1,000 - 9,900
Fensulfothion	700 - 1,000

TABLE 4
OILY SLUDGE PIT AREA
INORGANIC COMPOUNDS

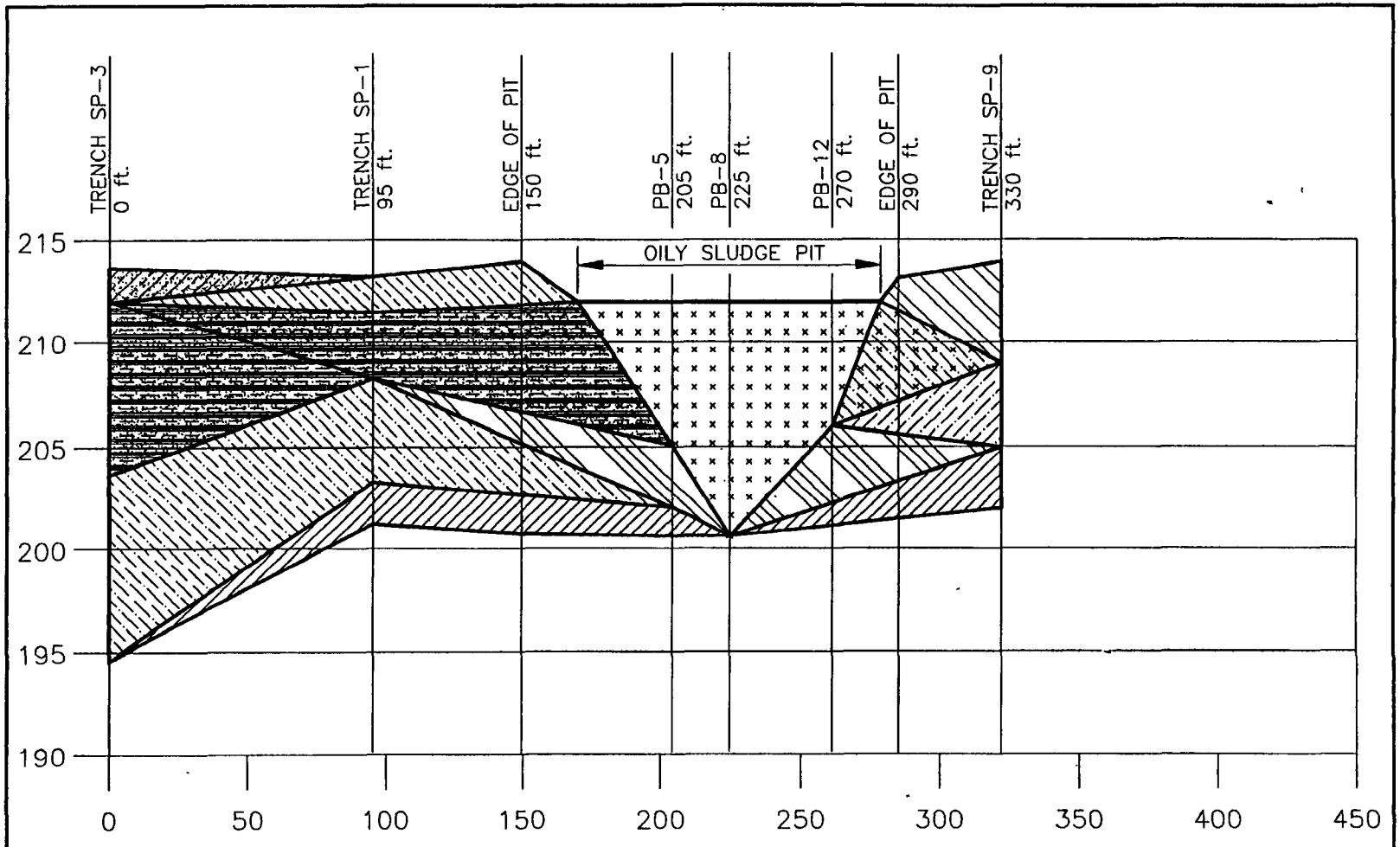
TABLE 4	
COMPOUND	RANGE OF CONCENTRATIONS (mg/kg)
Barium	1,010 - 2,760
Cadmium	11.2 - 12.4
Copper	39 - 210
Lead	6,460 - 33,600
Zinc	533 - 4970

TABLE 5
OILY SLUDGE PIT AREA
DIOXIN

TABLE 5					
Boring Location	Sample Depth (ft)	Compound	Measured Conc. (ug/kg)	TEF	Total TCDD Equiv. (ug/kg)
PB2	0 - 2	OCDD	31.8	0.001	0.032
PB2	2 - 8	OCDD	22.5	0.001	0.023
PB2	8 - 13.5	OCDD OCDF	570 80.7	0.001 0.001	0.651
PB5	0 - 5	OCDD	11.1	0.001	0.011

TABLE 6
OILY SLUDGE PIT AREA
TREATMENT CHARAC.

TABLE 6	
PARAMETER	RESULT
Higher Heating Value	3,502 - 11,160 BTU/LB Gross
Oil & Grease	6.6 - 50 %
Ash Content	13 - 56 %
Total Volatile Solids	26 - 42 %
pH	1 - 4



NOTE:

1.) ALL ELEVATIONS ARE M.S.L.

2.) REFER TO LEGEND IN APPENDIX FOR INTERPRETATION OF MATERIAL TYPE.

SCALE

VERTICAL 5 4 3 2 1 0 5

HORIZONTAL 50 40 30 20 10 0 50

FIGURE 7 SECTION 1 OF PIT AREA

RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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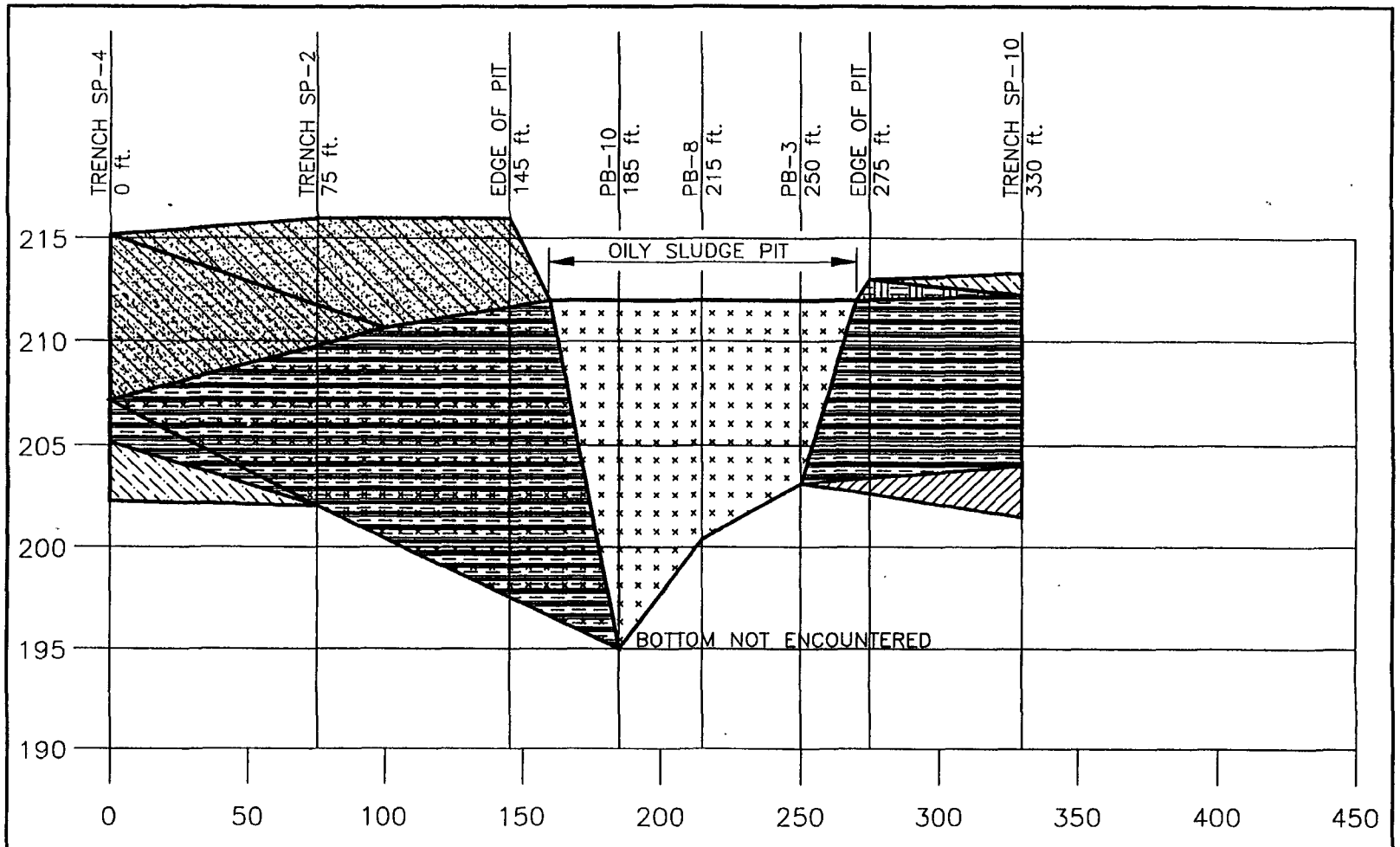

NOTE:

1.) ALL ELEVATIONS ARE M.S.L.

2.) REFER TO LEGEND IN APPENDIX FOR INTERPRETATION OF MATERIAL TYPE.

SCALE

VERTICAL 5 4 3 2 1 0 5

HORIZONTAL 50 40 30 20 10 0 50

FIGURE 8 SECTION 2 OF PIT AREA

RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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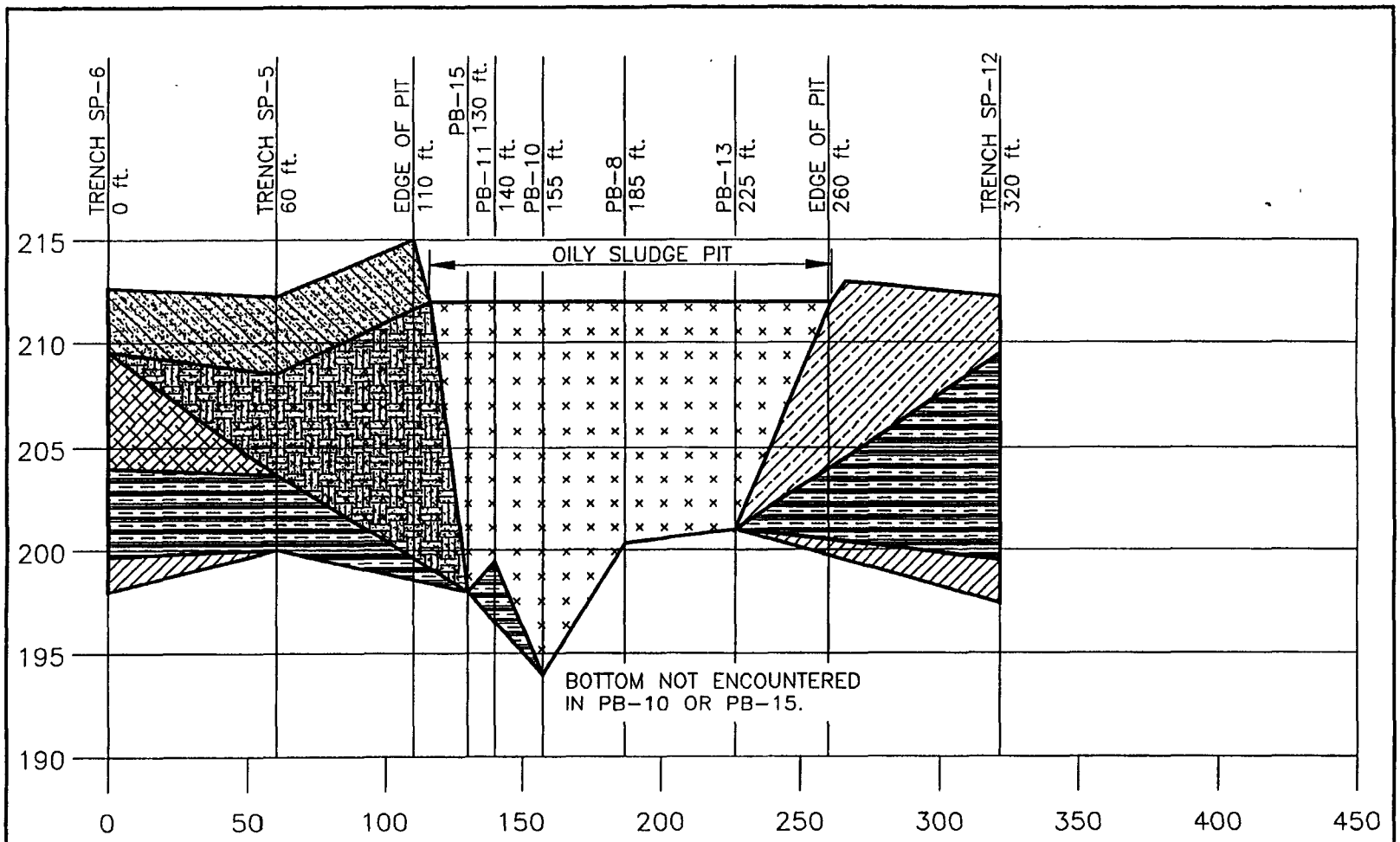

NOTE:

1.) ALL ELEVATIONS ARE M.S.L.

2.) REFER TO LEGEND IN APPENDIX FOR INTERPRETATION OF MATERIAL TYPE.

SCALE

VERTICAL 5 4 3 2 1 0 5

HORIZONTAL 50 40 30 20 10 0 50

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

FIGURE 9 SECTION 3 OF PIT AREA

RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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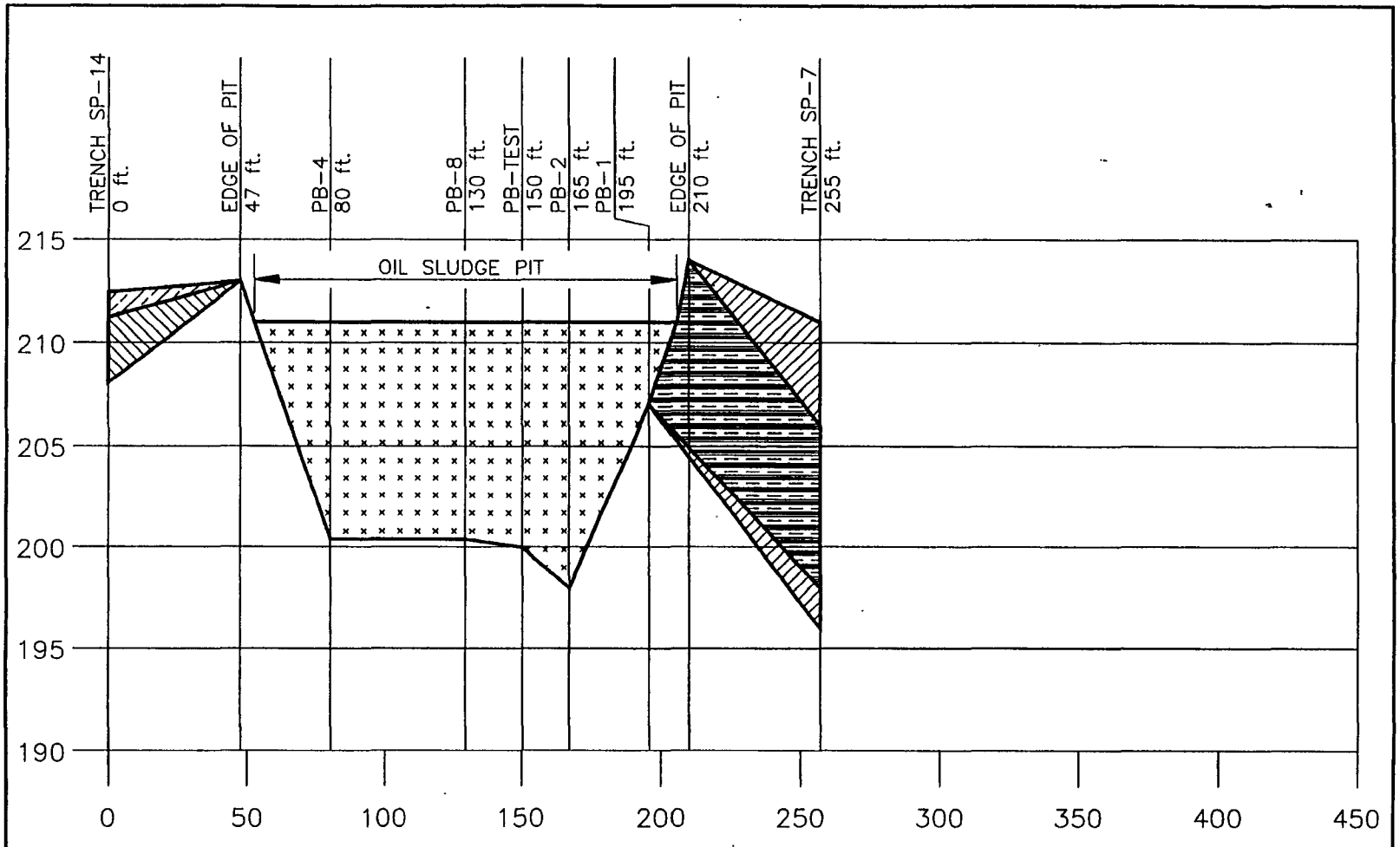

NOTE:

1.) ALL ELEVATIONS ARE M.S.L.

2.) REFER TO LEGEND IN APPENDIX FOR INTERPRETATION OF MATERIAL TYPE.

SCALE

VERTICAL 5 4 3 2 1 0 5

HORIZONTAL 50 40 30 20 10 0 50

FIGURE 10 SECTION 4 OF PIT AREA

RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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TABLE 7
OILY SLUDGE PIT AREA
CLAY CHARAC.

TABLE 7	
COMPOUND	**RANGE OF CONCENTRATIONS (ug/kg)**
VOLATILES	
1,2 - Dichloroethane	5
Ethylbenzene	2
Tetrachloroethylene	6.5
Xylene	0.9 - 13
PCBs & PESTICIDES	
Arochlor - 1016	550
Arochlor - 1242	58 - 110
Arochlor - 1254	580
Arochlor - 1260	430
4,4 - DDE	13 - 22
4,4 - DDT	14 - 29
Endrin Aldehyde	4.3 - 4.7
alpha - Chlordane	2.7
SEMIVOLATILES	
Anthracene	50
2- Methylnaphthalene	90 - 91
Naphthalene	46
Phenanthrene	52
METALS	(mg/kg)
Lead	21 - 336
Zinc	130 - 389

Landfill Areas

Field investigation of the landfill areas was conducted by the EPA to locate "hot spots" within the landfill, determine the nature and extent of the landfill wastes, and to characterize the risk the landfill areas pose to human health and the environment. Hot spots are defined as areas of high contaminant concentrations typical of drum or sludge disposal areas within the landfill which usually correspond to the greatest threat to human health and the environment. The primary objective of the investigation was to locate and characterize these hot spots. The investigation program consisted of the following elements:

- multimedia sampling of surface and subsurface soils, sediments, surface waters, air (including volatile organic compound (VOC) emission rates), and fish, mammal and plant tissue;
- real-time air monitoring during intrusive work;
- exploratory trenching;
- geophysical survey of the site with magnetics;
- soil gas survey;
- toxicity testing of pond water and sediment; and
- ecological characterization for wetland determination and habitat suitability.

Only the trenching program and the sampling of the surface soils, surface water, sediment and air will be discussed in detail in the ROD. The results and the methodologies employed to conduct all other parts of the investigation are described in detail in the RI/FS report.

Trenching. Prior to initiating trenching activities, a detailed review of historical aerial photographs was conducted to determine where past disposal activities at the site may have occurred. In addition, a magnetometer and soil gas survey was conducted in an attempt to identify hot spots within the areas of suspected disposal.

Upon completion of the magnetometer and soil gas survey, individual trench locations were established along surveyed lines based upon the results of the surveys and/or physical site features such as obvious depression areas potentially created by landfill settling. The resulting trench spacing ranged from 50 to 100 feet, center to center, along the base lines. The locations of all trenches are shown in Figure 11. A total of 44 trenches was excavated throughout the landfill. The breakdown of the number of trenches per area is as follows: 14 in Area 1; 10 in Area 2; and 20 in Area 3. The methodologies employed to conduct the landfill trenching activities are described in detail in the RI/FS report.

Results of Trenching. No hot spots (i.e., numerous drums or sludges) were observed during trenching operations. However, one drum was discovered, the contents of which were sampled and analyzed. EPA does not characterize one drum as a hot spot. Chemical testing of samples collected during the trenching operations confirmed the presence of several volatile organic compounds, semi-volatile organic compounds, and several pesticides and inorganic contaminants.

A summary of the contaminants detected is provided in Tables 8-10. Values that are enclosed by parenthesis followed by the letter "U" denote contaminant concentrations that are less than the detection

limit. The analytical detection limit is the number enclosed by the parentheses.

TABLE 8
LANDFILL AREA SUBSURFACE
VOLATILE ORGANIC COMPOUNDS

TABLE 8			
COMPOUND	RANGE OF CONCENTRATIONS (ug/kg)	BACKGROUND RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Methylene chloride	1 - 120	0.9 - 3	A3-TR9.7
Acetone	2 - 66	4 - 13	A3-TR9.7
Carbon Disulfide	0.9 - 1	NA	A3-TR2.2
2-Butanone	2 - 39	1 - 3	A3-TR3.5
1,1,1-Trichloroethane	(10) U - 0.4	3 - 4	A3-TR1.6
Benzene	(10) U - 300	Not Available (NA	A3-TR9.7
Toluene	(10) U - 3800	NA	A3-TR9.7
Ethylbenzene	(10) U - 5600	NA	A3-TR9.7
Xylenes, total	0.8 - 2	NA	A2-TR4.1a

TABLE 9
LANDFILL AREA SUBSURFACE
SEMIVOLATILE ORGANIC COMPOUNDS

TABLE 9			
COMPOUNDS	RANGE OF CONCENTRATIONS (ug/kg)	BACKGROUND[1] RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Naphthalene	69 J - 33000	(350) U - (430) U	A2-TR4.1b
2-Methylnaphthalene	70 - 190	(350) U - (430) U	A3-TR2.2
Acenaphthene	92	(350) U - (430) U	A3-TR2.4
Dibenzofuran	77	(350) U - (430) U	A2-TR4.1a
Fluorene	87	(350) U - (430) U	A3-TR2.4
Phenanthrene	42 - 980	(350) U - (430) U	A2-TR4.1a
Anthracene	62 - 260	(350) U - (430) U	A2-TR4.1a
Carbazole	160	(350) U - (430) U	A2-TR4.1a
Di-n-butylphthalate	44 - 80	25 - (430) U	A2-TR4.4
Fluoranthene	80 - 1100	26 - (430) U	A1-TR5.12
Pyrene	180 - 260	25 - (430) U	A2-TR4.1a

TABLE 9

COMPOUNDS	RANGE OF CONCENTRATIONS (ug/kg)	BACKGROUND* RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Butylbenzylphthalate	47 - 210	(350) U - (430) U	A3-TR3.5
Benzo(a)anthracene	110 - 170	(350) U - (430) U	A3-TR2.2
Chrysene	62 - 730	(350) U - (430) U	A3-TR3.5
bis(2-Ethylhexyl)phthalate	44 - 4100	120 - 1200	A2-TR4.1a
Di-n-octylphthalate	83 - 5400	31 - 260	A3-TR3.4
Benzo(b)fluoranthene	120 - 570	(350) U - (430) U	A2-TR4.1a
Benzo(k)fluoranthene	230 - 240	(350) U - (430) U	A3-TR3.5
Benzo(a)pyrene	43 - 250	(350) U - (430) U	A3-TR3.5
Indeno(1,2,3,cd)pyrene	70 - 330	(350) U - (430) U	A2-TR4.1a
Benzo(g,h,i)perylene	18 - 270	(350) U - (430) U	A2-TR4.1a

TABLE 10
LANDFILL AREA TRENCHING
INORGANIC COMPOUNDS

TABLE 10

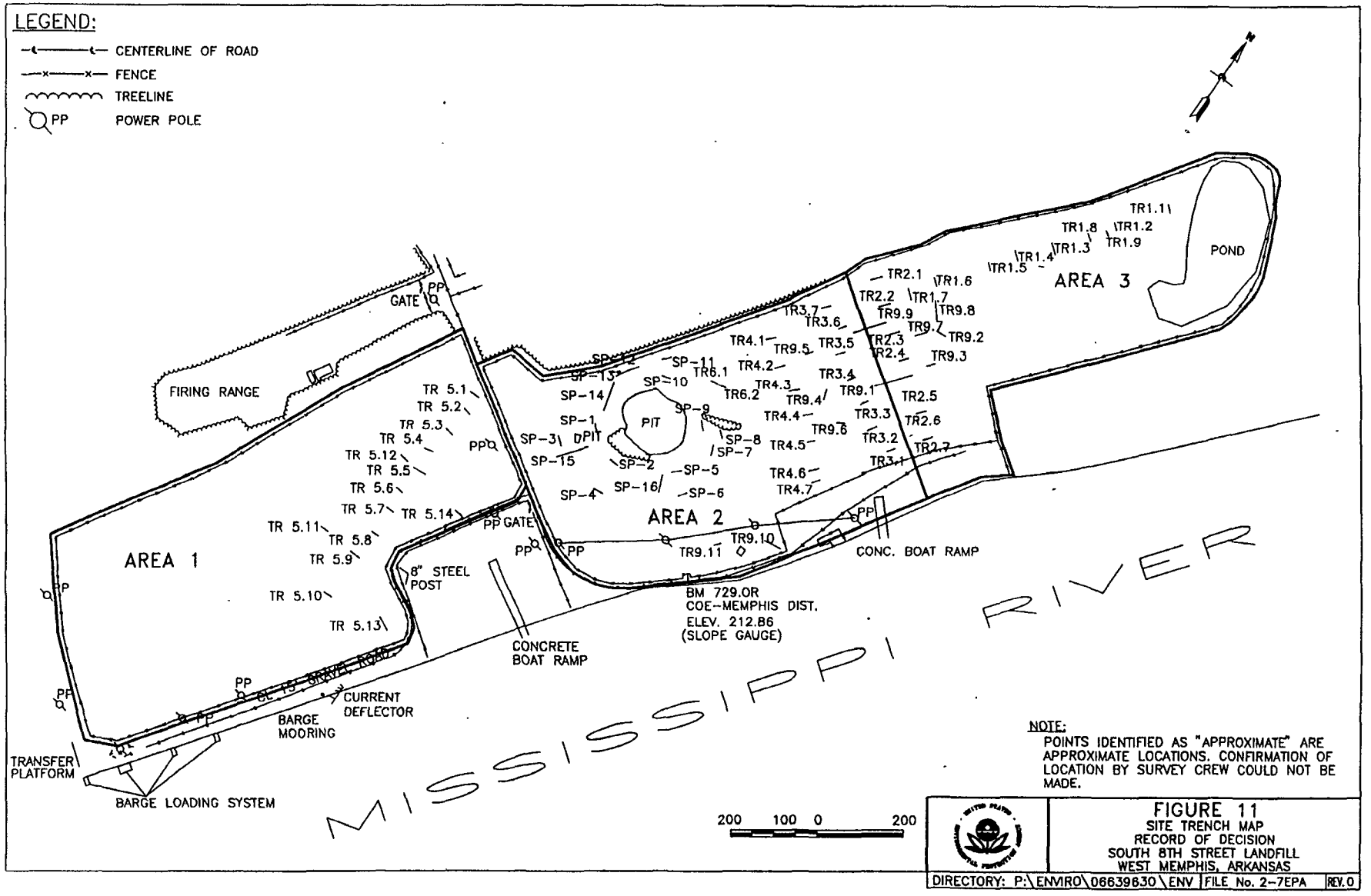
COMPOUND	RANGE OF CONCENTRATIONS DETECTED (mg/kg)	BACKGROUND RANGE (mg/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Aluminum	517 - 26800	5170 - 14300	A3-TR1.4-02
Antimony	(3.8) U - (5.2) U	(4.0) U - (4.7) U	A2-TR4.1b
Arsenic	1.4 - 16.2	3.2 - 8	A3-TR3.4
Barium	19.2 - 337	104 - 212	A3-TR2.4
Beryllium	0.2 - 2.3	0.19 - 1.2	A2-TR9.5
Cadmium	1.1 - 7.2	0.59 - 2.1	A3-TR2.4
Calcium	564 - 28600	4750 - 7060	A3-TR3.4
Chromium	3.6 - 43.5	9.1 - 19.9	A3-TR2.4
Cobalt	2.6 - 15.8	5.1 - 11	A3-TR3.4
Copper	1.8 - 293	13.9 - 18.8	A3-TR3.4
Cyanide	0.06 - 1.2	0.09 B - 0.41 B	A2-TR4.1b
Iron	3420 - 139000	11000 - 23200	A3-TR3.4
Lead	1.7 - 358	26.4 - 68.8	A3-TR3.4
Magnesium	155 - 6410	2830 - 4050	A3-TR1.4
Manganese	61.4 - 1320	210 J - 984	A3-TR3.4

TABLE 10			
COMPOUND	RANGE OF CONCENTRATIONS DETECTED (mg/kg)	BACKGROUND RANGE (mg/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Mercury	0.07 - 0.2	(0.08) U - (0.09) U	A1-TR5.5
Nickel	5.8 - 262	11.7 - 27	A3-TR3.4
Potassium	154 - 3600	958 - 1950	A3-TR1.4
Selenium	0.18 - 0.65	0.3 - 0.78	A3-TR1.1
Silver	(0.53) U - 1.2	0.62 - 0.86	A3-TR3.4
Sodium	61 - 689	43.5 - 104	A3-TR2.4
Thallium	0.23 - 0.47	(0.18) U - (0.21) U	A3-TR1.6
Vanadium	1 - 59.3	14.4 - 32.8	A3-TR1.4
Zinc	33.7 - 1510	73.9 - 86.5	A3-TR3.4

TABLE 11
LANDFILL AREA TRENCHING
PESTICIDES/PCBs

TABLE 11			
COMPOUNDS	RANGE OF CONCENTRATIONS DETECTED (ug/kg)	BACKGROUND RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
4,4'-DDE	(3.7) U - 48	(3.6) U - 3.8	A2-TR4.4
4,4'-DDD	(3.7) U - 42	(3.6) U - (4.4) U	A3-TR1.4-03

Based upon the initial information in the HRS package, EPA had estimated the size of the site at 48 acres. The size of area at the site with evidence of historical disturbance is estimated at 30 acres. The trenching data indicates that the area in which landfilling of municipal and industrial waste occurred is approximately sixteen acres in size. The estimated size of each landfill and waste area is presented in Table 12.



NOTE:
POINTS IDENTIFIED AS "APPROXIMATE" ARE APPROXIMATE LOCATIONS. CONFIRMATION OF LOCATION BY SURVEY CREW COULD NOT BE MADE.

FIGURE 11
SITE TRENCH MAP
RECORD OF DECISION
SOUTH 8TH STREET LANDFILL
WEST MEMPHIS, ARKANSAS

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TABLE 12
AREA/VOLUME OF
LANDFILL

AREA NO.	WASTE TYPE	AREA (ACRES) (SQ FT)	MAX. DEPTH (FT)
1	Municipal/Industrial	4.3 187,300	20
2	Municipal/Industrial	8.1 352,800	7 - 16
3	Municipal/Industrial	3.9 169,900	15 - 17
All	All Landfill Areas	16.3 710,000	10 (Avg)

Results of Surface Soil Investigation. A total of 44 surface soil samples was collected during the investigation, excluding the QA/QC samples; eight in Area 1, four in Area 2, five in Area 3, four background, and 23 on study area properties adjacent to the site which are owned by individual PRPs. Each sample was analyzed for volatiles, semi-volatiles, metals, cyanide and pesticide/PCBs.

Four volatile organic compounds were detected above the detection limits in the 44 surface soil samples which were analyzed. The concentrations were only slightly elevated above background, and there may be laboratory blank contamination associated with some of these samples. In addition, the reported concentrations of volatile compounds are all estimated values and are generally below the detection limit.

Twenty-three semivolatile organic compounds were detected at low concentrations in the surface soils. The majority of these concentrations are below the detection limit and are estimated values. Seven pesticides and one PCB (Aroclor) were detected in the surface soil samples analyzed. These detections are summarized in the chart below.

Finally, several of the inorganic contaminants were elevated with respect to background, including arsenic, chromium, lead and zinc. All of the surface soil sample analytical results are summarized in the tables below. Values that are enclosed by parenthesis followed by the letter "U" denote contaminant concentrations that are less than the detection limit, with the detection limit being the value reported within the parentheses.

TABLE 13
LANDFILL AREA SURFACE SOILS
VOLATILE ORGANIC COMPOUNDS

TABLE 13			
COMPOUND	RANGE OF CONCENTRATIONS (ug/kg)	BACKGROUND RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Methylene chloride	1 - 8	0.9 - 3	A1-SS-3-G
Acetone	2 - 66	4 - 13	A3-SS-40-G
2-Butanone	2 - 7	1 -7	A4-SS-23-G
1,1,1-Trichloroethane	0.3 - 4	3 - 4	A1-SS-34-G

TABLE 14
LANDFILL AREA SURFACE SOILS
SEMIVOLATILE ORGANIC COMPOUNDS

TABLE 14			
Compound	RANGE OF CONCENTRATIONS (ug/kg)	BACKGROUND RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Naphthalene	20 - 58	(350) U - (430) U	A4-SS-9
2-Methylnaphthalene	28 - 74	(350) U - (430) U	A4-SS-9
Acenaphthene	64 - 130	(350) U - (430) U	A1-SS-35
Dibenzofuran	42 - 67	(350) U - (430) U	A1-SS-35
Diethylphthalate	14 - 41	(350) U - (430) U	A1-SS-34
Fluorene	87 - 140	(350) U - (430) U	A1-SS-35
Phenanthrene	16 - 1100	(350) U - (430) U	A1-SS-35
Anthracene	11 - 290	(350) U - (430) U	A1-SS-35
Carbazole	120 - 210	(350) U - (430) U	A1-SS-35
Di-n-butylphthalate	13 - 1700	25 - (430) U	A2-SS-38
Fluoranthene	23 - 1300	26 - (430) U	A1-SS-35
Pyrene	23 - 1500	25 - (430) U	A1-SS-35
Butylbenzylphthalate	12 - 78	(350) U - (430) U	A1-SS-36
Benzo(a)anthracene	15 - 58	(350) U - (430) U	A4-SS-2
Chrysene	18 - 790	(350) U - (430) U	A1-SS-35
bis(2-Ethylhexyl)phthalate	42 - 8000	120 - 1200	A1-SS-34
Di-n-octylphthalate	21 - 650	31 - 260	A3-SS-6
Benzo(b)fluoranthene	45 - 1500	(350) U - (430) U	A1-SS-35
Benzo(k)fluoranthene	57 - 1700	(350) U - (430) U	A1-SS-35

TABLE 14			
Compound	RANGE OF CONCENTRATIONS (ug/kg)	BACKGROUND RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Benzo(a)pyrene	21 - 670	(350) U - (430) U	A1-SS-35
Indeno(1,2,3,cd)pyrene	92 - 220	(350) U - (430) U	A1-SS-35
Dibenzo(a,h)anthracene	64	(350) U - (430) U	A1-SS-35
Benzo(g,h,i)perylene	96 - 190	(350) U - (430) U	A1-SS-35

TABLE 15
LANDFILL AREA SURFACE SOILS
PESTICIDES & PCBs

TABLE 15			
COMPOUNDS	RANGE OF CONCENTRATIONS DETECTED (ug/kg)	BACKGROUND RANGE (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Dieldrin	(2.0) U - 11	(3.6) U - (4.4) U	A1-SS-35
4,4'-DDE	(2.0) U - 9500	(3.6) U - 3.8	A1-SS-36
4,4'-DDD	(2.0) U - 20000	(3.6) U - (4.4) U	A1-SS-36
4,4'-DDT	(2.0) U - 61000	(4.4) U - 5.4	A1-SS-36
alpha-Chlordane	(1.8) U - 22	(1.8) U - (2.2) U	A1-SS-35
gamma-Chlordane	(1.8) U - 18	(1.8) U - (2.2) U	A1-SS-35
Toxaphene	(2.0) U - 460000	(180) U - (220) U	A1-SS-36
Aroclor-1248	(35) U - 690	(36) U - (44) U	A2-SS-38

TABLE 16
LANDFILL AREA SURFACE SOILS
INORGANIC COMPOUNDS

COMPOUND	RANGE OF CONCENTRATIONS DETECTED (mg/kg)	BACKGROUND RANGE (mg/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Aluminum	2060 - 18700	5170 - 14300	A4-SS-20
Antimony	3.9 - 5.6	(4.0) U - (4.7) U	A1-SS-34
Arsenic	1.6 - 100	3.2 - 8	A1-SS-36
Barium	81.5 - 275	104 - 212	A1-SS-35
Beryllium	(0.08) U - 1.7	0.19 - 1.2	A1-SS-34
Cadmium	(0.24) U - 2.3	0.59 - 2.1	A1-SS-36
Calcium	1520 - 20100	4750 - 7060	A4-SS-9
Chromium	4.8 - 55.1	9.1 - 19.9	A1-SS-35

COMPOUND	RANGE OF CONCENTRATIONS DETECTED (mg/kg)	BACKGROUND RANGE (mg/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Cobalt	1.8 - 14.1	5.1 - 11	A4-SS-14
Copper	2.3 - 130	13.9 - 18.8	A1-SS-35
Cyanide	0.04 - 1.3	0.09 B - 0.41	A4-SS-4
Iron	5170 - 25600	11000 - 23200	A4-SS-18
Lead	12.2 - 5810	26.4 - 68.8	A2-SS-38
Magnesium	1030 - 6460	2830 - 4050	A4-SS-22
Manganese	78.1 - 2530	210 - 984	A4-SS-9
Mercury	(0.08) U - 0.49	(0.08) U - (0.09) U	A1-SS-35
Nickel	8.3 - 62.9	11.7 - 27	A1-SS-35
Potassium	376 - 2470	958 - 1950	A3-SS-41
Selenium	(0.13) U - 1.2	0.3 - 0.78	A1-SS-3
Silver	(0.40) U - 5.8	0.62 - 0.86	A1-SS-35
Sodium	15.6 - 726	43.5 - 104	A4-SS-9
Thallium	(0.19) U - 0.45	(0.18) U - (0.21) U	A4-SS-26
Vanadium	8.1 - 42.3	14.4 - 32.8	A4-SS-18
Zinc	29.8 - 579	73.9 - 86.5	A1-SS-36

Results of Sediment Investigation. Ten sediment samples, including one duplicate, were collected from the site and background locations. The comparability of the organic duplicate samples was low for volatiles, and the inorganic duplicate was comparable.

The results of the sediment analyses yielded positive detections for five volatile compounds. Three are considered common laboratory contaminants. One compound detected, 1,1,1-trichloroethene, was found only in the background sample. The one remaining detected compound, carbon disulfide, was reported below the detection limit. Nine semi-volatiles were detected. As stated above, most concentrations were reported below detection limits. Several compounds are also considered common laboratory contaminants. The inorganic compounds detected in on-site sediment samples exceeded the concentrations of inorganic analytes in the background sample, with the exception of selenium and sodium. The results of the various analyses are provided in the tables below.

TABLE 17
LANDFILL AREA SEDIMENTS
ORGANIC COMPOUNDS

TABLE 17			
COMPOUND	RANGE OF CONCENTRATIONS (ug/kg)	BLANK CONCENTRATIONS (ug/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
VOLATILES			
Methylene chloride	2 - 19	2	A3-SD-1-G
Acetone	12 - 230	14	A3-SD-2-G
Carbon disulfide	2	(11) U	A3-SD-2-G
2-Butanone	3 - 57	(11) U	A3-SD-1-D
1,1,1-Trichloroethene	(13) U - (29) U	4	OS-SD-10-G
SEMI-VOLATILES			
Phenanthrene	73 - 150	(360) U	A3-SD-8-D
Di-n-butlyphthalate	53	17	A2-SD-7-G
Fluoranthene	67 - 220	(360) U	A3-SD-8-D
Pyrene	55 - 150	(360) U	A3-SD-8-D
Butylbenzylphthalate	54	6	A2-SD-7-G
Chrysene	92	(360) U	A3-SD-8-D
bis(2-Ethylhexyl)phthalate	50 - 430	32	A2-SD-7-G
Di-n-octylphthalate	150 - 650	40	A4-SD-6-G
Benzo(b)fluoranthene	110	(360) U	A4-SD-6-G
PESTICIDES			
4,4'-DDD	4.6	U	A3-SD-7-G

TABLE 18
LANDFILL AREA SEDIMENTS
INORGANIC COMPOUNDS

TABLE 18			
COMPOUND	RANGE OF CONCENTRATIONS DETECTED (mg/kg)	BACKGROUND (mg/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Aluminum	6380 - 17700	11200	A3-SD-2-G
Antimony	(5.5) U	(4.2) U	NA
Arsenic	1.8 - 6.3	3.8	A2-SD-7-G
Barium	119 - 260	213	A3-SD-2-G

TABLE 18

COMPOUND	RANGE OF CONCENTRATIONS DETECTED (mg/kg)	BACKGROUND (mg/kg)	SAMPLE ID WITH HIGHEST CONCENTRATION
Beryllium	0.25 - 1.2	1.1	A1-SD-4-G/A2-SD-7-G
Cadmium	0.39 - 1.6	(0.27) U	A3-SD-1-G
Calcium	4940 - 23500	9050	A3-SD-1-G
Chromium	10.2 - 306	25.7	A2-SD-7-G
Cobalt	6.0 - 10.2	8.2	A2-SD-2-G/A1-SD-4-G
Copper	7.3 - 368	19.6	A2-SD-7-G
Cyanide	0.18 - 4.0	0.07	A2-SD-7-G
Iron	10900 - 24800	17800	A3-SD-2-G
Lead	8.7 - 38.9	14.1	A2-SD-7-G
Magnesium	3480 - 5400	4880	A3-SD-2-G
Manganese	138 - 680	564	A4-SD-6-G
Mercury	(0.08) U - (0.19) U	(0.08) U	NA
Nickel	14.4 - 816	27.3	A2-SD-7-G
Potassium	972 - 2480	1890	A3-SD-2-G
Selenium	0.26 - 0.93	1.3	A1-SD-4-G
Silver	(0.53) U - 1.2	0.50	A3-SD-1-G
Sodium	36.9 - 85.5	331	A4-SD-6-G
Thallium	(0.21) U - 0.26	(0.18) U	A1-SD-5-G
Vanadium	18 - 42.8	27.2	A3-SD-2-G
Zinc	41.4 - 111	65.3	A3-SD-2-G

Results of Surface Water Investigation. Nine surface water samples were collected and analyzed during the RI. Six surface water samples, including one duplicate, were collected from the on-site pond and pools of standing water. Two blanks were also analyzed. One sample was collected from a City of West Memphis fire hydrant to evaluate the water used for drilling fluids and equipment decontamination. Volatile and semi-volatile organic compound detections were uniformly reported at or below detection limits. The risk assessment identified two inorganic contaminants of potential concern, arsenic and beryllium. The concentrations detected in the surface water samples for these compounds are below the Primary Drinking Water Regulations Maximum Concentration Level (MCL) of 0.05 mg/L for arsenic and 0.004 mg/L for beryllium. The results of the inorganic analyses are provided in the chart below.

TABLE 19
LANDFILL AREA SURFACE WATER
INORGANIC COMPOUNDS

TABLE 19		
COMPOUND	RANGE OF CONCENTRATIONS DETECTED (ug/l)	BLANK (ug/l)
Aluminum	356 - 1790	51.9 B
Antimony	(27.4) U	(27.4) U
Arsenic	2.9 - 5.4	(1.9) U
Barium	51.8 - 124	(1.3) U
Beryllium	0.6	(0.52) U
Cadmium	1.8 - 5.1	2.6 B
Calcium	20800 - 49900	45.8 B
Chromium	2.0 - 4.8	2.5 B
Cobalt	2.9 - 7.0	3.3 B
Copper	6.0 B - 52.4	1.8 B
Cyanide	1.4 - 6.4	1.7 B
Iron	379 - 2500	49.6 B
Lead	3.4 - 37.3	(1.6) U
Magnesium	2800 - 18000	145 B
Manganese	13.9 - 111	2.1
Mercury	(0.16) U	(0.16) U
Nickel	(8.8) U - 15.6	(8.8) U
Potassium	3240 - 6600	(644) U
Selenium	0.92 - 1.9	(0.92) U
Silver	(0.29) U	(0.29) U
Sodium	993 - 9410	(2.18) U
Thallium	(1.2) U	(1.2) U
Vanadium	(2.2) U	(2.2) U
Zinc	4.2 - 117	1.9 B

VI. SUMMARY OF SITE RISKS

An evaluation of the potential risks to human health and the environment from site contaminants was conducted in accordance with OSWER Directive 9285, Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, (Part A), as part of the

baseline risk assessment. The results of all the sampling conducted at the site during the RI were used to evaluate the risk the site poses to the public health and the environment.

Because EPA had originally intended to address the oily sludge pit as a removal and the landfill areas as a remedial action, two risk assessments were prepared. One risk assessment was prepared in conjunction with the planned EE/CA for the oily sludge pit area, and one risk assessment was prepared during the RI for the landfill areas. Both risk assessments were prepared in accordance with EPA guidance and incorporated into the baseline risk assessment for the entire site.

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

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

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

To protect human health, the EPA has established an excess acceptable lifetime cancer risk range, from one in ten thousand to one in one million. This range may be expressed as 1×10^{-4} to 1×10^{-6}. For example, a risk of 1×10^{-6} means that 1 person out of one million could develop cancer as a result of a lifetime exposure to a site. EPA must consider the need to conduct remedial action at a site if the risk exceeds 1×10^{-6}. EPA usually requires remedial action at locations where excess cancer risks are greater than 1×10^{-4} (1 excess cancer case in ten thousand people could potentially occur).

The level of concern for non-carcinogenic contaminants is determined by calculating a Hazard Index (HI). If the HI exceeds one (1), there may be concern for potential exposure to site contaminants. EPA typically requires remedial action at locations where the HI values are greater than 1.0 for human populations who may reasonably be expected to be exposed.

The risk assessments conducted at the South 8th Street Landfill site do not use either residential or industrial exposure scenarios because the flooding pattern at the site precludes the use of such typical scenarios. Because of the frequent flooding, it is highly unlikely that a residence or business (other than barge transfer operations) will ever be established on the site. However, the site has been considered for use as a state park, and residents of the nearby RV park had access to the site before it was fenced. Therefore, EPA has determined that it is appropriate to use a site specific recreational setting in order to develop the exposure scenarios for the baseline risk assessment. EPA also considered an agricultural scenario since the site was used for agricultural purposes in the past, and areas near the site have been used for agricultural purposes within the last several years.

Based upon the above scenarios, EPA considered several receptors during the development of the human health portion of the baseline risk assessment. These hypothetical receptors included current recreational visitors, future recreational visitors, future recreational workers (e.g., site caretaker), and crop consumers. The assumptions utilized to calculate risk are specified in detail in the baseline risk assessment. Some of the risks associated with both the oily sludge pit and landfill areas are shown in Figures 12 through 14.

Finally, although the risks from both the average (AVG) and reasonable maximum exposure (RME) scenarios were calculated in the risk assessment, the RME risks were used to evaluate threats at the site because the NCP and current EPA policy mandate the use of the RME when evaluating the need for response actions at Superfund sites. EPA policy requires the AVG risk to be quantified in the baseline risk assessment. The difference between the AVG and RME risks results from using different assumptions in the equations utilized to perform the risk calculations. For example, the soil intake rate utilized for the recreational worker AVG risks is 240 mg/day as opposed to 480 mg/day for the RME risk, the exposure frequency for AVG is 152 days per year as opposed to 250 days per year for RME, and the exposure duration is 9 years for AVG as opposed to 25 years for RME. RME risks are greater, and thus more conservative, than average risks.

Oily Sludge Pit Area Risk Assessment Results

Human Health Risk Assessment

The most significant threat to human health from the pit area is attributed to the low pH of the sludges in the pit. The low pH means that the sludges are corrosive. Upon contact, corrosive material may destroy body tissues, metals, plastics and other materials. At a minimum, the highly corrosive nature of the pit sludges likely will cause severe burns to recreational visitors and workers who may come into contact with the sludge while in the area.

The lifetime excess cancer risk for current recreational visitors is estimated to be 6×10^{-7} (RME) and 1×10^{-8} (AVG), taking into account the risks from surface soils in the pit area via dermal contact and oral ingestion. This risk is below EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}. Risks to current recreational visitors via inhalation were considered, but ultimately were not quantified due to the low emission rates documented in the undisturbed areas of the pit.

The lifetime excess cancer risk for future adult recreational visitors is estimated to be 1×10^{-4} (RME) and 5×10^{-6} (AVG), taking into account risk from exposure to waste material that may be spread over the entire site area in the future, groundwater from a hypothetical future on-site well, and emissions that may be created by the redistribution of the pit waste. This risk is within EPA's acceptable risk range.

The excess lifetime cancer risk for a future recreational worker is estimated to be 1×10^{-3} (RME) and 1×10^{-4} (AVG), taking into account risk from exposure to waste material that may be spread over the entire site area in the future, groundwater from a hypothetical future on-site well, and emissions that may be created by the redistribution of the pit waste. This risk exceeds EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}. The organic contaminants that contribute to this risk are carcinogenic PAHs, PCBs, and TCDD equivalents.

The excess lifetime cancer risk for a future crop consumer is estimated to be 8×10^{-2} (RME) and 2×10^{-2} (AVG), taking into account risk from ingestion of vegetables grown in waste material that may be spread over the oily sludge pit area in the future. This risk exceeds EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}. The organic contaminants that contribute to this risk are carcinogenic PAHs, PCBs, and TCDD equivalents.

With regard to non-carcinogenic threats, the HI for current child and adult recreational visitors are 0.008 and 0.004 RME, respectively, taking into account exposure to only surface soils in the pit area. Since these HI values are less than 1, non-

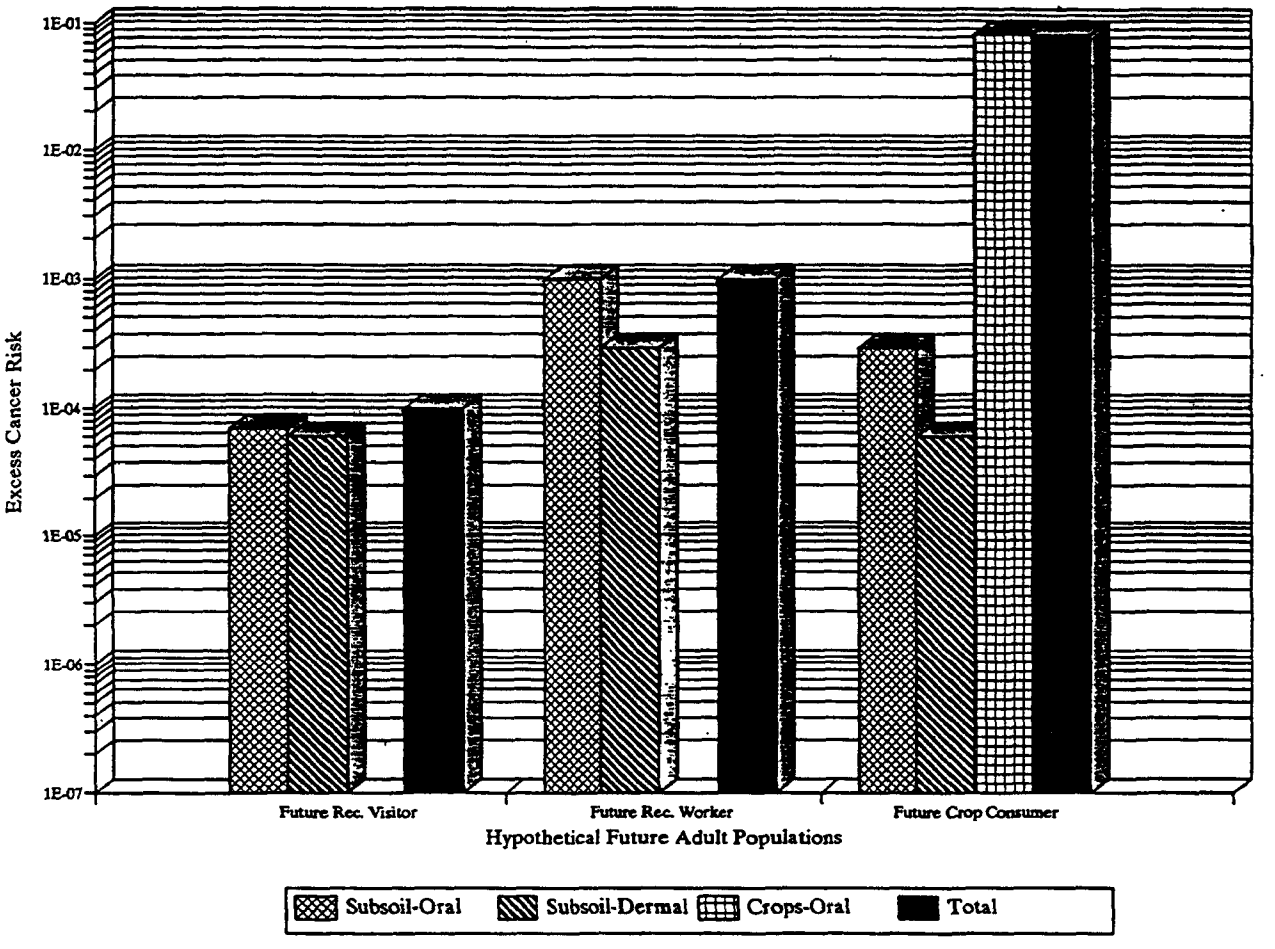

FIGURE 12 SUMMARY OF EXCESS CANCER RISKS FOR FUTURE POPULATIONS - RME

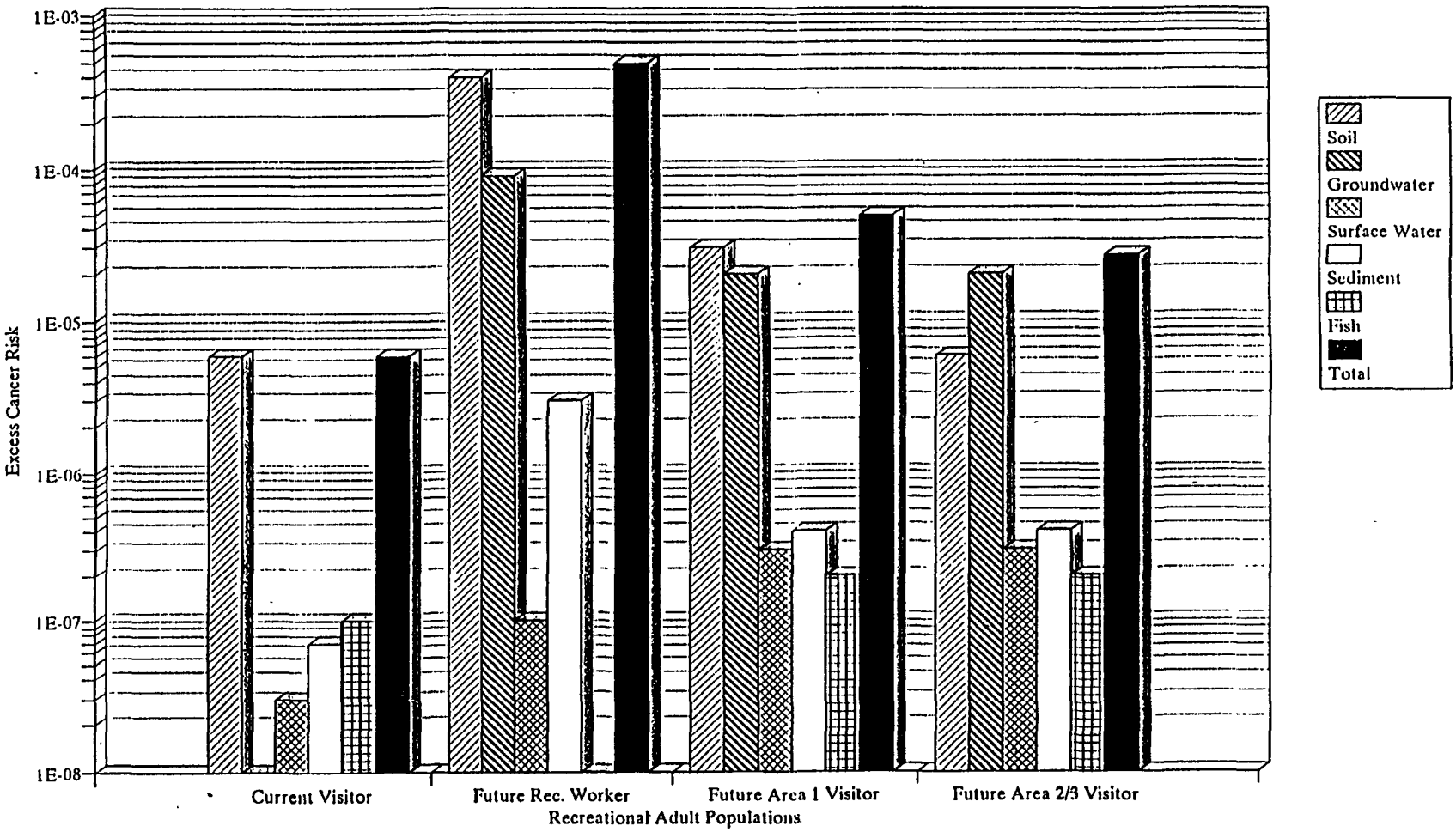

FIGURE 13 SUMMARY OF EXCESS CANCER RISK FOR RECREATIONAL POPULATIONS - RME

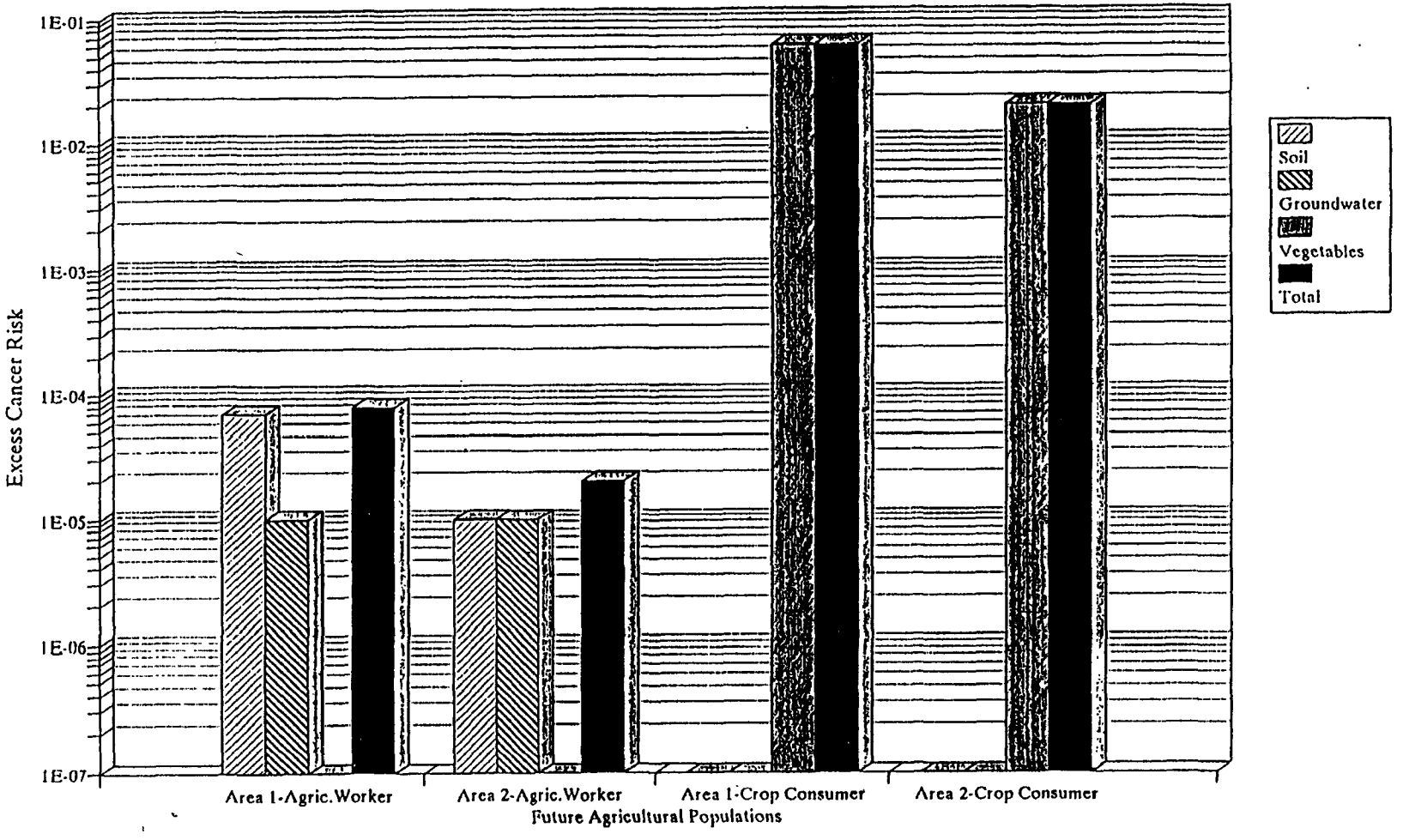

FIGURE 14 SUMMARY OF EXCESS CANCER RISKS FOR AGRICULTURAL POPULATIONS - RME

carcinogenic health threats, with the exception of the chemical burns as previously discussed, are not expected to occur for current child and adult recreational visitors.

The HI for future child and adult recreational visitors is 20 RME (3 AVG) and 3 RME (0.6 AVG), respectively, taking into account exposure to waste material that may be spread over the entire site area in the future, groundwater from a hypothetical future on-site well and emissions that may be created by the redistribution of the pit waste. These HI values exceed EPA's acceptable action level of 1.0. The primary contaminants that contribute to the high HI values are volatile organic compounds that may be released into the air if the pit waste is excavated and redistributed over the pit area at some point in the future.

The HI for future recreational workers is 20 RME and 6 AVG, taking into account exposure to waste material that may be spread over the entire site area in the future, groundwater from a hypothetical future on-site well, and emissions that may be created by the redistribution of the pit waste. These HI values exceed EPA's acceptable action level of 1.0. The primary contaminants that contribute to the high HI values are volatile organic compounds that may be released into the air, carcinogenic PAHs, PCBs and TCDD equivalents.

The HI for future child and adult crop consumers is 6 RME (4 AVG) and 70 RME (50 AVG), respectively, taking into account exposure resulting from ingestion of vegetables grown in waste material that may be spread over the oily sludge pit area in the future, and, for the adult crop consumer only, direct contact, ingestion, and inhalation of contaminants that may occur while growing the vegetables. These HI values exceed EPA's acceptable action level of 1.0. The contaminants that contribute to this risk are PCBs, alpha-chlordane and bromomethane.

Ecological Risk Assessment

An ecological risk assessment was conducted to evaluate the threats the pit area poses to the environment. Based upon a review of the data and relevant technical literature, EPA determined that environmental receptors are avoiding the pit area due to the highly corrosive nature of the pit waste. As was the case with the human health risk assessment, the low pH of the pit waste presents an acute threat to the ecosystem. In addition, the continuous flooding at the site will result in the spread of contamination from the pit, potentially impacting plants and wildlife located on or near other areas of the site.

Landfill Areas Risk Assessment Results

Due to the size of the site, it is possible that future campgrounds

may be developed in one or more areas of the site. It is therefore reasonable to assume that a campground could be developed in Area 1 or in an area that includes both Area 2 and Area 3, with the future recreational visitors being exposed primarily to contaminants present in one of these areas.

Human Health Risk Assessment

The lifetime excess cancer risk for current recreational visitors is estimated to be 6×10^{-6} (RME), taking into account the risks from on-site surface soils and surface water, sediments, and fish in the large pond located near the RV Park. This risk is within EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}.

The lifetime excess cancer risks for future recreational visitors who camp in Area 1 is estimated to be 5×10^{-5} (RME), taking into account risk from surface soils, groundwater from a hypothetical future on-site well and surface water, sediments and fish in the large pond located near the RV park. This risk is within EPA's acceptable risk range.

The lifetime excess cancer risk for future recreational visitors who camp in Area 2/3 is estimated to be 2×10^{-5} (RME), taking into account risk from surface soils, groundwater from a hypothetical future on-site well, and surface water, sediments and fish in the large pond located next to the RV park. This risk is within EPA's acceptable risk range.

The lifetime excess cancer risk for a future recreational worker is estimated to be 5×10^{-4} RME taking into account risk from on-site surface soils, groundwater, and surface water and sediments in the large pond located next to the RV park. It should be noted that the risk from ingestion of the on-site surface soils accounts for the majority of the total risk to the recreational worker. This risk exceeds EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}. The contaminants that contribute to this risk are carcinogenic PAHs, pesticides (including toxaphene, DDD, DDE and DDT, PCBs) and the inorganic compounds, arsenic and beryllium.

With respect to Area 1, the excess lifetime cancer risk for a future crop consumer is estimated to be 6×10^{-2} (RME), taking into account risk from ingestion of vegetables grown in waste material from Area 1. The contaminants that contribute to this risk are carcinogenic PAHs, pesticides (including toxaphene, DDD, DDE and DDT, PCBs) and the inorganic compounds, arsenic and beryllium. This risk exceeds EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}.

With respect to Area 2/3, the excess lifetime cancer risk for a future crop consumer is estimated to be 2×10^{-2} (RME) taking into account risk from ingestion of vegetables grown in waste material from Area 2/3. The contaminants that contribute to this risk are carcinogenic PAHs, pesticides including toxaphene, DDD, DDE and

DDT, PCBs, and the inorganic compounds, arsenic and beryllium. This risk exceeds EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}.

In addition to evaluating cancer risks, EPA also evaluated the potential health threats associated with non-carcinogenic effects of the contaminants detected on the site. EPA uses the hazard index to evaluate non-carcinogenic health threats. If the total subchronic (for children) or chronic (for adults) is less than one for all pathways, it is believed that non-carcinogenic health threats will not occur. If the HI is equal to or exceeds 1, it is believed that there is some possibility that non-carcinogenic health effects may occur.

The risk assessment shows that, with the exception of crop consumers, none of the potential receptors that EPA is using to evaluate risk at the site have HI values greater than 1.

Area 1 HIs for both future child and adult crop consumers are 60 and 30, respectively, taking into account exposure resulting from ingestion of vegetables grown in waste material from Area 1 that may be spread over the site in the future. Area 2/3 HIs for both future child and adult crop consumers are 5, taking into account exposure resulting from ingestion of vegetables grown in waste material from Area 2/3 that may be spread over the site in the future. These HI values exceed EPA's acceptable action level of 1.

Ecological Risk Assessment

An ecological risk assessment was conducted to evaluate the threats the landfill areas pose to the environment. Based upon site data and relevant technical literature, EPA identified several environmental receptors potentially affected by the site. These receptors include small mammals such as mice, aquatic organisms present in the large pond located next to the RV park, and birds such as the red shouldered hawk and the least tern. The least tern is an endangered species that was identified as an environmental receptor of concern in the HRS package.

The ecological risk assessment indicates that soil invertebrates (earthworms, snails, slugs, etc.) and plants may be at risk due to exposure to metal contaminants in the soil. A comparison of the water and sediment concentrations to U.S. EPA Ambient Water Quality Criteria and sediment quality criteria established by the National Oceanic and Atmospheric Administration (NOAA) indicates that the pond's ecosystem appears to be at risk. However, toxicity tests using pond water and sediments show that these media were not toxic to the test organisms.

The presence of pesticides and PCBs in bluegill, largemouth bass, and channel catfish obtained from the pond indicates that a bioaccumulation impact could be present and potentially could be a

threat to fish-eating birds and mammals. However, the data was insufficient to substantiate that the contamination is attributable to the site as fish in the nearby Mississippi River upstream of the site contain similar levels of contaminants. The fish located in the pond may have very well come to be located there during one of the frequent flood events and could have been exposed to pesticides and PCBs prior to arriving at the site. The hypothesis is substantiated by the fact that none of the pond sediment or surface water samples indicated the presence of PCBs or pesticides above the detection limit. Therefore, a foodchain link between organisms that feed off the pond sediments and the fish cannot be established. In addition, the ecological risk assessment shows that small mammals and birds are not at risk from exposure to other food sources located in the landfill areas.

Finally, EPA was concerned that the least tern might be exposed to chemicals through ingestion of the fish present in the large pond located next to the RV park. However, information regarding the least tern's foraging habits indicates that the pond is not likely to provide a forage base for the least tern. This is because the pond is located more than 100 meters from the nearest known least tern colony, and that distance is beyond the usual foraging range of the least tern. Furthermore, even if the least tern's foraging range were to include the site area, the least tern's preference for foraging on suitable fish species in large open bodies of water such as the Mississippi River would preclude its use of the pond as a viable forage base. Consequently, the least tern almost certainly will not be exposed to contaminants associated with fish in the pond.

VII. DESCRIPTION OF ALTERNATIVES

Oily Sludge Pit Area - Generic Response Actions

With the exception of the no action alternative, all of the remedial alternatives that were evaluated contain common elements that are described here rather than repeated for each alternative. The alternatives discussed later in the ROD differ only in their handling of the principal threat posed by the oily sludge and its ancillary contaminated soil and debris.

Excavation

All of the treatment alternatives will require the excavation of an estimated 22,000 cubic yards of sludge, contaminated soil and debris from the pit area. This volumetric estimation is based on existing sampling data indicating that the sludge and visibly contaminated soil and debris encompass approximately 3.5 acres and are present at depths of up to 18 feet below the existing surface of the site.

Water Treatment and Management

All of the treatment alternatives will require that contaminated water be properly collected and disposed of during removal of the pit contents. Sources of contaminated water will include water contained within the waste matrices that may be released during excavation activities, accumulated rainfall within the area of remedial activities, and water used for decontamination of personnel and equipment.

Rain water that falls within the berm surrounding the oily sludge pit will have to be managed during the remedial action. The average monthly precipitation in the West Memphis area is approximately 4.2 inches. Over the approximate area inside the berm (3.5 acres), 4.2 inches of rain water will result in the accumulation of approximately 400,000 gallons of water each month, not accounting for infiltration or evaporation. In addition, an estimated volume of 1,000 gallons/month of water produced from miscellaneous operations (decontamination, blowdown, etc.) will require management.

Disposal of the contaminated waters may be addressed by one or both of two methods. The exact method or combination of the two methods that will be used to handle and dispose of contaminated water will be further refined in the remedial design. The two methods that may be used to dispose of contaminated water are: (1) use contaminated water in connection with implementation of the remedial alternative; and/or (2) discharge water that has been treated to meet applicable and relevant and appropriate requirements to either a nearby stream or river and/or to a publicly owned wastewater treatment plant (such as the one owned by the City of West Memphis).

The technology options available for the remediation of sludges involve the excavation and movement of the contaminated material, and/or treatment of the contaminated material prior to final disposition. Water may be required for dust control to minimize the release of airborne contaminants during either movement or pretreatment of these sludges and soils. EPA anticipates that contaminated surface water will be utilized in the already contaminated process area to the extent possible to knock down dust particles before they migrate from the contaminated process area. Extensive monitoring of the air will be conducted throughout the process to ensure that contaminants in the water or in the sludge will not pose a risk to nearby human and environmental receptors.

Water that cannot be incorporated into the treatment process will be treated and discharged to a nearby stream and/or to publicly owned wastewater treatment plant. Although discharge to a nearby stream or river will not require a permit, the substantive requirements of the Clean Water Act (CWA) and relevant state requirements (Arkansas Water and Air Pollution Control Act) must

still be met. Discharge to a POTW may require less stringent treatment requirements at the site because the wastewater treatment plant may provide some treatment of the water before it is discharged. Furthermore, studies conducted during the remedial design may determine that discharge of the contaminated water to a publically owned wastewater treatment plant might be less expensive and easier to implement than discharge from the site to nearby streams and rivers.

Sludge Pretreatment

Pretreatment of the sludge material may be necessary prior to implementation of the remedial alternative. The analytical data available for the oily sludge pit indicate that the waste exhibits the characteristic of a corrosive hazardous waste pursuant to 40 CFR Part 268.41. Additionally, the waste matrix is a thick, viscous tar material that likely will adhere to the excavation and transportation equipment, potentially reducing the efficiency of the excavation operation.

Pretreatment would involve the addition of a material handling agent, such as kiln dust or the nearby contaminated soils/sands, to improve the handling characteristics of the sludge. Improved handling characteristics will increase the effectiveness of the excavation and hauling equipment and should reduce the amount of time needed to decontaminate equipment. Therefore, the alternatives described and evaluated below include this pretreatment step as part of the alternative.

Debris Management and Disposal

All of the remedial alternatives address the contaminated debris and non-contaminated debris present in and around the contaminated soils in the pit area. Non-contaminated debris will be removed and sent to a Resource Conservation and Recovery Act (RCRA) Subtitle D landfill for disposal in order to comply with ARARs. Accordingly, non-contaminated debris will be segregated, to the extent possible, during the excavation of contaminated materials.

Debris that is either contaminated when excavated or becomes contaminated as a result of the excavation processes will be segregated from the contaminated soils and the non-contaminated debris. Once the contaminated debris has been separated from the contaminated soils, it will be transported to an area of the site where it will be decontaminated. A potential technique that may be used to separate the contaminated debris from the contaminated soil involves the use of large diameter screens placed over a sump to separate and collect contaminated residues removed from the contaminated debris. High pressure steam may then be used to wash the contaminated soils from the debris. Material removed from the contaminated debris and small items of debris passing through the screen will be treated in conjunction with the oily sludges in the

pit. Although the separation and decontamination process is labor intensive, it is considered more effective and efficient than remediating large items of debris in conjunction with the contaminated soils.

The actual separation technique will be addressed in the remedial design. Design considerations will include the ability of the selected remedial alternative to manage the contaminated debris, the economics of decontaminating various sizes of contaminated debris, and the effectiveness of decontamination methods. Decontaminated debris will be disposed of in a RCRA Subtitle D landfill.

Backfill

Since each of the alternatives involves excavation of the waste, each alternative will require the placement of some type of fill into the excavated area in order to stabilize the sides of the excavation. The extent of the backfill will be determined in the remedial design. EPA may not backfill all of the excavation in order to create a small depression in the oily sludge pit area to facilitate the creation of compensatory wetlands that will be needed to effectuate EPA's preferred alternative for the landfill areas (described in following sections of this ROD). Regardless of whether EPA backfills all or only a portion of the excavation, a sufficient amount of clean imported fill will be placed to ensure that vegetable crops cannot be grown in site surface soils contaminated with site-related contaminants.

Oily Sludge Pit Area - Response Actions Evaluated

The following alternatives to address the oily sludge pit hot spot contamination were evaluated in detail in the FS. Three additional alternatives, containment/institutional controls, low temperature thermal desorption and off-site disposal at an energy recovery facility were screened out earlier in the evaluation process for reasons described in detail in the FS.

ALTERNATIVE 1: NO ACTION

Total Cost (present worth): $0
Time of Implementation: 0 months

The NCP requires EPA to consider the No Action alternative. No action assumes that no action would be taken to reduce the threat to the public health and the environment posed by the oily sludge pit. The remedial action objectives for the oily sludge pit area would not be met.

ALTERNATIVE 2: ON-SITE INCINERATION, STABILIZATION OF ASH, OFF-SITE DISPOSAL OF ASH IN SUBTITLE D LANDFILL

Total Cost (present worth): $17,900,000
Time of Implementation: 18 months

Alternative 2 consists of pretreatment and excavation of the sludge and contaminated soil and debris; decontamination and subsequent disposal of the debris in a RCRA Subtitle D landfill; reduction of the waste volume and destruction of organic contaminants in a transportable on-site incinerator; stabilization of incineration residues; off-site disposal of the stabilized residues to a regulated RCRA Subtitle D landfill facility; and backfill of the excavated area with clean imported fill. The remedial action objectives for the oily sludge pit area would be met.

ALTERNATIVE 3: ON-SITE INCINERATION, OFF-SITE DISPOSAL OF ASH IN SUBTITLE C LANDFILL

Total Cost (present worth): $22,800,000
Time of Implementation: 18 months

Alternative 3 consists of pretreatment and excavation of the sludge and contaminated soil and debris; decontamination and subsequent disposal of the debris in a RCRA Subtitle D landfill; reduction of the waste volume and destruction of organic contaminants in a transportable on-site incinerator; off-site transportation and disposal of incineration residues to a regulated RCRA Subtitle C treatment, storage, and disposal facility; and backfill of the excavated area with clean imported fill. This alternative is similar to Alternative 2 with the exception that incineration residues will be managed by the RCRA Subtitle C, treatment, storage, and disposal facility. The remedial action objectives for the oily sludge pit would be met.

ALTERNATIVE 4: STABILIZATION, OFF-SITE DISPOSAL AT SUBTITLE D LANDFILL

Total Cost (present worth): $6,900,000
Time of Implementation: 10 months

Alternative 4, the alternative selected by this ROD, consists of pretreatment and excavation of the sludge and contaminated soil and debris; decontamination and subsequent disposal of the debris in a RCRA Subtitle D landfill; stabilization of the waste to reduce the mobility of the contaminants; disposal of the stabilized waste at a regulated RCRA Subtitle D landfill facility; and backfilling the excavated area with clean imported fill material. The remedial action objectives for the oily sludge pit would be met.

ALTERNATIVE 5: DISPOSAL OF WASTE AT SUBTITLE C TREATMENT, STORAGE, DISPOSAL FACILITY

Total Cost (present worth): $12,800,000
Time of Implementation: 8 months

Alternative 5 consists of pretreatment and excavation of the sludge and contaminated soil and debris; decontamination and disposal of the debris in a RCRA Subtitle D landfill; disposal of the waste at a RCRA Subtitle C treatment, storage, and disposal facility; and backfilling the excavated area with clean imported fill material. The RCRA Subtitle C facility likely would be required to treat the waste further to comply with the land disposal restrictions. The remedial action objectives for the oily sludge pit would be met.

ALTERNATIVE 6: OFF-SITE INCINERATION

Total Cost (present worth): $45,700,000
Time of Implementation: 8 months

Alternative 6 consists of pretreatment and excavation of the sludge and contaminated soil and debris; decontamination and subsequent disposal of the debris in a Subtitle D landfill; destruction of the organic contaminants at an off-site commercial incineration facility that also would be responsible for disposing of the ash in accordance with EPA and state regulations; and backfill of the excavated area with clean imported material. The remedial action objectives for the oily sludge pit would be met.

ALTERNATIVE 7: ORGANIC CONTAMINANT TREATMENT, STABILIZATION OF INORGANICS, OFF-SITE DISPOSAL AT SUBTITLE D LANDFILL

Total Cost (present worth): $14,800,00 to $18,100,000
Time of Implementation: 18 to 24 months

Alternative 7, the alternative that EPA identified as its preferred alternative in the Proposed Plan, consists of excavation of the sludge and contaminated soil and debris; decontamination and subsequent disposal of the debris in a RCRA Subtitle D landfill; separation, reduction of volume and/or treatment of the organic contaminants; stabilization of treatment residuals and inorganic contaminants; disposal of the stabilized residuals in a RCRA Subtitle D landfill; and backfill of the excavated area with clean imported fill material. The remedial action objectives for the oily sludge pit would be met.

EPA identified three separation, volume reduction and treatment techniques that could be employed to reduce the mobility, toxicity and volume of the organic contaminants. These options are solvent extraction, oil treatment, and slurry biodegradation. The Proposed Plan contains an extensive discussion of the technical aspects of

these three options.

Landfill Areas - Response Actions Evaluated

The following alternatives to address the landfill areas were evaluated in detail. One additional alternative, a composite cap, was screened out earlier in the evaluation process for reasons described in detail in the FS.

ALTERNATIVE 1: NO ACTION

Total Cost (present worth): $0
Time of Implementation: 0 months

The NCP requires EPA to consider the No Action alternative. No action assumes that no action would be taken to reduce the threat to the public health and the environment posed by the site. The remedial action objectives for the landfill areas would not be met.

ALTERNATIVE 2: INSTITUTIONAL CONTROLS

Total Cost (present worth): $600,000
Time of Implementation: 12 months

Alternative 2 utilizes institutional controls designed to restrict public access to the site. Institutional controls consist of maintaining the existing site perimeter fencing and warning signs, the imposition of deed notices, regular maintenance and five (5) year reviews. Although EPA has deferred its decision regarding the selection of remedial action for the groundwater until a later date, this alternative does include groundwater monitoring, in addition to 5-year reviews, to ensure that any contaminants left in the landfill that may migrate into the groundwater do not present a threat to the public health and the environment at a future date. The remedial action objectives for the landfill areas would be met.

ALTERNATIVE 3: NATURAL SOIL COVER IN CONJUNCTION WITH INSTITUTIONAL CONTROLS

Total Cost (present worth): $2,260,000
Time of Implementation: 24 months

Alternative 3, the alternative chosen in this ROD and identified as EPA's preferred alternative in the Proposed Plan, consists of containment (primarily a native soil cover designed and constructed in accordance with the Arkansas Solid Waste Management Code), the creation of a compensatory wetlands, and institutional controls. The remedial action objectives for the landfill areas would be met.

The cover material would be a native soil capable of supporting vegetative growth. The native soil will likely be porous (sand or

silty sand) to allow natural diffusion of landfill gas (LFG), such as methane, throughout the entire surface area of the cap, thereby controlling any buildup of explosive gases within the landfill. A more extensive LFG collection system is not anticipated to be necessary because the levels of LFG that were identified in the RI were not high enough to present a risk to the public health and the environment so long as it is not allowed to build up under a semi-impermeable barrier.

However, additional review of the data or further studies conducted during the remedial design may determine that a more extensive LFG is prudent. A more extensive LFG collection and treatment system will be added to this alternative if EPA determines that a more extensive LFG system is required to protect the public health and the environment.

Installation of a soil cap may consist of clearing and grubbing existing vegetation, performing initial site grading, and installing a biotic barrier consisting of a geotextile or cobbles to prevent root uptake. At least two feet of native soil will then be placed on top of the existing landfill areas and remediated oily sludge pit area, and vegetative growth will be established on the final topsoil layer. The native soil cap must be porous to allow LFG diffusion and graded to divert surface water runoff away from the fill areas and toward a series of surface ditches leading to nearby drainage areas. The vegetation selected for the cover must be self-sustaining and suited to the climatic conditions of the site.

The final cover must also be designed to minimize erosion from flooding and drainage. An established vegetative cover combined with regular maintenance will provide the primary method of erosion control. Additional design features may also include synthetic erosion control netting for slopes and cap ditches, silt fences and riprap spillways. Erosion control details will be addressed in the remedial design. The institutional controls outlined in Alternative 2, with the exception of fencing, would also be an integral part of this alternative.

The compensatory wetlands would likely be created by obtaining the cover material from the flood plain near the site. Once the cover material was excavated from the floodplain, the area could be planted with appropriate vegetation, stocked with appropriate biota, and engineered to provide the requirements necessary to turn the borrow area into a wetlands area.

VIII. COMPARATIVE ANALYSIS OF ALTERNATIVES

EPA is required to use certain criteria to evaluate alternatives for addressing a Superfund site. These nine criteria are categorized into three groups: threshold, primary balancing, and

modifying. The threshold criteria must be met in order for an alternative to be eligible for selection. The primary balancing criteria are used to weigh major tradeoffs among alternatives. The modifying criteria are taken into account after state and public comment is received on EPA's preferred alternative as identified and described in the Proposed Plan of Action.

NINE CRITERIA

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

Threshold Criteria

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

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

Primary Balancing Criteria

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

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

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

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

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

Modifying Criteria

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

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

Oily Sludge Pit Area

Overall Protection of Human Health and the Environment

Alternative 4 will eliminate the threat to public health and the environment from direct contact with the corrosive waste and contaminated soils and debris and will eliminate the potential for future off-site migration of contaminants via other pathways such as migration to the ground and surface water. The inorganic contaminants will be immobilized, and the remaining contaminants will be disposed of in a regulated landfill.

Each of the alternatives, with the exception of no action, effectively reduces the threat to public health and the environment at the site through the removal of the waste or treatment residuals to an off-site, regulated landfill. Alternatives 2, 3 and 7 require the treated residuals from the incineration or organic treatment process to be disposed of in either a regulated RCRA Subtitle D or Subtitle C offsite landfill. Alternatives 5 requires the waste to be disposed of in a RCRA Subtitle C landfill. Alternative 6 requires the waste to be incinerated at an offsite facility that will ultimately be responsible for disposing of the treated residuals in a regulated offsite landfill.

Because the no action alternative is not protective of the public health and the environment, it will not be considered further in the evaluation process.

Compliance with ARARs

Alternative 4, as well as the other alternatives, will comply with the ARARs identified in the FS. Because the sludge in the oily sludge pit is meets the definition of hazardous waste due to its

low pH and high leachable lead content, the selected alternative must achieve the relevant requirements of RCRA. The site's location in a flood plain necessitates an evaluation of each alternative's ability to comply with the requirements relevant to implementation of response actions in a floodplain such as 40 CFR § 6, Appendix A, and 40 CFR §§ 230 and 231. The likelihood that contaminated water will be produced as a result of the remediation process means that each of the alternatives must adhere to the requirements of the CWA and the Arkansas Water and Air Pollution Control Act.

Each of the alternatives is expected to comply with the relevant ARARs via the use of engineered controls and equipment. A detailed discussion regarding how Alternative 4 will comply with ARARs is provided in the following section of this ROD entitled "Selected Remedy."

Long-term Effectiveness and Permanence

Alternative 4 achieves long-term effectiveness through the treatment of the corrosive pit wastes, the stabilization and off-site disposal of the inorganic contaminants, and the stabilization and off-site disposal of organic contaminants in a regulated Subtitle D landfill. Alternative 2 is both effective over the long-term and permanent because the organic contaminants will be permanently destroyed via the combustion process, and the inorganic contaminants will be stabilized and disposed of offsite in a regulated Subtitle D landfill. Alternative 3 is both effective over the long-term and permanent because the organic contaminants will be permanently destroyed via the combustion process, and the inorganic contaminants will be secured offsite in a regulated Subtitle C hazardous waste landfill. Alternative 5 is effective over the long-term because the waste will be disposed of off-site in a regulated Subtitle C hazardous waste landfill, but it is not permanent because the organic contaminants will be neither destroyed nor immobilized. Alternative 6 is both effective over the long-term and permanent because the waste will be incinerated and disposed of offsite in accordance with all relevant environmental laws and regulations. Alternative 7 is both effective over the long-term and permanent because the organic contaminants will be destroyed and the inorganic contaminants will be immobilized and disposed of offsite in a regulated Subtitle D landfill.

While the alternatives considered in the FS all would achieve long-term effectiveness, they differ with respect to permanence. Alternative 4 achieves permanence with respect to the corrosivity of the oily sludge pit waste through treatment to render the waste non-corrosive. However, there is some uncertainty as to Alternative 4's permanence with respect to the remaining organic waste. This is because the nature of the remaining site organic waste (i.e., the waste matrix and the percentage of organics

contained in the waste) raises some question as to whether stabilization will effectively immobilize the organics.

Although the nature of the waste is such that there is no absolute certainty that stabilization will effectively immobilize the organics, there is still the possibility that stabilization potentially could immobilize the organics at the site at a significant cost savings over EPA's original preferred alternative as identified in the Proposed Plan, which called for use of a destruction technology such as incineration to deal with the organic wastes at the site. Despite the uncertainties associated with the stabilization process, the community and the State supported this alternative based primarily upon that cost savings.

Finally, the selected remedy is further protective of human health and the environment because the stabilized waste will be disposed of in a properly constructed and operated regulated Subtitle D landfill where the risks associated with the waste can be more appropriately managed. Placement of the stabilized waste into a Subtitle D landfill will reduce the risk posed by the waste to the public health and environment by limiting exposure pathways and subjecting the stabilized waste to greater controls and monitoring than if the waste were left at the site. For example, the likelihood that the waste will be reexcavated in the future (thereby resulting in direct exposure to landfill workers and site visitors and trespassers) is substantially reduced by virtue of regulations governing Subtitle D landfills. Moreover, the landfill itself will be an engineered and carefully controlled disposal location designed to retard and monitor the potential migration of contaminants, as opposed to the site, where conditions are highly uncontrolled and conducive to contaminant migration by virtue of the site topography, hydrology, geology, and the site's close location to the Mississippi River.

Reduction of Mobility, Toxicity, or Volume (MTV) Through Treatment

Alternative 4 will reduce the toxicity of the waste through treatment by elevating the pH of the waste to levels that will no longer be corrosive and will immobilize the inorganic contaminants via the stabilization process. Likewise, Alternatives 2, 3, 6, and 7 reduce the toxicity of the waste by elevating the pH and reduce the mobility of the waste by stabilizing the inorganic contaminants. Alternative 5 will reduce the toxicity of the waste through treatment by making the waste noncorrosive, but it will not treat either the inorganic or organic contaminants.

Alternatives 2, 3, and 6 also reduce the toxicity, mobility, and volume of the waste by permanently destroying the toxic organic contaminants via the incineration process. Alternative 7 results in the permanent destruction of the organics through biodegradation or by separating the organics from the remainder of the waste and

then sending it offsite for permanent destruction in an incinerator or energy recovery facility.

As discussed earlier, if, upon completion of the excavation and stabilization of the oily sludge pit waste and associated contaminated soil and debris, the stabilized waste meets the performance criteria for stabilization specified in this ROD, then immobilization of the organic contaminants through treatment will have occurred. However, it must be noted that there is some uncertainty as to whether stabilization of these particular site wastes will effectively immobilize the organic contaminants. This is because the nature of the remaining site organic waste (i.e., the waste matrix and the percentage of organics contained in the waste) raises some question as to whether stabilization will effectively immobilize the organics. Section IX of this ROD (Selected Remedy) discusses factors contributing to EPA's decision to utilize stabilization as the principal form of treatment at the site.

In summary, Alternatives 2, 3, 6, and 7 more effectively reduce MTV than Alternatives 4 and 5. Alternatives that employ treatment to permanently reduce the risk associated with both the organic and inorganic contaminants achieve greater reduction of MTV than alternatives that treat organic or inorganic contaminants only. Alternatives that treat the organic contaminants, but not the inorganic contaminants, achieve greater MTV reduction than alternatives that treat inorganic contaminants only since the primary risk at the site is associated with the organic contaminants. Alternatives that do not employ treatment do not meet this criterion.

Short-term Effectiveness

Most of the short-term risks to the community and site workers that are associated with Alternative 4 and the other alternatives, with the exception of the no action alternative, are the result of air emissions generated during the excavation, handling, and pretreatment of the raw waste. However, there are some additional alternative-specific short-term risks.

Risks associated with upsets to an on-site incinerator are greater than the risks posed by treatment processes that do not employ incineration technology. These types of risks can be monitored and controlled through the use of site-specific air monitoring and action plans. Risks associated with transportation related accidents are greater for those alternatives that do not treat the waste prior to off-site disposal than those alternatives that do include treatment of the waste on-site prior to off-site disposal.

Overall, the short-term risk to the community and site workers is equal for all of the alternatives because the risk assumed for on-site incineration or other process upsets and additional material

handling steps is comparable to the risk associated with the transportation of untreated waste.

Alternatives 2, 3, 4, and 7 have more potential for adverse environmental impacts than Alternatives 5 and 6. Since Alternatives 5 and 6 do not include any active onsite treatment, these alternatives will require fewer material handling steps and may be completed in less time than the other alternatives. Most of the potential environmental impacts can be attributed to flood events that may occur during implementation of the remedial action, thereby spreading the contamination to the river and the surrounding areas. Alternatives that require less time to implement, therefore, are less likely to result in an adverse impact to the environment.

Implementability

The technical feasibility of Alternative 4 is considered to be excellent. The equipment and personnel associated with the pretreatment, excavation, transportation, and stabilization components of the alternative are readily available in the hazardous waste remediation and construction industries. Regulated RCRA Subtitle D landfill space is generally available through private and/or local solid waste disposal facilities. The technical feasibility of Alternatives 2, 3, 5, and 6 is also quite good. The technical feasibility of implementing Alternative 7, although good, is less than the other alternatives because it requires the use of innovative technologies.

The administrative feasibility of constructing and operating either the stabilization technology or the other on-site treatment technologies on the river side of the levee for Alternatives 2, 3, 4, and 7 may be difficult. Remedial action contractors may charge higher fees to construct flood protection devices or to cover any potential losses they might incur as a result of flood events. Additionally, it might be necessary for EPA to seek access to property on the land side of the St. Francis levee to aid in implementing the remedial action. For example, the treatment/verification process may be too lengthy to be accomplished during the dry period, and the treatment component of the remedy may have to implemented on the land side of the levee in order to minimize adverse environmental impacts. Alternatives 2, 3, and 7 face similar administrative obstacles.

Alternatives 5 and 6 do not face significant administrative obstacles because these alternatives will not require space on the land side of the levee to be implemented. The waste will only have to be pretreated as it is being excavated and then shipped to the offsite disposal facility.

In summary, Alternatives 2, 3, 4, and 7 are considered to be less implementable than Alternatives 5 and 6 because of administrative

feasibility issues. The alternatives that involve only excavation and transportation to some off-site treatment or disposal facility are more implementable than alternatives that employ some type of on-site treatment as long as disposal facilities will take the untreated waste.

Cost

This criterion compares the capital costs of implementing the alternatives to address the oily sludge pit area. The alternatives for the oily sludge pit area do not require any long-term operation and maintenance. Alternative 6 is the most costly, followed by Alternatives 3, 7, 2, 5 and 4, in that order. The costs are compared in the table below.

TABLE 20
COST COMPARISON-OILY SLUDGE PIT

ALTERNATIVE	COST ($)
1 - No Action	0
2 - On-site Incineration, Stabilization, Disposal in Subtitle D Landfill	17,900,000
3 - On-site Incineration, Stabilization, Disposal in Subtitle C Landfill	22,800,000
4 - Stabilization, Disposal in Subtitle D Landfill	6,900,000
5 - Disposal in Subtitle C Landfill	12,800,000
6 - Off-site Incineration	45,700,000
7 - Organic Treatment, Stabilization, Disposal in Subtitle D Landfill	14,800,000 - 18,100,000

Landfill Areas

Overall Protection of Human Health and the Environment

Alternative 1 (no action) does not achieve the remedial action objectives and does not provide protection to human health and the environment. The no action alternative does not prevent direct contact with and ingestion of landfill contents present on the surface of the site.

Alternative 2 provides limited protection by keeping humans away from the landfill, thereby greatly reducing the risk of direct

contact, but it does not prevent trespassers and wildlife from coming into contact with the landfill contents. In addition, the off-site migration of contaminated surface soils via the air pathway (dust) is not addressed.

Alternative 3 provides overall protection of human health and the environment by preventing direct contact with landfill contents, eliminating air/dust emissions, and providing for landfill gas diffusion through the porous native soil cover into the atmosphere (the diffusion prevents an explosive buildup of the gas). In addition, institutional controls will limit traffic at the site, thereby reducing the risk of direct contact should the soil cover ever be breached at some point in the future.

Compliance with ARARs

Alternative 2 does not achieve ARARs. The Arkansas Solid Waste Management Code states in Section XVIII that "Existing open dumps and other unpermitted disposal facilities shall be required to meet the same closure criteria as set out in this Code for permitted facilities." The site and the landfill areas on the site constitute an unpermitted disposal facility in accordance with Section II.F of the Code. The site does not currently comply with the requirements of Section XII.6.e of the Code, which states "A compacted layer of at least two (2) feet of material capable of supporting vegetation...shall be placed over the entire surface of all completed portions of the landfill."

Alternative 3 complies with the Arkansas Solid Waste Management Code because it provides for a native soil cover capable of supporting vegetation over the entire surface of the landfill. However, care must be taken during the implementation of Alternative 3 because the site is located in a flood plain, and certain portions of the site are wetlands. As result, the site remedy must comply with 40 CFR § 6, Appendix A, and 40 CFR §§ 230 and 231. Alternative 3 will comply with these location specific ARARs by creating a compensatory wetlands during the implementation of the remedial action. In addition, Alternative 3 will have to be designed to ensure that the stormwater runoff from the covered landfill will meet the requirements of the Clean Water Act upon discharge to the Mississippi River.

The new requirements for solid waste landfills (40 CFR § 258) issued by EPA in 1991 are not applicable to this response action because disposal at the site ceased prior to October 6, 1991, (56 Fed. Reg. 51,001 (1991)). Since the design and operating requirements specified in the regulation pertain to new landfills or lateral expansions of existing landfills, they are not relevant and appropriate for this response action since none of the alternatives involve construction of a new landfill on the site. The siting requirements of the regulation are not relevant and appropriate to the response action because the landfill is already

closed. The closure requirements are not relevant and appropriate because the construction of an impermeable clay layer is nonsensical when the groundwater table is close to the surface and the site is routinely flooded.

All of the alternatives must comply with the relevant and appropriate post-closure monitoring requirements of the regulation. These requirements include maintaining the effectiveness and integrity of the final cover and groundwater monitoring. Leachate management is not necessary because the landfill areas do not include a leachate collection system. Gas monitoring will not be necessary because the final cover will be designed to facilitate the permeation of landfill gas through the cover material.

Long-term Effectiveness and Permanence

Alternatives 1 and 2 provide little or no long-term effectiveness. Alternative 3 provides the best long-term effectiveness and permanence possible because the installation of the native soil cover with vegetative growth will eliminate direct contact with the landfill and its contents, control air/dust emissions, control LFG emissions, prevent root uptake, and minimize erosion and surface soil migration from flood events. Any remedy short of excavation and offsite disposal of all waste at the site can never be completely permanent and effective over the long-term because the site is subject to flooding and erosion by the Mississippi River. Excavation and offsite disposal of all waste at the site is not considered practicable for landfills (OSWER Directive 9355.3-11, "Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites," p. 4-12) and is not specified by EPA's presumptive remedy guidance for landfills (OSWER Directive 9355.0-49FS, "Presumptive Remedy for CERCLA Municipal Landfill Sites"). In addition, groundwater monitoring will ensure that any future migration of contaminants from the site will be detected so that appropriate response actions can be implemented.

Arkansas Solid Waste Regulations (ADPCE, 1984) require maintenance of the final cap for the first two years following completion. After that period, regular maintenance must be performed to continue meeting the remedial action objectives for the site. Regular maintenance is necessary to ensure the effectiveness of the remedy because erosion of the cap caused by flooding could expose the landfill contents.

Reduction of Mobility, Toxicity or Volume Through Treatment

None of the alternatives will provide reduction in mobility, toxicity, or volume of the landfill waste through treatment. However, Alternative 3 will immobilize the dust emissions associated with solid waste materials and hazardous substances that may be present on the surface of the site.

Short-term Effectiveness

Over the short-term, implementation of Alternatives 1 and 2 would not significantly affect the levels of risk to the community or site workers. Implementation of Alternative 3 may take up to two years to design and construct. Construction of a native soil cover may increase emissions, especially dust, during site grading, material handling and placement. The greatest exposure to the site media during implementation of Alternative 3 would be to site workers. The risk to site workers will primarily result from exposure to hazardous air and/or dust emissions that may be created when the site is disturbed by heavy remediation equipment, and the release of LFG from the solid waste mass. Short term risk will be mitigated by using an approved Health and Safety Plan (HSP) and contingency plan during remedial construction. The HSP will specify various procedures and safety equipment that the remediation workers must use to conduct the work safely. The HSP will also include plans to detect and address any release of pollutants from the site during the work.

Implementability

Alternatives 1 and 2 are the most implementable. Alternative 1 does not require any construction activity, and Alternative 2 requires only minor construction, limited mostly to existing fence repair. Deed notices should also be fairly easy to implement.

Alternative 3, while slightly more difficult to implement than Alternatives 1 and 2, does not require any highly specialized equipment or services. Construction of the native soil cap can be accomplished by following standard engineering design and construction techniques.

Cost

This criterion compares the capital, O&M, and present worth costs of implementing the alternatives to address the landfill area. Alternative 3 is the most costly, followed by Alternatives 2 and 1 in that order. The costs are compared in the chart below.

TABLE 21
COST COMPARISON-LANDFILL AREA

ALTERNATIVE	CAPITAL COST ($)	ANNUAL O&M COST ($)	PRESENT NET WORTH ($)
1 - No Action	0	0	0
2 - Institutional Controls	50,000	550,000	600,000
3 - Natural Soil Cover	1,780,000	480,000	2,260,000

IX. SELECTED REMEDY

Based on consideration of the requirements of CERCLA, the comparative analysis of alternatives, and public comments, the EPA has determined that Alternative 4 (excavation, on-site stabilization, and off-site disposal at a Subtitle D landfill) will best provide a remedy that is protective of human health and the environment for the oily sludge pit area. Similarly, EPA has determined that Alternative 3 (natural soil cover and institutional controls) will best provide a remedy that is protective of human health and the environment for the landfill areas.

The remedy selected by EPA for the site is consistent with the presumptive remedy for landfills guidance (OSWER Directive 9355.0-49FS). The presumptive remedy for municipal landfills is containment. Containment components suggested for municipal landfills in the directive include: (1) landfill cap; (2) source area groundwater control; (3) leachate collection and treatment; (4) landfill gas collection and treatment; and/or (5) institutional controls to supplement engineering controls. The remedy selected in this ROD includes a landfill cap and institutional controls. Landfill gas is not currently recognized as a threat at the site. Issues regarding contaminated groundwater and leachate will be addressed in a separate ROD.

As discussed in Section IV of this ROD, the specific remedial objectives determined to be necessary at the site are:

Oily Sludge Pit Area

1. Prevent current and future direct contact with the highly corrosive wastes.

2. Prevent current and future direct contact, ingestion, and inhalation of contaminants in the pit waste and ancillary contaminated soil and debris.

3. Prevent the future migration of contaminants from the sludge pit area to other areas both on and off the site.

4. Prevent the potential for future migration of contaminants to the groundwater at concentrations above appropriate action levels.

The selected remedy for the oily sludge pit area will meet the relevant objectives by:

- Treating all the sludges and ancillary contaminated soil at the site by neutralizing it in either the pre-treatment or stabilization process and subsequently disposing of the treated residuals at an off-site regulated Subtitle D landfill.

- Treating and/or removing the contaminants in the sludge and its ancillary contaminated soil and debris by stabilizing the inorganic contaminants, disposing of both the organic and inorganic contaminants that are present in the waste at concentrations below those which define a waste as hazardous in an off-site regulated Subtitle D landfill, and backfilling the excavations with clean soil.

- Removing the contaminants from the flood plain where they are currently located to a regulated Subtitle D landfill and backfilling the excavation with clean soil, thereby precluding the further spread of contaminants from the site through migration caused by site flooding and other events.

- Treating and/or removing all contaminants present in the sludge and its ancillary soil and debris above the Remediation Goals (RGs) and disposing of the treated residuals in a regulated Subtitle D landfill.

Remediation Goals (RGs) for the oily sludge pit were established to ensure that the above remedial objectives for the oily sludge pit area will be met upon completion of the remedial action. The RGs are based on the recreational risk scenario developed in the baseline risk assessment. A more detailed discussion of the baseline risk assessment can be found in Section VI. of this ROD.

The recreational worker (i.e., site caretaker) scenario was used to assess site risk because EPA believes that scenario represents the most plausible reasonable maximum exposure scenario at the site. Other site risk scenarios, including the crop consumer and recreational visitor, were not used because these scenarios were too uncertain or did not best represent a reasonable maximum exposure. After performing the risk calculations and developing the risk based RGs for the primary contaminants of concern (PAHs, PCBs, and TCDD) in accordance with OSWER Directive 9285.7-018, "Risk Assessment Guidance for Superfund, Volume 1 - Human Health Evaluation Manual, Part B, Development of Risk Based Remediation Goals," EPA discovered that the RGs were much lower than the cleanup concentrations typically selected for similar contaminants at other sites.

In fact, the concentrations were so small that the analytical detection limit would actually control the degree of cleanup because it is not possible to measure such small concentrations of contaminants in soil. Also, EPA noted that the methodology specified in the guidance for determining cleanup levels does not allow for consideration of the fact that the pit area will be backfilled with clean soil as part of every clean up alternative considered.

If the oily sludge pit were re-excavated in the future to construct a fishing pond or some other recreational feature, the soils

located in the bottom of the pit would be mixed with clean backfill material present in the upper area of the pit, resulting in the reduction of the concentration of contaminants in the pit bottom soils such that the total concentration of contaminants in the mixed material excavated and deposited on the surface of the site would be significantly less than the concentrations found in the bottom of the pit. EPA developed RGs at the site that are based on risk in accordance with existing EPA guidance, and also took into account the reduction in contaminant concentration that inevitably will occur due to the mixing of material located at the bottom of the pit with clean backfill at the top of the pit in the event the pit is re-excavated at some future time. A more detailed discussion pertaining to the development of the RGs for the site may be found in Appendix B of this ROD.

An RG was established for lead because the concentrations of lead in the oily sludge pit area are greater than concentrations that are considered to be protective of public health and the environment. The 500 mg/kg RG established for lead was developed by setting the UBK Lead Exposure Model (Version 5.0) to its default values. The default values assume a residential exposure scenario. This practice is appropriate at the site because the future recreational use planned for the site includes the exposure of children to lead. Risk-based RGs for lead cannot be established because a published slope factor or reference concentration for lead is unavailable.

The RGs for the oily sludge pit area are specified in Table 22 below:

TABLE 22
REMEDIATION GOALS

TABLE 22	
CONTAMINANT	**RG (MG/KG)**
PAH as Benzo(a)Pyrene Equivalents	3
PCB (Total)	10
Pb	500

Treatment goals for the sludge and ancillary contaminated soil and debris are identified in the following section, entitled "Statutory Determinations." The treatment goals identified for the remedy are

based on ARARs and "To Be Considered" information relevant to the implementation of stabilization remedies.

Since all the contaminated sludge and its ancillary contaminated soil and debris will be excavated, treated and disposed of in an off-site Subtitle D landfill, the remedy is protective of the public health and the environment and complies with all ARARs. There are expected to be no unmanageable short-term risks associated with this remedy. Although the selected remedy is not as permanent as many of the other remedies evaluated in the FS, it utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable at this particular site. The remedy is cost effective. The State has stated that it will accept this remedy, and this remedy is most like the remedy preferred by the public. Therefore, the selected remedy provides the best balance among alternatives with respect to the criteria used to evaluate remedies.

The criterion that ultimately weighed most heavily and contributed most to the selection of the alternative for the oily sludge pit over the other evaluated alternatives was State and community acceptance. The remedy selected in this ROD is as protective of human health and the environment as the preferred alternative identified in EPA's Proposed Plan. The main differences between the two alternatives are 1) the remedy selected in this ROD is less permanent than, but equally as protective as, the preferred alternative identified in the Proposed Plan, and 2) the remedy selected in this ROD is significantly less expensive than the preferred alternative identified in the Proposed Plan.

The State and members of the community were adamant in their opposition to EPA's preferred alternative as identified in the Proposed Plan. Their opposition was based on the belief that the preferred alternative was too expensive, while other less expensive and less permanent alternatives also would achieve protection of human health and the environment. The State and community have maintained their opposition to the preferred alternative despite EPA's explanation that its original basis for selecting the preferred alternative was grounded in EPA's desire to select a more permanent remedy.

The State and community have spoken and made clear their desire for a less expensive, less permanent, but equally protective remedy. The selected remedy is as protective as the originally identified preferred alternative. Accordingly, EPA has determined that it is appropriate in this instance to give deference to the State and community desire for a less expensive, albeit less permanent, remedy.

Landfill Areas

1. Prevent direct contact with and ingestion of the landfill

contents.

2. Ensure that contaminants present in the landfill areas that may migrate into the groundwater will not constitute a threat to public health and the environment.

The selected remedy for the landfill area will meet the objectives by:

- Covering the landfill areas with a natural soil cover to prevent humans and animals from contacting or ingesting exposed waste materials.

- Placing notifications in the property deeds to alert potential future owners that hazardous substances are present at the site and explaining actions taken to address contamination at the site.

- Long-term groundwater monitoring to detect and evaluate any threat posed by migration of contaminants at the site.

RGs were not developed for the landfill areas because the risk assessment shows the landfill areas to be a low-level threat that will not require active remediation in order to be protective if the above remedial action objectives are met.

No treatment goals have been established for the landfill area of the site because treatment of the landfill contents is not a component of the selected remedy for the landfill areas. Any necessary groundwater action levels will be established in the ROD for the groundwater operable unit, not this source control operable unit.

X. STATUTORY DETERMINATIONS

This section describes how stabilization and off-site disposal of the oily sludge pit wastes in a Subtitle D landfill, and installation of a natural soil cover over the landfill areas, along with implementation of institutional controls and long-term groundwater monitoring, will meet the statutory requirements of CERCLA Section 121.

♦ **Be protective of human health and the environment**

The remedy is protective of human health and the environment. The remedial action objectives and goals specified for the site in section IV of this ROD will be met.

The remedy for the oily sludge pit area is protective of the public health and the environment because:

1. The soils underlying the excavated material will not present

a risk from the direct contact, ingestion, or inhalation of any contaminants remaining in such soils;

2. If the visible waste and soils with contaminant concentrations greater than the RGs are excavated and treated in accordance with ARARs and the criteria specified in this ROD, then the threat due to the corrosivity of the waste will be removed;

3. Based on contaminant transport modeling performed during the RI/FS, the low concentrations of any contaminants remaining in the soils after excavation and treatment of the oily sludge pit waste and associated contaminated soil and debris should not present a threat to groundwater from leaching; and

4. Based on the analysis of the cleanup criteria contained in Appendix B to this ROD, concentrations of contaminants in the remaining soils after excavation and treatment of the oily sludge pit waste and associated contaminated soil and debris should not present a threat to public health or the environment if they migrate offsite.

The selected remedy for the landfill portion of the site is protective of the public health and the environment because the natural soil cover will prevent direct contact and ingestion of the landfill contents. The institutional controls will inform potential future owners that the site contains hazardous substances, and the groundwater monitoring will alert EPA to any future contaminant migration from the landfill. Thus, the remedial action objectives for the landfill area are met by the selected remedy.

♦ **Comply with ARARs**

The selected remedy will comply with all ARARs identified for the site. The ARARs that have been identified can be classified as chemical-specific, location-specific and action specific. The specific requirements applicable or relevant and appropriate to the selected remedy are discussed below. Additionally, although the selected remedy must comply with all substantive requirements of federal and state environmental statutes, on-site activities will not have to comply with the administrative requirements of these laws.

CHEMICAL-SPECIFIC ARARs

Clean Water Act - If water is generated and discharged on-site during the course of the remedial action, it will have to meet the substantive requirements of the Clean Water Act and the applicable standards for discharges to waters of the State of Arkansas as specified by ADPCE. The wastewater discharge limits specified by ADPCE are set forth in Table 23.

TABLE 23
WASTEWATER DISCHARGE LIMITS

TABLE 23	
Parameter	**ADPCE Discharge Standard ug/l (Unless Specified Otherwise)**
Temperature	32° Celcius
Turbidity	50 NTU
pH	6 - 9 s.u.
Phosphorus, Total	100 ug/l
Oil and Grease	10 mg/l monthly avg. 15 mg/l daily max.
Chlorides	60 mg/l
Sulfates	175 mg/l
Total Dissolved Solids	450 mg/l
Arsenic	1.75
Beryllium	0.076
Cadmium	1.66
Cyanide	5.2
Lead	5.9
Mercury	0.012
Nickel	100
Silver	0.12
Thallium	40
Chlordane	0.0043
PCB's	0.014
DDT	0.001
TCDD	$1.0e^{-6}$

Consistent with CERCLA § 121(d)(2)(A) & (B), EPA has determined that EPA's Water Quality Criteria developed in accordance with the CWA § 304 are relevant and appropriate to the remedial action at the site. EPA considered the potential uses of the surface water near the site, the environmental media affected and the purposes of the criteria. The State of Arkansas has identified several potential uses for the Mississippi River near the area of the site, including primary contact recreation,

secondary contact recreation, domestic and industrial water supply and as a perennial delta fishery. Thus, since both humans and aquatic life may potentially use the surface water near the site, EPA has determined that the criteria that apply to both human health and the protection of aquatic life are relevant and appropriate to the remedial action at the site. The remedial action will comply with this ARAR through treatment of any wastewater before it is discharged from the site to the Mississippi River.

LOCATION-SPECIFIC ARARs

40 CFR § 6, Appendix A - The remedial action must minimize the potential for harm to the wetlands and restore and preserve natural and beneficial values of the floodplain. This requirement is applicable to the remedial action because the site is located in the two-year floodplain of the Mississippi River. The remedial action will restore and preserve the natural and beneficial uses of the floodplain by eliminating the severe threat to the environment associated with the corrosive oily sludge pit and by restoring the area to its natural condition through the introduction of native grasses and soils.

40 CFR § 230 and 231 - The discharge of fill material into a wetland without a permit is prohibited. The substantive requirements of this regulation are applicable to the remedial action because portions of the site are wetland areas. Generally, a permit for discharging fill material into a wetland will only be granted where the permittee agrees to either create compensatory wetlands or take other appropriate abatement action. The remedial action will comply with this ARAR through the creation of compensatory wetlands during the excavation of the natural soil material that will be used to construct the soil cover.

Migratory Bird Act of 1918 (16 USC §§ 703-712) - Prohibits the unregulated and unintentional "taking" of native birds in the United States, such as would be the case if a bird landed in the oily sludge pit and was chemically burned or poisoned. The remedial action will comply with this ARAR through the excavation, stabilization and off-site disposal of the pit wastes and installation of a native soil cover because there will be no hazard to native birds after these actions are completed.

ACTION-SPECIFIC ARARs

Several requirements of Arkansas Hazardous Waste Management Act and the Arkansas Solid Waste Management Act are applicable or relevant and appropriate to the selected remedy.

1. **ADPCE Regulation No. 22, Section XII.B, which incorporates 40 CFR § 258.61** - Post closure of the landfill must be conducted in accordance with state regulations. The Operation and Maintenance Plan developed in the remedial design phase of the project will specify appropriate inspection procedures designed to maintain the integrity and effectiveness of the final cover. In addition, the selected remedy requires groundwater monitoring to ensure that any migration of contaminants remaining in the landfill is detected and evaluated appropriately to ensure they do not create or pose an unacceptable risk to the public health and the environment.

2. **ADPCE Regulation No. 23 § 268.42** - Because the waste in the oily sludge pit demonstrates the characteristic of corrosivity (EPA Waste Code D002), based on 40 CFR § 261.22(a)(1), prior to off-site disposal in a Subtitle D landfill, the waste must be deactivated to remove its corrosive characteristic, and it must be treated such that each underlying hazardous constituent in the waste meets the same concentration-based treatment standard promulgated for that constituent in the treatment standards for F039 wastewaters and nonwastewaters. F039 is the hazardous waste code for liquids that have percolated through land disposed wastes (i.e., leachate) resulting from the disposal of more than one listed hazardous waste (40 CFR § 261.31).

3. **ADPCE Regulation No. 23 § 268.41** - Because the waste in the oily sludge pit demonstrates the characteristic of toxicity for lead (EPA Waste Code D008), based on 40 CFR § 261.24(a), prior to off-site disposal the waste must be treated such that the concentration of lead in the extract of the treatment residuals does not exceed 5 mg/l.

4. **ADPCE Regulation No. 23 § 264** - The systems utilized to effectuate waste treatment or storage prior to waste treatment must conform to the design and operating standards set forth in this regulation for hazardous waste treatment and storage units. Systems that may be utilized in the treatment process include tanks, surface impoundments and waste piles.

5. **ADPCE Regulation No. 23 § 264.111** - Portions of this regulation, to be determined during RD, are relevant and appropriate to the oily sludge pit area because excavation of the waste in the oily sludge pit and placement of clean backfill is analogous to closure of a RCRA Subtitle C storage or treatment unit. This

regulation is not applicable because the waste was disposed in the oily sludge pit prior to November 19, 1980.

In addition to the chemical specific requirements specified earlier in this ROD, the substantive portions of the Arkansas Water and Air Pollution Control Act could be applicable or relevant and appropriate to the remedial action depending upon how treatment and disposal of the contaminated waters is accomplished.

1. **ADPCE Regulation No. 6 which incorporates 40 CFR §§ 122 and 125.3** - If wastewater is discharged from the site to a surface water of the State of Arkansas, it must meet: 1) certain technology-based requirements for the removal of pollutants from the wastewater prior to discharge, and 2) certain monitoring requirements. During RD, EPA will examine the pollutants present in the wastewater and determine to what degree proven technologies have been successful in treating those pollutants. Based upon this information, specific numerical effluent limitations or treatment efficiency requirements will be established that the remediation contractor must meet prior to discharging the wastewater.

2. **ADPCE Regulation No. 6 which incorporates 40 CFR § 403** - If wastewater is discharged from the site to a publicly owned treatment works (POTW), it must meet discharge standards that prevent pass through or interference with the POTW. For example, if heavy metals enter the POTW, the POTW's processes may not treat heavy metals in the wastewater (the metals may "pass through" the POTW), or the heavy metals may inhibit POTW operations and contaminate the POTW's sludge (the metals may interfere with the POTW). In such a circumstance, the remediation contractor would be required to remove the heavy metals before discharging wastewater to the POTW.

TO BE CONSIDERED CRITERIA

Off-site Disposal Policy - CERCLA wastes may only be disposed in a regulated landfill that complies with EPA's Off-site Disposal Policy. In general, a facility must be in compliance with all environmental laws in order to comply with EPA's off-site disposal policy.

Performance Criteria for Stabilization - EPA Region 6 has established certain performance goals for stabilization technologies that will measure the overall effectiveness of stabilization remedies. The goals which the selected remedy must meet are outlined in the following table:

TABLE 24
STABILIZATION PERFORMANCE GOALS

TABLE 24	
PARAMETER TESTS	**PERFORMANCE CRITERIA**
Unconfined Compressive Strength ASTM D1633	> 50 psi
Permeability ASTM D5084-90	$<10^{-5}$ cm/sec
Free Liquids	No visible liquid exuded under maximum strength test
Microbial Growth ASTM G-21, G-22	No growth; test required only if >10% organic content in the treated waste
Stabilization of Organics SW846-3550, 8270 (Adjusting for Dilution)	Reduction in Contaminant Conc. >50% Bases >30% Neutrals >60% Acids

- **Be Cost-Effective**

The selected remedy is cost-effective. Excavation, stabilization and off-site disposal at a Subtitle D landfill is the least costly remedy evaluated by EPA in the RI/FS that achieves the remedial action objectives established for the oily sludge pit area.

Installation of a natural soil cover, execution of deed notices, and implementation of long-term groundwater monitoring is a cost effective solution to the problem posed by the landfill areas at the site. Although it is the most costly of the remedial alternatives evaluated for the landfill areas, it is the only alternative that achieves the remedial action objectives. In addition, the natural soil cover alternative is the most permanent alternative for the landfill areas and is also the only alternative that complies with ARARs.

- **Utilize Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable**

EPA has determined that the selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, given the site-specific circumstances, including issues relating to State and community acceptance of the originally proposed remedy and the remedy selected in this ROD.

♦ **Preference for Treatment as a Principal Element**

The selected remedy satisfies EPA's preference for treatment as a principal element of the remedial action to address the principal threat at the site. The principal threat at the site is the 3.5 acre oily sludge pit that contains an estimated 22,000 cubic yards of corrosive sludge and associated contaminated soil and debris.

The most significant threat associated with the oily sludge pit area is the corrosivity of the oily sludge pit wastes. The selected remedy will address this threat through treatment via the stabilization process. During the stabilization process, the pH of the wastes will be raised to at least 7, thereby rendering the waste non-corrosive, or neutral.

The baseline risk assessment identifies the organic contaminants in the pit waste as the source of long-term risk at the site. If, upon completion of the excavation and stabilization of the oily sludge pit waste and associated contaminated soil and debris, the stabilized waste meets the performance criteria for stabilization specified in this ROD, then immobilization of the organic contaminants through treatment will have occurred. However, as discussed earlier, there is some uncertainty as to whether stabilization of these particular site wastes will effectively immobilize the organic contaminants.

Any threat associated with inorganic contaminants (e.g., lead) leaching from the waste into the groundwater will be addressed through the stabilization/treatment process. Although it is currently unclear whether or not the groundwater at the site has been impacted by the high lead content of the wastes, the stabilization process will treat the lead to render it immobile in the natural environment. During RD, EPA will evaluate and select an appropriate binder (e.g., cement, pozzolan, etc.) that will be mixed with the waste to promote the formation of insoluble lead hydroxides or other compounds with very small solubility coefficients.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

The remedy selected in this ROD to address the oily sludge pit is significantly different than the remedy identified by EPA as the preferred remedy in the Proposed Plan. Specifically, EPA is selecting stabilization and off-site disposal of the oily sludge pit wastes at a Subtitle D landfill (Alternative 4) rather than organic treatment, stabilization and off-site disposal at a Subtitle D landfill (Alternative 7), which was EPA's original preferred remedy. The change occurred as a direct result of comments EPA received from the public, PRPs, and the State of Arkansas during the public comment period.

In general, the public, the PRPs, and the State of Arkansas felt that the cost of the remedy preferred by EPA was not justified in light of the fact that the selected remedy, which costs significantly less, would also achieve protectiveness of human health and the environment. The Proposed Plan specifically discussed the fact that the selected remedy is less permanent than EPA's originally identified preferred remedial alternative. This issue also was explicitly addressed by EPA during the public meeting held in West Memphis, Arkansas on August 17, 1993.

The results of selecting Alternative 4 rather than Alternative 7 are: (1) the selected remedy is less permanent than (although equally as protective as) the remedy preferred by EPA because the risk associated with the organic contaminants will not be permanently addressed through destruction of the organic contaminants; and (2) the cost associated with cleaning up the oily sludge pit decreased from an estimated $14.8 - $18.1 million to an estimated $6.9 million.

In addition, a minor change is being made to the remedial alternative selected for the landfill areas at the site. Specifically, the selected remedy does not include backfilling the fishing pond near the RV park located north of the site as specified by EPA in the Proposed Plan. This change occurred because EPA reevaluated its decision to backfill the fishing pond to address the risk to fish eating birds and mammals from contaminants found in the pond fish.

It is now EPA's opinion that the fish from the Mississippi River may have been washed into the pond during past flood events. Since the fish in the Mississippi River contain contaminants at concentrations similar to those found in the fish in the pond, it is unclear whether or not the contaminants in the fish came from the site. This fact coupled with the fact that the contaminants in the fish were not found in either the pond water or sediments, has led EPA to conclude that backfilling the pond is not necessary to achieve protection of human health and the environment. Additionally, as noted in this ROD, the least tern is not anticipated to forage in the pond area.

XII. RESPONSIVENESS SUMMARY

This response to comments is provided to document EPA's consideration of relevant technical comments regarding the Administrative Record, including EPA's Proposed Plan. EPA has endeavored to address every comment it received. However, certain comments generally relating to EPA's selection of its originally identified preferred alternative for the oily sludge pit area are not specifically addressed in this Responsiveness Summary since that alternative was not selected to address the risk posed by the South 8th Street site.

In lieu of responding to those comments, EPA can best sum up the comments it received regarding the proposed alternative for the oily sludge pit area by stating that no comments in support of the preferred remedy were received by EPA. The public, the State of Arkansas, and the PRPs all stated that EPA's preferred alternative was too costly. Although EPA initially determined that the benefits of added permanence and increased reduction of mobility, toxicity, and volume justified the higher cost of EPA's proposed alternative, EPA has selected the remedy set forth in this ROD based upon the strong public sentiment to select a less costly remedy that is as protective, but less permanent than, the preferred remdy identified in the Proposed Plan. Although the selected remedy is less permanent than EPA's originally identified preferred remedy set forth in the Proposed Plan, the selected remedy meets the threshold criteria for selecting remedies mandated by the NCP.

COMMENTS SUBMITTED BY INDIVIDUAL CITIZENS

1. I do not accept as justified the charging of West Memphis taxpayers for any part of the Eighth Street Superfund Site actions.

Response: The comment is not relevant to the selection of remedial alternatives.

2. The site has been inundated almost every year for the past 30-40 years and any health hazards that may have existed have long since washed down the river and into the Gulf. The logical thing to do is cover the oil pit with gumbo clay and leave it alone.

Response: EPA disagrees. Health hazards at the site have not all washed downstream, as the risk at the site is above EPA's acceptable risk range. Merely capping the site was considered early in the evaluation of remedial alternatives, but was screened out because it was determined to be ineffective. Readers are referred to Section 2.5 of the Feasibility Study for more information regarding the reasons capping alone was screened out prior to the detailed analysis of alternatives.

3. The risk at the site is minimal and the reported risks are overinflated. Minimal risks at the site can be controlled via fencing and berm construction that has already been conducted.

Response: EPA disagrees. The risk at the site is neither minimal nor overinflated. EPA does not believe that the fence and berm are protective of the public health and the environment over the long-term because these remedies do not address the underlying hazards associated with the waste; nor do they comply with ARARs. Any remedy that does not include the excavation and off-site disposal

of the oily sludge pit will not accomplish the remedial action objectives and will not comply with ARARs. As recently as spring of 1994, local flooding destroyed part of the fence at the site, further indicating that such a remedy as that suggested by the commentor is not at all permanent.

4. The risk at the site is minimal. Risks attributed to the landfill can be controlled via maintenance of the fence and warning signs and limiting future development. A practical solution to the oily sludge pit would be to stabilize and dispose of the sludge on-site, cover it with a natural soil cover, and restrict public access by maintaining perimeter fencing.

Response: EPA disagrees. Merely limiting the remedial action to institutional controls for the landfill areas does not comply with ARARs. Stabilization and disposal of the sludge pit waste on the site is not protective of the public health and the environment because flood plains and other environments tend to promote the mobility of the contaminants, meaning there would be potential for the waste to migrate as a result of future flood events.

COMMENTS BY THE STATE OF ARKANSAS

5. The oily sludge pit should be remediated via alternatives 4 (stabilization) or 5 (subtitle C) and the landfill should be remediated via alternative 3 (natural soil cover). Comment submitted by Office of the Governor.

Response: EPA is selecting Alternative 4 for the oily sludge pit and Alternative 3 for the landfill areas.

6. The Governor of Arkansas urges that EPA eliminate any requirement to collect costs from the City of West Memphis. Comment submitted by Office of the Governor.

Response: The comment does not affect the selection of a remedial alternative for the site.

7. ADPCE supports Alternative 3 (natural soil cover) for the landfill area and, for the oily sludge pit area, ADPCE supports pretreatment of the oily material only and disposal in a Subtitle D or C landfill.

Response: EPA is selecting the natural soil cover, institutional controls, and long-term groundwater monitoring for the landfill. EPA disagrees with ADPCE's assessment that only pretreatment is necessary prior to offsite disposal in order to ensure the protection of public health and the environment. The waste will need to be treated via stabilization/solidification as necessary to comply with land disposal restrictions and performance goals identified in this ROD.

8. ADPCE will not support EPA's preferred alternative.

Response: EPA has selected a remedy other than its initially identified preferred alternative.

COMMENTS BY THE CITY OF WEST MEMPHIS, ARKANSAS

9. The scenarios used in the baseline risk assessment to develop, screen and select the EPA's preferred alternatives are unreasonable, unrealistic and do not accurately represent any risks associated with the current or reasonably possible uses of the site.

Response: EPA disagrees. The receptors that were considered in the baseline risk assessment include: (1) current and future recreational visitors; (2) future recreational workers; and (3) current and future crop consumers. A recreational exposure and crop consumer scenario were utilized because:

- The site is in the two-year flood plain of the Mississippi River, thereby precluding the construction of any residential or commercial facilities.

- The site was seriously considered as a possible location for a state park by the Arkansas Department of Parks and Recreation.

- There is currently a large RV park that borders the site immediately on the north.

- The site was used as a parking lot for an annual local festival where total attendance was as great as 30,000 people.

- The EPA Remedial Project Manager (RPM) personally observed numerous people, including children, engaged in recreational activities near the river in the vicinity of the site before it was fenced.

- Aerial photography shows that the site was farmed as recently as 1986.

10. Remediation goals (RGs) should be established for the landfill areas. If RGs are not required, then the landfill areas should not be cleaned up.

Response: EPA disagrees. RGs are not necessary for the landfill areas because the remedial alternatives for the landfill areas do not involve the excavation of the waste. The presumptive remedy for landfills (OSWER Directive 9355.0-49FS) states that EPA does not usually excavate landfills because it is impractical and too costly for the amount of risk reduction that would be achieved.

Were excavation of the landfill contents contemplated, RGs would be established in order to ensure that the excavation proceeded until all the contaminated material was removed from the landfill.

11. The Proposed Plan dismisses "No Action" without proper development of this alternative.

Response: EPA disagrees. The "No Action" alternative was developed to the extent necessary to determine that a decision of "No Action" would be inconsistent with the NCP because it would not meet the threshold requirements and would neither be protective of human health and the environment nor comply with ARARs.

12. The EPA's preferred alternatives are more costly than other possible alternatives that meet the remedial action objectives for the oily sludge pit and the landfill and should be eliminated on the basis of cost.

Response: EPA agrees that there is a difference in the costs of all of the alternatives considered in the FS. However, EPA disagrees that alternatives should have been eliminated solely on the basis of cost. The NCP requires EPA to consider a wide range of possible response actions and nine different criteria in the evaluation process. The NCP identifies only two criteria as threshold criteria that a remedy must meet in order to be considered further for a site. Cost is not one of those threshold criteria, and, accordingly, may not be used alone to eliminate an alternative from consideration.

13. There are no "hot spots" in the landfill areas requiring remedial action.

Response: EPA agrees. However, while there are no "hot spots" requiring active treatment, the landfill areas pose risks to human health and the environment that must be addressed.

14. The level that the EPA proposes to reduce the lifetime cancer risk associated with the site greatly and unreasonably exceeds the national lifetime risk of cancer from everyday sources.

Response: EPA agrees that the level to which the risks are proposed to be reduced are less than the national lifetime risk, but disagrees with the commentor's opinion that this action is unreasonable. The level to which risk is proposed to be reduced (between 1 in 1 million and 1 in ten thousand) is the level mandated by the NCP, and EPA must act not inconsistently with the NCP. Changing or amending the NCP is beyond the scope of the remedial action decision at the South 8th Street Landfill site.

15. The EPA's preferred alternatives are not reasonable or appropriate considering overall protection of human health and the environment, compliance with applicable or relevant and

appropriate requirements, long-term effectiveness and permanence, reduction of toxicity or volume through treatment, short-term effectiveness, implementability, cost, state acceptance, and community acceptance.

Response: EPA disagrees. As discussed in the ROD, EPA's preferred alternatives are appropriate when considering the primary and balancing criteria.

16. The risk assessment fails to consider that before any recreational use could be made of the property some development and improvements would be necessary. The filling in of low areas and raising the elevation of the entire site provide a covering which would reduce the risk of exposure for any future recreational visitor or worker.

Response: EPA disagrees. The site has been utilized for recreational purposes in the past without any improvements and there is no reason to believe that it would not be so utilized in the future. In addition, future improvement and development would likely result in the excavation and spreading of contaminants over the site, thereby increasing the risk to the public.

17. The cost of on-site incineration, stabilization of ash and disposal in a Subtitle D landfill appears to be excessive for meeting the remedial action objectives for the oily sludge pit.

Response: EPA disagrees. The cost of the remedial action described by the commentor is not excessive considering the high degree of permanence and contaminant destruction that would be achieved via implementation of that remedy.

18. In regards to on-site incineration and disposal of ash in a Subtitle C landfill, the necessity of disposal in a Subtitle C landfill as opposed to the disposal in a Subtitle D landfill has not been demonstrated.

Response: The inclusion of an incineration alternative in the FS that specified disposal of ash in a Subtitle C landfill rather than a Subtitle D landfill was performed to comply with the NCP's mandate to develop a range of alternatives.

19. Of the proposed alternatives meeting the remedial action objectives for the pit, Alternative 4 is the most cost effective.

Response: EPA agrees that Alternative 4 is a cost effective remedy. However, EPA notes that other alternatives set forth in the FS are also cost effective.

20. The disposal of waste at a Subtitle C landfill is not necessary when a Subtitle D landfill will suffice.

Response: EPA agrees that ARARs would not require the disposal of non-hazardous waste at a Subtitle C facility rather than a Subtitle D facility. However, decisions as to the appropriateness of the use of a Subtitle C versus a Subtitle D facility for the disposal of any given waste must be viewed in the context of the particular site and waste being considered and with reference to the nine criteria EPA must utilize in evaluating potential remedial alternatives, especially long-term permanence and compliance with ARARs. Finally, EPA notes that hazardous waste cannot be legally disposed in a Subtitle D landfill without first being rendered nonhazardous. See also response to comment 18 above.

21. Off-site incineration should be eliminated on the basis that its cost is excessive.

Response: EPA disagrees. Cost alone is not a sufficient reason to eliminate an alternative from the range of alternatives that will be evaluated in the analysis of alternatives. If a particular alternative is expensive, but also achieves a high degree of permanence and significantly reduces the mobility, toxicity and volume of the waste, it can still be cost effective. Indeed, the NCP requires EPA to develop a wide range of alternatives, including an alternative that "removes or destroys hazardous substances, pollutants, or contaminants to the maximum extent feasible," [40 CFR § 300.430 (e)(3)]. Off-site incineration is one such alternative.

22. The cost and time associated with EPA's preferred alternative (organic treatment, stabilization, disposal in Subtitle D landfill) are greater than the cost and time of other alternatives that also meet the remedial action objectives.

Response: EPA agrees. However, many of the less costly alternatives, inter alia, are less permanent and reduce mobility, toxicity and volume to a lesser degree.

23. Institutional controls meets the remedial action objectives (for the landfill areas) and is more cost effective than EPA's preferred alternative.

Response: Institutional controls was not selected as the remedial alternative for the landfill areas because Institutional Controls alone can not meet the threshold criterion of compliance with ARARs.

24. Groundwater monitoring is unnecessary in that the remedial investigation has determined that any groundwater contamination is below applicable action levels.

Response: EPA disagrees. EPA is deferring any decision regarding the groundwater operable unit at this time pending further investigation. Current groundwater data is insufficient to render any decision regarding the threat or lack of a threat to human health and the environment posed by the groundwater. Groundwater monitoring is specified as a component of the selected remedy because hazardous substances will remain at the site after the remedial action is completed, and monitoring will enable EPA to detect any migration of contaminants in the groundwater. Additionally, groundwater monitoring is included as a component of EPA's presumptive remedy for landfills.

25. EPA has failed to demonstrate that the requirements of the Arkansas Solid Waste Management Act and the regulations adopted by the Arkansas Pollution Control and Ecology Commission, particularly the requirement of a two-foot clay cover, are applicable, relevant or appropriate for this site.

Response: EPA disagrees. EPA agrees with the State of Arkansas that the 2-foot cover requirement is a State ARAR for the response action. Section XVIII of the Arkansas Solid Waste Management Code states that existing open dumps and other unpermitted disposal facilities shall be required to meet the same closure criteria as set out in the Code for permitted facilities. The closure criteria for permitted facilities require that a compacted layer of at least 2 feet of material capable of supporting vegetation be placed over all completed portions of the landfill.

COMMENTS BY W.L. JOHNSON COMPANY, A PRP

26. The three-acre or so area comprising the "Gurley Pit" should be separated out and treated independently.

Response: EPA agrees. The three acres comprising the pit that resulted from Mr. W.M. Gurley's re-refining operation are being treated differently from the landfill area.

27. The legal process needs to be sped up to keep pace with the technical work performed at the site.

Response: Comment so noted. EPA has endeavored to move the enforcement process forward as expeditiously as possible.

28. The pond should not be backfilled due to a possible risk to fish-eating birds and mammals when any contamination that is present in the fish may very well have resulted from fish in the Mississippi River being washed into the pond.

Response: EPA agrees. After further review of the relevant data, EPA has determined that the contaminated fish may very well have come from the Mississippi River as no contaminants similar to those

found in the fish were found above detection limits in the pond water or sediments.

COMMENTS BY CHEVRON, A PRP

29. Health risks have clearly been overestimated due to the use of default exposure parameters throughout the risk assessment.

Response: The EPA disagrees. The use of default exposure factors does not a priori result in overestimates of risk. EPA selected standard default exposure factors to represent high end exposures in situations where site-specific data are not available. In this case, the commentor did not provide studies quantifying exposure factors for this site, or any other site-specific information, that could be reviewed by EPA for determination of its usability in the site risk assessment. It should be re-emphasized that default values were not used when more specific scenarios were utilized (e.g., the maximum length of stay in an Arkansas campground/park, the number of days the site is flooded, etc.).

30. Assumed soil ingestion rates for workers are inconsistent with EPA guidance, are unrealistic, and are the least validated of the default exposure parameters propagated by EPA.

Response: EPA disagrees. EPA's guidance does not prohibit the use of the 480 mg/day soil ingestion rate for workers who are engaged in outdoor activities that would result in more contact with soil. It simply says that the exposure duration generally (not "only") will be short, but that it might vary according to site-specific plans. EPA believes the assumed exposure durations are consistent with the assumed future use of the area as a campground or as a state park. It is acknowledged that the default ingestion rate is based upon limited empirical evidence. It should be noted, however, that there is some possibility that actual measurements (were they to be performed) could be even higher. A more detailed discussion of EPA's risk scenarios for recreational workers may be found in Appendix B to this ROD.

31. The assumed skin surface areas are unjustified given the temperate environment in Arkansas and that a more appropriate surface area value would take into account the seasonal climate at the site.

Response: EPA disagrees. EPA believes that the default assumption for skin surface area (25% of total skin area, from EPA's dermal guidance) is appropriate for this site. Although the guidance suggests that this value could be adjusted for climate, the adjustment would likely increase the assumed exposed skin area since climate conditions in Arkansas would favor warmer weather for a greater portion of the year than in a more temperate region of

the country. Indeed, the time of year when visitors will likely visit the site is when the weather is warm.

32. The exposure duration for an agricultural worker of 25 years does not appear to be reasonable. It is unusual for workers to be associated with one particular agricultural property for more than a few years unless it is a farm family.

Response: EPA disagrees that an exposure duration of 25 years is unreasonable. Given the size and location of the site, it is not unreasonable to assume that the agricultural worker is part of a farm family that works a portion of the site continuously for 25 years.

33. The average ingestion rate assumed for the child camper (200 mg/day) is not the average soil intake by children at a residence but is an upper bound for soil and dust and is therefore inappropriate for use in an average exposure scenario.

Response: EPA disagrees with the commentor's opinion that it is inappropriate to use 200 mg/day to represent an average soil intake rate by children at a campground. While it is true that the 200 mg/day ingestion rate represents an upper bound estimate for a *residential* scenario, EPA used a *recreational* scenario in the risk assessment. Soil intake rates for recreational scenarios are likely to be greater than soil intake rates for a residential scenarios because children will likely spend more time outside engaged in activities that promote the intake of dust and contaminated soil. Thus, it is appropriate to assume an average soil intake in a campground situation of 200 mg/day when 300 mg/day represents the reasonable maximum intake, as performed in the risk assessment.

34. The assumed soil ingestion rates for the adult recreational visitor are high and appear not to be validated by scientific studies.

Response: EPA agrees that the soil ingestion rates may appear high and that they are not validated by scientific studies. However, the rates utilized in the risk assessment are not inappropriate given the overall lack of scientific information available regarding ingestion rates in recreational situations. The rates that were used in the risk assessment are based on judgmental extrapolations based on best professional judgment by a professional toxicologist and represent EPA's best efforts to perform a risk assessment that is protective of the public health and the environment. Since no other data were available, EPA believes the rates are reasonable and appropriate for this situation.

35. The assumption of 40% of vegetable intake for the RME consumer greatly overestimates risks and should be re-evaluated or quantitatively evaluated in the uncertainty section.

Response: EPA disagrees. The fractional intake assumption was based on a farm family in the area who used the site to grow produce both for their consumption and for sale in a truck-farm type situation (not a commercial agricultural operation, per se). The Agency recognizes the uncertainty in quantification of the vegetable pathway and has appropriately factored that information into its risk management decisions regarding remediation at this site.

36. The models for estimating chemical concentrations in produce are not well validated and supporting data are sparse.

Response: EPA recognized the uncertain methodology for estimating risks from the vegetable pathway and factored this information into its risk management decisions regarding remediation at this site.

37. Soil data used to determine vegetable concentrations was biased.

Response: EPA disagrees. The site data were developed by using a systematic/random approach in which some samples were collected from areas that were obviously contaminated and some samples were collected from areas where no obvious contamination existed. In an effort to control the cost of the investigation and ensure the protection of public health and the environment, more samples were collected from areas which appeared to be visibly contaminated than areas in which no visible contamination was identified.

38. Likely crops that would be grown in the area were not evaluated.

Response: EPA disagrees. An evaluation was conducted of the possible types of crops that could be grown at the site. EPA concluded that all three types of plants (leafy, root, fruits) could be grown, and this information was considered in the risk assessment. In the absence of site specific information, the evaluation conducted is appropriate, and the uncertainty associated with the agricultural scenario was factored into EPA's risk management decisions at the site.

39. Soil samples were taken in biased locations and then inappropriately used in exposure point concentrations.

Response: EPA disagrees. See response to comment 37 above.

40. In area 2/3 it was assumed that excavated soils were spread on the surface and this methodology biases the data.

Response: EPA disagrees. EPA believes it is reasonable to assume that the site will be excavated and the soils spread on the surface because such an event actually occurred at the site when the current owner constructed the fishing pond located at the north end of the site. Other commentors (see comments 16 and 64) have noted that improvements to the site may be conducted in order to make it more suitable for recreational visitors. These improvements could very well involve the excavation and spreading of subsurface materials on the site surface, thereby increasing the likelihood that receptors will come into contact with the contaminated subsurface soils. EPA believes that its assumption does not bias the data, but rather presents a plausible scenario that considers the risk associated with the most highly contaminated portions of the site.

41. The appropriateness of using the maximum toxaphene value as being representative of the data set needs to be further evaluated since the chemical was detected at a low frequency.

Response: EPA disagrees. The calculation of the exposure point concentration for toxaphene was conducted according to EPA guidance (i.e., the upper 95th confidence limit of the arithmetic mean, or the maximum concentration (whichever was lower) was used). In areas where toxaphene was never detected, the exposure point concentration was assumed to be zero.

The fact that toxaphene was detected only twice is not a valid reason for eliminating it from the chemicals of potential concern. Since both samples detecting toxaphene were clustered in Area 1 and showed fairly high concentrations (40-240 ppm), inclusion of this chemical in the risk assessment was warranted.

42. It is unclear which soil values were used to evaluate the future recreational worker risk. Since naturally occurring chemicals (beryllium and arsenic) contribute significantly to risk, there needs to be further discussion of their significance.

Response: The risk assessment clearly shows which soil values were used to evaluate future recreational worker risk. The specific sample identifiers used in exposure point concentration calculations for this scenario are listed in Table 3-2 of the risk assessment. EPA acknowledges that <u>total</u> site risks were calculated without regard to the source of the chemicals (either from background or site activities) and that the levels of arsenic and beryllium found at the site are not significantly different from background. However, EPA disagrees with the commentor's assertion that arsenic and beryllium contribute significantly to the risk at the site. In any event, a review of Table 5-2 (depicting risk associated with each major contaminant) in the oily sludge pit risk assessment establishes that, even without considering the risk from arsenic and beryllium, the risk at the site is 1×10^{-3}, which

corresponds to the total RME risk reported for the recreational worker pathway in Table 5-1.

A similar evaluation of the risk associated with the landfill areas shows that even when the risk from arsenic and beryllium is subtracted from the total site risk for the future recreational worker as specified in Table 5-1, the risk (4×10^{-4}) still exceeds EPA's acceptable risk range of between 1×10^{-4} and 1×10^{-6}.

43. It is unclear how background samples were used for the site. The contribution of background levels to risk estimates needs to be understood to help evaluate the significance of the risk estimates.

Response: See response to comment 42.

44. It is recommended that chemical-specific degradation data be used to more accurately assess representative exposure concentrations over the chronic exposure periods.

Response: EPA disagrees. Exposure concentrations were assessed consistent with relevant EPA Risk Assessment and RI/FS guidance and policy, which do not require the development and use of chemical-specific degradation data. Consistent with that guidance and policy, most EPA RI/FSs do not include the collection of site specific degradation data, and degradation is typically not considered in the baseline risk assessment.

45. The effect of degradation from flooding events is also not considered or discussed.

Response: EPA agrees that degradation caused by flooding was not considered in the risk assessment. However, given the fact that the contaminants have been located at the site for a significant period of time and continue to pose a significant risk to the public health and the environment, the potential effect of degradation from flooding events is not expected to be significant. See also EPA's response to comment 44 above.

46. The uncertainties associated with the toxicity treatment for carcinogenic PAHs needs to be further quantitatively evaluated and discussed.

Response: EPA disagrees. At the time the risk assessment was conducted, the Toxicity Equivalency Factor (TEF) approach for characterizing the carcinogenic risks associated with PAHs was not yet officially adopted by EPA. If the toxicity equivalency factor approach was considered in the baseline risk assessment, the risk estimates would be approximately one order of magnitude lower. For example, the future risk to a recreational worker would be 1×10^{-4} rather than 1×10^{-3}. This would still exceed EPA's acceptable risk range.

47. The terminology to describe the landfill is confusing. There seem to be several uses of the word "site". Also it would be useful to understand the rationale for separating the two areas.

Response: The term "site" refers to the 30 acre area encompassed by the fence in Figure 1 of the ROD. The two landfill areas were separated when evaluating the risk to recreational visitors and agricultural workers because it is conceivable that neither of those receptors would be likely to frequent the entire 30 acre area. The site was not separated to address the risk to a recreational worker because a recreational worker would be expected to frequent the entire site area.

48. On Table 2-1 are the detection frequencies for the landfill area or for the landfill plus study area.

Response: The table lists detection frequencies for samples from the landfill area only. Sampling data from the study area are summarized in Appendix A, Tables A1-6 and A1-7 of the risk assessment.

49. An Executive Summary should be included to summarize the approach and findings of the risk assessment.

Response: An Executive Summary was prepared for the risk assessment for inclusion in the RI report. The RI report includes a summary of the risk assessment in Section 5.

50. The introduction should be expanded to include a discussion of proposed future land uses.

Response: EPA believes that the discussion of future land uses is appropriately included in the exposure assessment.

51. The risks on Table 5-3 presented for the Recreational Worker are those associated with the RME, not the average.

Response: There is a typographical error in the heading and it should read "RME," not "average".

52. There is an inconsistency between Appendix 2 and Table 3-5 on the exposure frequency for the crop consumer.

Response: The assumed exposure frequency for the crop consumer is 350 days per year, and this is the value that appears in both Appendix 2 and Table 3-5.

53. On Page 3-7 flux rates were presented and it is unclear why these data are presented here. Simple calculations are available to give an indication of the relationship between

the flux and an estimated risk.

Response: The purpose of this section of the report was to identify all possible, reasonable exposure pathways and to then evaluate if the pathway was complete and the degree to which it would be evaluated quantitatively in the risk assessment. The flux data were presented with other monitoring data in Section 2.1.2 and were merely discussed in the exposure assessment as the data relate to potential exposures to volatile chemicals on site.

54. A Monte Carlo analysis should be utilized to provide true estimates of the average and RME risks.

Response: Average and RME risks for the site were developed consistent with relevant EPA guidance and policy, which do not require the use of a Monte Carlo analysis in risk assessments.

COMMENTS SUBMITTED BY PRP GROUP

55. The conclusions of the risk assessment are invalid based on the use of unrealistic and unreasonable exposure scenarios.

Response: EPA disagrees. As noted in its response to comment No. 9, EPA believes that the exposure scenarios used to develop the baseline risk assessment are consistent with the NCP and EPA guidance and relevant site specific information. In making its risk management decision, the EPA has taken into consideration the uncertainty associated with each of the exposure pathways.

56. The land uses proposed by EPA in the risk assessment are not reasonable or justifiable for the site in its current physical state.

Response: EPA disagrees. See response to comment No. 9.

57. The use of the site for agricultural production is unreasonable.

Response: EPA disagrees. See response to comment No. 9.

58. The frequency and duration of exposure via crop consumption are greatly overestimated.

Response: While the EPA agrees that agricultural future use likely is not as probable as the recreational future use, the assumed exposure duration and frequency are standard defaults specified in EPA guidance for a farm family scenario. They are designed to represent the reasonable maximum exposure for this type of human activity.

59. Accurate quantitative presentations of risks posed by crop consumption are not possible given the lack of developed contaminant transport models for crops. In addition there was no effort to account for differential uptake or different types of edible crops.

Response: In the risk assessment, the EPA acknowledged the uncertainty associated with attempts to quantify any crop consumption pathway. The EPA has taken this into consideration when making remedial decisions regarding this site. Ignoring the agricultural scenario would not be protective of the public health and environment because aerial photographic analysis and site visits by EPA personnel confirmed that the site has been used for agricultural purposes in the past and that areas near the site were being used for agriculture at the time the site was proposed to the NPL.

60. The future recreational use of the site is not reasonable given the current condition of the site.

Response: EPA disagrees. See response to comment No. 9.

61. There is no reasonable scenario which would result in subsurface soils being excavated and spread on the ground.

Response: EPA disagrees. See response to comment No. 16 and 40.

62. The ingestion of fish from the on-site pond, especially for the long term assumed in the risk assessment, is unreasonable and unrealistic.

Response: EPA disagrees. Catching and eating one fish meal each day the pond is visited is not unrealistic and represents an estimate of a reasonable maximum exposure from this pathway.

63. The occasional trespasser scenario or recreational worker scenario should have been used as the reasonable maximum exposure.

Response: EPA disagrees. The RME exposures utilized in the risk assessment are appropriate. An occasional trespasser does not represent the current reasonable maximum exposure because the site has a history and potential for frequent visits by a large number of people. See response to comment No. 9 regarding the rationale used by EPA to develop exposure scenarios.

64. Potential future land use for the site would only occur after site improvements were performed which would result in the elimination of exposure pathways.

Response: EPA disagrees. See response to comment 16.

65. The removal of the direct contact pathway will result in acceptable risks under any reasonable exposure scenario.

Response: EPA agrees with this comment to the extent that it addresses risks posed by direct contact with the site contaminants. The removal of direct contact with the contaminated soil (with the associated subsequent ingestion or dermal absorption of the material) will reduce direct contact risks at the site to acceptable levels. The direct contact threat associated with the landfill areas will be removed by installing a natural soil cover the site.

EPA disagrees with the comment to the extent that the comment fails to acknowledge that there are other risks and exposure pathways at the site that would not be addressed adequately solely through the elimination of the direct contact pathway (e.g., migration of site contaminants to the groundwater).

66. The RI does not present an adequate evaluation of the data.

Response: EPA disagrees. Section 3.4 of EPA's "Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA" states that the requirements for site characterization and data analyses shall include: the site physical characteristics, source characteristics, nature and extent of contaminants, and contaminant fate and transport. EPA has addressed these requirements through field activities, assembling data in the Administrative Record, and project reporting. EPA investigated the site, visually and technically identified hot spots, determined the physical characteristics and nature and extent of contaminants, assessed contaminant fate and transport, evaluated and documented risk considerations, and produced a comprehensive RI/FS report. As such, EPA has, in fact, provided an adequate evaluation and reporting of the data.

67. The RI does not provide the basis for the constituents/ concentrations which are subsequently used in the risk assessment.

Response: EPA disagrees. The analytical results summarized in the RI report, in several instances, did not include concentrations below contract required detection limits that were reported in the data packages. The organic data from the oily sludge pit were estimated (i.e., "J" qualified) on several accounts due to inherent problems with extraction and dilution on this difficult type of matrix. This data was included in the appendices for the RI report (and the Administrative Record) and was concurrently available for evaluation and use in the risk assessment. According to EPA's guidance, J-qualified data are used for risk assessment calculations as if they were unqualified. Data from previous EPA investigations (HRS Documentation Record, FIT report 5/88, and TAT report 6/87) established that carcinogenic PAHs (i.e.,

benzo(a)pyrene, chrysene) are present in the oily sludge material and contaminated soils at concentrations comparable to those reported in the RI data package. Therefore, the EPA determined that the estimated concentrations for the referenced compounds are appropriate for calculating risk for the site.

68. The constituents of concern, which are identified as carcinogens in the Proposed Plan, are not, in fact, carcinogenic.

Response: EPA concurs. However, this comment is not entirely correct and is misleading if considered outside of the context in which the statement was rendered. While it is true that naphthalene, 2-methylnaphthalene, phenanthrene, and anthracene are not carcinogenic by themselves (assuming the Toxicity Equivalent Rule), their presence typically is indicative of the presence of carcinogenic PAHs. The detection limits for the individual carcinogenic PAH compounds reported in Tables 3-6 through 3-12 and Appendices P, R, X and Z of the RI Report were so high due to the interference caused by the oily nature of the wastes, that they were not detected as individual constituents. However, based upon the confirmed presence of carcinogenic PAHs in previous studies and in wastes found at other similar sites created by the depositing of wastes generated during waste oil re-refining (e.g., Double Eagle and Fourth Street sites, Sand Springs site, and Gurley Pit site (where wastes were generated by the same facility utilizing the same process that generated waste at the South 8th Street site)), it is reasonable to report the concentrations of non-carcinogenic PAHs as strongly indicating the probable presence of carcinogenic PAHs.

69. EPA's proposed remedy for the landfill area is not appropriate based on the evaluation of current and future risks posed by this area.

Response: EPA disagrees. The risks attributed to the landfill area exceed EPA's acceptable risk, as set forth in the NCP.

70. The degree of mitigation of wetlands during site remediation should be dictated by the current usefulness of wetlands.

Response: EPA agrees. The wetlands mitigation plan will be developed during the remedial design. EPA currently estimates that 1.1 acres will need to be mitigated during the remedial action.

71. The risk associated with a current recreational visitor scenario demonstrates that the pit area actually poses a lower current risk than the landfill areas.

Response: The comment is irrelevant since the current visitor scenario is not the scenario that drives the risk management decision at the site. The current recreational visitor risk for

both areas is within the range of 10^{-6} to 10^{-7}. However, the risk associated with the oily sludge pit area is one order of magnitude greater than the landfill area for the future recreational worker. Furthermore, the comment ignores the immediate threat posed by the corrosive oily sludge pit waste and the need to address the risks to the public health and the environment that it poses.

72. The remedial measures proposed for the landfill would be adequate as well for the pit area.

Response: EPA disagrees. The sole application of a soil cap for the oily sludge pit area was considered in the FS but screened out early in the process because it would be ineffective at controlling the oily sludge pit risk over the long-term. See also response to comment 2.

73. The stated remedial action goals for the pit area will be met by removing the direct contact pathway, the need for removal of pit materials is not warranted to meet the remedial action goals.

Response: EPA disagrees. The removal of the direct contact pathway is only one of a number of considerations which were incorporated into the remedial action goals for this site. For example, merely covering the oily sludge pit area to eliminate the direct exposure pathway for the oily sludge pit waste will not address the potential for migration of contaminants into the groundwater. See also EPA's response to comment 65.

74. The numerical remedial goals presented in Figure 5-2 of the FS for total carcinogenic PAHs (0.33 mg/kg) and total PCBs (0.07 mg/kg) are not justified based on the risk assessment and are not consistent with the remedial goals at other Superfund sites.

Response: EPA has reassessed the remediation goals identified in the FS and established new goals that more adequately consider the specific factors at the South 8th Street site. The basis for the revised remediation goals is provided in Section IV and Appendix B of the ROD.

75. In-place neutralization of the pit sludge will adequately address EPA's stated "most significant risk" from the pit area.

RESPONSE: EPA agrees that neutralization, either in-place or at an intermediate location, will achieve a reduction in the risk associated with the corrosivity of the pit waste. However, neutralization is only one step in the process of addressing the overall risk at the site. Addressing the corrosivity of the pit waste does not diminish the need to address the other components of risk presented by organic and inorganic contaminants at the site.

76. EPA has not demonstrated that the pit area is a "hot spot" requiring additional remedial measures.

Response: EPA disagrees. Considering the site as a whole, the oily sludge pit clearly constitutes a principal threat as defined by the NCP and EPA guidance. The NCP defines a principal threat or "hot spot" as those source materials that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. Wastes that generally will be considered to constitute principal threats "include waste contained in drums, lagoons or tanks, ..., containing contaminants of concern," (Draft Guide to Principal Threat and Low-Level Threat Wastes, November 1991 (Publication 9380-06FS) (emphasis added). The chart below summarizes the differences between the oily sludge pit area and the landfill area that have resulted in the oily sludge pit area's designation as a "hot spot":

TABLE 25
THREAT COMPARISON
SLUDGE PIT/LANDFILL AREA

TABLE 25		
Characteristic	**Sludge Pit**	**Landfill**
Corrosive	Yes	No
Mobility	High (esp. Pb)	No
Risk	1×10^{-3}	1×10^{-4}

77. EPA rejected onsite remedies including [sic] without justification.

Response: EPA disagrees. The remedial action alternatives considered and developed by EPA are appropriate and were based upon the technical characteristics of the site. The NCP does not require EPA to develop every potential alternative for a site, or even to develop a cadre of on-site and off-site remedies. Rather, EPA is required to develop a range of alternatives in which treatment is a principal element, one or more alternatives that involve little or no treatment, the no action alternative, and one or more innovative treatment technologies for further consideration if those technologies offer the potential for comparable or superior treatment.

78. The use of in-place stabilization was rejected without proper technical evaluation. Stabilization has been demonstrated to be effective in immobilizing organic constituents.

Response: EPA disagrees. See EPA's response to comment 77 for a discussion of EPA's compliance with the NCP's requirement regarding the evaluation of alternatives. EPA is not required to exhaustively evaluate in-place stabilization. EPA also disagrees with the commentor's suggestion that stabilization is an effective technique for the treatment of all organic waste, irrespective of the specific characteristics of a given waste. Furthermore, EPA notes that the commentor, in an attempt to support its statement, appears to have erroneously interpreted various treatability studies from other sites.

An example of the commentor's erroneous interpretation of other site treatability studies is the commentor's discussion of the use of stabilization at the PAB Oil site. The commentor cited the PAB Oil site as one at which EPA Region 6 has selected stabilization to treat organic waste. The commentor's citation of PAB is misleading, in that the selected remedy for the PAB Oil site consists of the use of stabilization <u>in conjunction with</u> bioremediation to treat the organic waste at the site. In fact, the PAB Oil ROD specifically discusses the fact that stabilization alone would be insufficient to address the organic waste at the PAB Oil site.

79. The need for immobilization of the constituents in the waste mass has not been demonstrated.

Response: EPA disagrees. The risk assessment establishes that the waste that will be immobilized constitutes the principal threat at the site. If the contaminants are not immobilized, they may migrate into the groundwater or be released to the surface water during flood events. Finally, the oily sludge fails the TCLP for lead and must be immobilized prior to final disposal in order to comply with land disposal restrictions.

80. EPA has not considered that an on-site remedy could actually result in a lower overall ultimate risk for the site.

Response: EPA disagrees. The waste must be disposed of off-site in a secure landfill in order for the risk at the site to be properly addressed. The disposal of a hazardous or solid waste in a floodplain where it can easily come into contact with both surface and groundwater is generally not considered to be protective of the public health and the environment. For example, recent EPA regulations pertaining to the siting of solid waste landfills preclude new landfill construction in a floodplain. See also EPA's response to comment 77 regarding the development and evaluation of remedies that specify in-situ stabilization.

81. The remedy selection process was not consistent with the NCP.

Response: EPA disagrees.

82. EPA has not developed appropriate remedial goals or ARARs for the proposed alternative.

Response: EPA disagrees. See response to comment No. 74 with reference to remediation goal issues. With respect to ARARs issues, chemical and location specific ARARs for the site are provided in Tables 2-1 and 2-2 in the landfill portion of the FS. These ARARs were not repeated in Section 5 of the FS because it is apparent that chemical and location specific ARARs would not change between the landfill and oily sludge pit portion of the site (i.e., the oily sludge pit and landfill area are located in the same vicinity (both in a flood plain) relative to a discussion of ARARs, and the chemicals of concern had not changed except with regard to concentration). Action specific ARARs were identified separately for the two areas in Tables 2-11 and 5-3. The discussion of each alternative in the FS contains a specific statement relative to whether or not an alternative would comply with the identified ARARs.

83. The NCP does not absolutely require a remedy that includes treatment.

Response: EPA concurs. However, the context in which the comment is presented is misleading. The commentors implied that EPA screened out non-treatment alternatives simply because they did not require treatment. Alternatives were screened from further consideration based on the nine criteria set forth and discussed in the FS report and this ROD.

84. EPA did not consider the NCP-specified criteria in screening alternatives.

Response: EPA disagrees. The NCP-specified criteria were used to screen alternatives as discussed in detail in the FS Report.

85. EPA has not performed an adequate detailed analysis of potential remedial alternatives, especially regarding the implementability of the remedies.

Response: EPA disagrees. EPA conducted a detailed analysis of remedial alternatives and considered in depth the potential impacts flooding and other technology specific concerns, including technical feasibility, administrative feasibility, and availability, may have upon the overall implementability of the various alternatives.

86. EPA has selected a remedy and assumed that ARARs will be attained even though no demonstration that the proposed remedy will attain ARARs has been made.

Response: EPA disagrees. See response to comment No. 82. In addition, a more detailed discussion regarding how ARARs will be

attained by the selected remedy is included in Section IX of the ROD.

87. EPA did not address the NCP bias against a remedy entailing off-site land disposal.

Response: EPA assumes the commentor is referring to the NCP's description of remedies calling for the off-site disposal of untreated hazardous waste as "least favored." With the exception of Alternative 5, all of the alternatives proposed for the oily sludge pit provided for treatment of the waste. In the context of this site, EPA has determined that disposal of hazardous waste in a floodplain poses far more serious threats to the public health and the environment than disposing of the oily sludge pit waste in a secure off-site landfill, either with or without treatment. See also EPA's response to comment 80.

88. The commentors proposed an alternative remedy that includes (1) placement of a soil cover over landfill "hot spots", (2) in-situ neutralization of the pit sludges, and (3) covering, regrading, and revegetating the sludge pit area.

Response: EPA has evaluated the proposed remedy and offers the following comments:

* *Placement of a natural soil cover over areas of the landfill which are visible and may pose a direct contact or ingestion risk;*

  EPA agrees that a soil cover is needed over the landfill area. However, placement of the soil cover over only the areas which are visibly contaminated or which may pose a direct contact or ingestion risk is not consistent with the State of Arkansas Landfill Closure Requirements (ARARs). The ARAR requires a minimum 2-foot natural soil cover over the entire landfill area. As can be seen from the landfill trench profiles presented in the RI, there is minimal (<2 feet) to no cover over nearly the entire landfill. Therefore, a 2-foot native soil cover is warranted for the entire site, as provided for in EPA's selected remedy.

* *Construction of erosion control features;*

  EPA agrees that this is an appropriate component for remedial action at the site. Any civil construction type work involving soil placement requires proper grading and surface features to minimize erosion potential, especially in a floodplain. EPA's selected remedy provides for erosion control features.

* *Establishment of mitigating wetlands to replace those which are "lost" during performance of this remedy;*

EPA agrees that this is an appropriate component for remedial action at the site. Lost wetlands must be mitigated according to federal law. EPA's selected remedy provides for wetlands mitigation.

* *The in-situ treatment of the sludge by the addition of a neutralizing agent such as Portland cement, kiln dust, and fly ash. The treatment would be performed in-place using mixing devices for deep applications;*

EPA disagrees. The proposed in-situ neutralization process is not a proven technology and has several shortcomings associated with implementation at this site. These shortcomings include, inter alia: (1) The long-term protectiveness of the alternative is highly suspect because neutralization will not immobilize the contaminants in the waste, and the contaminants may be exposed to groundwater; (2) The radius of influence of in-situ neutralization is severely limited due to the consistency of the waste material; and (3) As established by the trench profiles presented in the RI, approximately 50% of the site waste is present outside of the "observed pit" in landfill waste material. The effectiveness of drilling/mixing into and through concrete, steel wire and debris is questionable.

* *Backfill of the pit area with imported material. The need for low permeability material (i.e., a cap) may be addressed, if necessary, pending the results of treatability testing;*

EPA agrees that this is an appropriate component for remedial action at the site. EPA's selected alternative provides for backfill of the pit area with imported material.

* *Establishment of deed notification;*

EPA agrees that this is an appropriate component for remedial action at the site. EPA's selected alternative provides for deed notifications.

* *Long-term operations and maintenance.*

EPA agrees that this is an appropriate component for remedial action at the site. Long-term operation and maintenance will be required.

89. The commentors compared EPA's preferred alternative to their alternative remedy.

Response: Although the ROD selected a different remedy from the remedy preferred in the Proposed Plan, EPA's response to the comparison is provided for informational purposes.

* *The technology to be used for the neutralization of the sludge will provide a high degree of control over the treatment process.*

  EPA disagrees. The inability to effectively verify in-situ treatment precludes the commentors from being able to substantiate their claim that their proposed technology would provide a "high degree of control" over the treatment process. Ex-situ treatment as proposed by EPA in the Proposed Plan would provide a higher degree of control.

* *The neutralization process proposed herein will allow for control of potential emissions from the treatment, as well as minimizing worker exposure to the waste constituents, resulting in greater short-term effectiveness than EPA's ex-situ remedies.*

  EPA agrees that in-situ treatment could potentially provide a greater short-term effectiveness than ex-situ treatment in terms of potential emissions. However, EPA believes that the increase in short-term effectiveness would be out-weighed by a substantial decrease in long-term effectiveness.

* *Both remedies meet all of the stated remedial action objectives for the Pit Area. Neither remedy will achieve the numerical remedial goals for carcinogenic PAHs or PCBs. Therefore, the remedies offer equivalent long-term effectiveness.*

  EPA disagrees. The commentors suggested remedy does not address the potential for contaminant migration to the groundwater (one of the remedial action objectives for the oily sludge pit area). EPA believes that the remedy selected in this ROD will achieve the remediation goals established in Appendix B to the ROD. The commentors' suggested remedy will not achieve the remediation goals. In addition, removal of the waste material from the site with disposal of waste residues at a facility permitted to accept these wastes provides for greater long-term effectiveness than in-situ treatment providing "some chemical stabilization" with the waste remaining in an uncontained, unpermitted facility (i.e., the site).

* *Both remedies offer reduction in toxicity and mobility of contaminants of concern. Both remedies also result in an overall increase in waste volume. A larger increase in waste volume would likely be realized under the EPA remedy because of the need to add reagents on two occasions.*

  EPA disagrees. If the in-situ treatment would work, then the first two sentences of this comment are correct. However, due to the inefficiency of in-situ stabilization techniques, a large volume of reagents would be required to compensate for the overlap needed to cover 100% of the area and volume of the waste

matrix (assuming uniform radial coverage). Therefore, the volume of reagents required to assure complete coverage under the PRP plan could potentially equal or exceed the volume required under the EPA plan.

* *This remedy can be completed in a much shorter time frame (3 to 4 months vs. 12 construction months for EPA's preferred remedy) making it a more attractive remedy from a statutory standpoint. In addition, this means that potential flood waters and high water table will have less of an impact.*

  The EPA's plan provides for pretreatment on-site followed by additional treatment on the land side of the levee. This procedure could be accomplished in the same time frame as the PRPs' proposed plan. Therefore, protection from flood water and high groundwater conditions would be equally realized by both remedies.

* *The PRP Group's proposed remedy will eliminate the need for transportation of waste off-site (with over 1500 tractor trailers through West Memphis) and comply with the NCP preference for on-site handling of wastes at NPL sites.*

  EPA agrees with the first part of the comment but disagrees with the latter part. The alternative selected in this ROD also utilizes on-site handling of the waste; only final disposal would be conducted off-site. Also, as noted in EPA's response to comments 80 and 87, EPA does not believe that it is appropriate to dispose of the oily sludge pit waste on the site.

* *The cost for this remedy is significantly less than the cost for implementing EPA's proposed remedy.*

  EPA agrees. However, it should be noted that EPA's proposed remedy meets the remedial action objectives while complying with the ARARs while the PRP's plan does not comply with ARARs or meet the remedial action objectives. Therefore, the two alternatives cannot legitimately be compared side to side on the basis of cost alone.

APPENDIX A
Index of Administrative Record

ADMINISTRATIVE RECORD INDEX

FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 1 AR PAGE NUMBER: 002049 - 002053
DOCUMENT DATE: Undated
NUMBER OF PAGES: 005
AUTHOR: Office of Research and Development
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Agency Guidelines
DOCUMENT TITLE: "Guidelines for Effective Stabilization Currently Being Considered by U.S. EPA's Office of Research and Development"

DOCUMENT NUMBER: 2 AR PAGE NUMBER: 000027 - 000039
DOCUMENT DATE: 07/02/82
NUMBER OF PAGES: 013
AUTHOR: Dave Peters, Chief, Hazardous Waste Section
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Sam Nott, Chief, Enforcement Section, U.S. EPA Region 6
DOCUMENT TYPE: Transmittal memo w/attached report
DOCUMENT TITLE: Boring and Sampling Program field report

DOCUMENT NUMBER: 3 AR PAGE NUMBER: 008457 - 008503
DOCUMENT DATE: 01/01/84
NUMBER OF PAGES: 047
AUTHOR: Renate D. Kimbrough, et al.
COMPANY/AGENCY: Journal of Toxicology and Environmental Health
RECIPIENT: U.S. EPA Region 6 Superfund Site File
DOCUMENT TYPE: Journal Article
DOCUMENT TITLE: "Health Implications of 2,3,7,8-Tetrachlorodibenzodioxin (TCDD) Contamination of Residential Soil"

DOCUMENT NUMBER: 4 AR PAGE NUMBER: 000040 - 000040
DOCUMENT DATE: 10/29/85
NUMBER OF PAGES: 001
AUTHOR: Joe Roberto
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Tentative Disposition
DOCUMENT TITLE: Summary of initial investigation and recommendations for action, such as preparing a preliminary Hazard Ranking System (HRS) package

ADMINISTRATIVE RECORD INDEX

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 5 AR PAGE NUMBER: 000041 - 000048
DOCUMENT DATE: 01/27/87
NUMBER OF PAGES: 008
AUTHOR: Rashid A. Khalid
COMPANY/AGENCY: Roy F. Weston, Inc.
RECIPIENT: Pat Hammack, On-Scene Coordinator (OSC), Emergency Response Branch (ERB), U.S. EPA Region 6
DOCUMENT TYPE: Emergency Response Report
DOCUMENT TITLE: Sludge and soil sampling report from the West Memphis Landfill

DOCUMENT NUMBER: 6 AR PAGE NUMBER: 000049 - 000053
DOCUMENT DATE: 02/13/87
NUMBER OF PAGES: 005
AUTHOR: Dorothy C. Lane, Ph.D., Project Manager
COMPANY/AGENCY: Western Research Institute
RECIPIENT: Roy F. Weston, Inc.
DOCUMENT TYPE: QA Report, Case Narrative, Case SAS 2636F
DOCUMENT TITLE: Laboratory quality assurance information relating to soil sampling conducted by Technical Assistance Team (TAT), results reflected in 01/27/87 ERB report

DOCUMENT NUMBER: 7 AR PAGE NUMBER: 000054 - 000064
DOCUMENT DATE: 06/19/87
NUMBER OF PAGES: 011
AUTHOR: Donald M. Smith, TAT
COMPANY/AGENCY: Ecology & Environment, Inc. (E&E)
RECIPIENT: Pat Hammack, OSC, ERB, U.S. EPA Region 6
DOCUMENT TYPE: Emergency Response Report
DOCUMENT TITLE: Compilation of laboratory data from the March 1987 site investigation

DOCUMENT NUMBER: 8 AR PAGE NUMBER: 000065 - 000163
DOCUMENT DATE: 05/17/88
NUMBER OF PAGES: 099
AUTHOR: Jean Koeninger, Field Investigation Team (FIT) Geologist
COMPANY/AGENCY: E&E
RECIPIENT: David Wineman, Remedial Project Officer (RPO) U.S. EPA Region 6
DOCUMENT TYPE: Field Sampling Report
DOCUMENT TITLE: Results of soil, ground water, surface water, pit, and air sampling conducted for the proposed Hazardous Ranking System (HRS) II Package

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 9 AR PAGE NUMBER: 000164 - 000188
DOCUMENT DATE: 08/29/88
NUMBER OF PAGES: 025
AUTHOR: Brian K. Boerner, FIT Chemist
COMPANY/AGENCY: E&E
RECIPIENT: David Wineman, RPO, U.S. EPA Region 6
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: Proposed air sampling strategy for October 1988

DOCUMENT NUMBER: 10 AR PAGE NUMBER: 000189 - 000201
DOCUMENT DATE: 12/27/88
NUMBER OF PAGES: 013
AUTHOR: Brian K. Boerner, FIT Chemist
COMPANY/AGENCY: E&E
RECIPIENT: David Wineman, RPO, U.S. EPA Region 6
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: Results of air sampling conducted October 3 - 7, 1988

DOCUMENT NUMBER: 11 AR PAGE NUMBER: 002054 - 002055
DOCUMENT DATE: 03/31/89
NUMBER OF PAGES: 002
AUTHOR: Office of Emergency and Remedial Response
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Risk Assessment Guidance - Interim Final
DOCUMENT TITLE: "Risk Assessment Guidance for Superfund: Volume 2 - Environmental Evaluation Manual"; (EPA/540/1-89/001) (This document may be reviewed at U.S. EPA Region 6)

DOCUMENT NUMBER: 12 AR PAGE NUMBER: 000001 - 000026
DOCUMENT DATE: 05/31/89
NUMBER OF PAGES: 026
AUTHOR: Office of Waste Programs Enforcement
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Compendium of Guidance: Users Manual
DOCUMENT TITLE: Guidance to documents used by EPA in selecting a response action

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 13 AR PAGE NUMBER: 002056 - 002057
DOCUMENT DATE: 12/31/89
NUMBER OF PAGES: 002
AUTHOR: Office of Emergency and Remedial Response
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Risk Assessment Guidance - Interim Final
DOCUMENT TITLE: "Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part A)"; (EPA/540/1-89/002) (This document may be reviewed at U.S. EPA Region 6)

DOCUMENT NUMBER: 14 AR PAGE NUMBER: 002058 - 002059
DOCUMENT DATE: 12/31/89
NUMBER OF PAGES: 002
AUTHOR: Office of Emergency and Remedial Response
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Risk Assessment Guidance for Superfund - Interim
DOCUMENT TITLE: Volume 1 - "Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals)"; (Publication 9285.7-01B) (This document may be reviewed at U.S. EPA Region 6)

DOCUMENT NUMBER: 15 AR PAGE NUMBER: 002060 - 002061
DOCUMENT DATE: 12/31/89
NUMBER OF PAGES: 002
AUTHOR: Office of Emergency and Remedial Response
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Risk Assessment Guidance for Superfund - Interim
DOCUMENT TITLE: Volume 1 - "Human Health Evaluation Manual, (Part C, Risk Evaluation of Remedial Alternatives)"; (Publication 9285.7-01C) (This document may be reviewed at U.S. EPA Region 6)

DOCUMENT NUMBER: 16 AR PAGE NUMBER: 000202 - 000224
DOCUMENT DATE: 07/27/90
NUMBER OF PAGES: 023
AUTHOR: EPA Staff
COMPANY/AGENCY: U.S. EPA Headquarters
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Federal Register/ Vol. 55, No. 145/ Proposed Rules
DOCUMENT TITLE: Technical data relating to cleaning levels for various hazardous substances

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FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 17 AR PAGE NUMBER: 002062 - 002365
DOCUMENT DATE: 02/28/91
NUMBER OF PAGES: 304
AUTHOR: Office of Emergency and Remedial Response
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: EPA Guidance Document
DOCUMENT TITLE: "Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites"; (EPA/540/P-91/001)

DOCUMENT NUMBER: 18 AR PAGE NUMBER: 001952 - 002007
DOCUMENT DATE: 03/22/91
NUMBER OF PAGES: 056
AUTHOR: Sally Mansbach, Acting Director, CERCLA Enforcement Division
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: Remedial Administrative Record Coordinators - Regions I-X
DOCUMENT TYPE: CERCLA Administrative Records Compendium of Guidance - Us
DOCUMENT TITLE: "CERCLA Administrative Records: First Update of the Compendium of Documents Used for Selecting CERCLA Response Actions"

DOCUMENT NUMBER: 19 AR PAGE NUMBER: 000225 - 000284
DOCUMENT DATE: 12/10/91
NUMBER OF PAGES: 060
AUTHOR: Abbott C. Widdicombe
COMPANY/AGENCY: Property Owner, West Memphis, AR
RECIPIENT: David Weeks, Remedial Project Manager (RPM), U.S. EPA Region 6
DOCUMENT TYPE: Correspondence and Attachment
DOCUMENT TITLE: General site history information

DOCUMENT NUMBER: 20 AR PAGE NUMBER: 000285 - 000285
DOCUMENT DATE: 01/02/92
NUMBER OF PAGES: 001
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Record of Communication (ROC)
DOCUMENT TITLE: Phone conversation with Jim Covington (Director, Planning and Development, West Memphis, AR) to request a meeting between EPA, the Mayor, and other city officials

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 21 AR PAGE NUMBER: 000286 - 000286
DOCUMENT DATE: 01/15/92
NUMBER OF PAGES: 001
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: ROC
DOCUMENT TITLE: Status of EPA activities at West Memphis Site

DOCUMENT NUMBER: 22 AR PAGE NUMBER: 002366 - 002401
DOCUMENT DATE: 01/15/92
NUMBER OF PAGES: 036
AUTHOR: Gregory Day, Region 6 Technical Assistance Team (TAT)
COMPANY/AGENCY: Ecology and Environment, Inc.
RECIPIENT: Mike Ryan, On-Scene Coordinator (OSC), Emergency Response Branch, U.S. EPA Region 6
DOCUMENT TYPE: Site Assessment and Attachments
DOCUMENT TITLE: Site Assessment for West Memphis Landfill, West Memphis, Crittenden County, AR

DOCUMENT NUMBER: 23 AR PAGE NUMBER: 000287 - 000287
DOCUMENT DATE: 01/31/92
NUMBER OF PAGES: 001
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: ROC
DOCUMENT TITLE: "Documentation of Site Visit"

DOCUMENT NUMBER: 24 AR PAGE NUMBER: 000288 - 000299
DOCUMENT DATE: 02/06/92
NUMBER OF PAGES: 012
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Mr. W.M. Gurley
DOCUMENT TYPE: General Notice Letter/104(e) Information Request
DOCUMENT TITLE: Re: 1) Notification of potential liability/potential response activities Mr. Gurley may be requested to perform or finance; and 2) request for information regarding site activities

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 25 AR PAGE NUMBER: 000300 - 000312
DOCUMENT DATE: 02/06/92
NUMBER OF PAGES: 013
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Addressees
DOCUMENT TYPE: General Notice Letter/104(e) Information Request
DOCUMENT TITLE: Re: 1) Notification of potential liability/potential response activities addressees may be requested to perform or finance; and 2) request for information regarding site activities

DOCUMENT NUMBER: 26 AR PAGE NUMBER: 000313 - 000313
DOCUMENT DATE: 02/11/92
NUMBER OF PAGES: 001
AUTHOR: Harold Lashner, Controller
COMPANY/AGENCY: Northern Shipping Company
RECIPIENT: Allyn M. Davis, Director, Hazardous Waste Management Division, U.S. EPA Region 6
DOCUMENT TYPE: General Notice Response Letter
DOCUMENT TITLE: Response to EPA 02/06/92 104(e) General Notice Letter

DOCUMENT NUMBER: 27 AR PAGE NUMBER: 000314 - 000314
DOCUMENT DATE: 02/14/92
NUMBER OF PAGES: 001
AUTHOR: W.L. Reid, Jr.
COMPANY/AGENCY: Landowner of property adjoining West Memphis, AR Landfill Site
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to EPA 02/06/92 104(e) Notice Letter

DOCUMENT NUMBER: 28 AR PAGE NUMBER: 000315 - 000325
DOCUMENT DATE: 02/19/92
NUMBER OF PAGES: 011
AUTHOR: Ralph McFerrin, Owner
COMPANY/AGENCY: Tri-State Adhesives & Resins
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to 02/06/92 EPA 104(e) Letter

FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 29 AR PAGE NUMBER: 000326 - 000328
DOCUMENT DATE: 02/20/92
NUMBER OF PAGES: 003
AUTHOR: James Day, Director of Administration and Secretary
COMPANY/AGENCY: Truman Arnold Companies (TAC)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to EPA 02/06/92 104(e) Notice Letter

DOCUMENT NUMBER: 30 AR PAGE NUMBER: 000329 - 000329
DOCUMENT DATE: 02/21/92
NUMBER OF PAGES: 001
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Wilce Rawles, International Paneling Products, Inc. (IPPI)
DOCUMENT TYPE: ROC
DOCUMENT TITLE: IPPI's potential responsible party (PRP) status

DOCUMENT NUMBER: 31 AR PAGE NUMBER: 000330 - 000331
DOCUMENT DATE: 02/21/92
NUMBER OF PAGES: 002
AUTHOR: Cheryl Followell and Connie Brandenburg
COMPANY/AGENCY: Property Owners, West Memphis, AR
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to EPA 02/06/92 104(e) Notice Letter

DOCUMENT NUMBER: 32 AR PAGE NUMBER: 000332 - 000455
DOCUMENT DATE: 02/25/92
NUMBER OF PAGES: 124
AUTHOR: Martha Horvitz
COMPANY/AGENCY: Borden, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to EPA 02/06/92 104(e) Notice Letter

ADMINISTRATIVE RECORD INDEX

FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 33 AR PAGE NUMBER: 000456 - 000457
DOCUMENT DATE: 02/25/92
NUMBER OF PAGES: 002
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Helen Tracy, Attorney for Sun Company, Inc.
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: Regarding Sun Company's 02/12/92 verbal request for an extension of time to respond to 02/06/92 104(e) General Notice Letter

DOCUMENT NUMBER: 34 AR PAGE NUMBER: 000458 - 000531
DOCUMENT DATE: 02/25/92
NUMBER OF PAGES: 074
AUTHOR: Gary Simpson, Attorney-at-Law
COMPANY/AGENCY: Attorney for Coastal Unilube
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Coastal Unilube's partial response to questions 1 through 32 of EPA 02/06/92 CERCLA 104(e) Letter; request for an additional 30 days to file supplemental responses

DOCUMENT NUMBER: 35 AR PAGE NUMBER: 000532 - 000599
DOCUMENT DATE: 02/26/92
NUMBER OF PAGES: 068
AUTHOR: Helen Tracy, Law Department
COMPANY/AGENCY: Sun Refining and Marketing Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response/Attachments
DOCUMENT TITLE: Response to questions 21 and 22 of EPA 104(e) General Notice Letter

DOCUMENT NUMBER: 36 AR PAGE NUMBER: 002402 - 002405
DOCUMENT DATE: 02/26/92
NUMBER OF PAGES: 004
AUTHOR: Mary Aronov, Attorney
COMPANY/AGENCY: Law Offices of Heiskell, Donelson, Bearman, Adams, Williams & Kirsch (for Nortek, Inc.)
RECIPIENT: David Weeks, Remedial Project Manager (RPM), U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information Letter

ADMINISTRATIVE RECORD INDEX

FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 37 AR PAGE NUMBER: 000600 - 000621
DOCUMENT DATE: 02/27/92
NUMBER OF PAGES: 022
AUTHOR: James Gentry, Jr., Attorney
COMPANY/AGENCY: Law Offices of Spears, Moore, Rebman & Williams, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Respondent refuses to respond for Mr. Gurley and returns 104(e) information request

DOCUMENT NUMBER: 38 AR PAGE NUMBER: 000622 - 000624
DOCUMENT DATE: 02/28/92
NUMBER OF PAGES: 003
AUTHOR: Wilce Rawles, President
COMPANY/AGENCY: IPPI
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Persuant to telephone conversation of 02/21/92

DOCUMENT NUMBER: 39 AR PAGE NUMBER: 008453 - 008454
DOCUMENT DATE: 02/28/92
NUMBER OF PAGES: 002
AUTHOR: Office of Emergency and Remedial Response
COMPANY/AGENCY: U.S. EPA - Headquarters
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Guidance - Volume 1, Summary Report
DOCUMENT TITLE: "Evaluation of Ground Water Extraction Remedies: Phase II"; (Publication 9355.4-05, PB92-963346) (Document may be reviewed at U.S. EPA Region 6)

DOCUMENT NUMBER: 40 AR PAGE NUMBER: 008455 - 008456
DOCUMENT DATE: 02/28/92
NUMBER OF PAGES: 002
AUTHOR: Office of Emergency and Remedial Response
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Guidance - Case Studies and Updates, Volume 2
DOCUMENT TITLE: "Evaluation of Ground Water Extraction Remedies: Phase II" (Publication 9355.4-05A, PB92-963347) (Document may be reviewed at U.S. EPA Region 6)

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 41 AR PAGE NUMBER: 000625 - 000635
DOCUMENT DATE: 03/02/92
NUMBER OF PAGES: 011
AUTHOR: David Peeples, City Attorney
COMPANY/AGENCY: City of West Memphis, AR
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to EPA 02/06/92 104(e) Notice Letter

DOCUMENT NUMBER: 42 AR PAGE NUMBER: 002406 - 002406
DOCUMENT DATE: 03/02/92
NUMBER OF PAGES: 001
AUTHOR: Harold Lashner, Controller
COMPANY/AGENCY: Northern Shipping Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information Letter

DOCUMENT NUMBER: 43 AR PAGE NUMBER: 000636 - 000718
DOCUMENT DATE: 03/05/92
NUMBER OF PAGES: 083
AUTHOR: Sam Blair, Jr.
COMPANY/AGENCY: Heiskell, Donelson, Bearman, Adams, Williams & Kersch - Attorneys for William L. Johnson Co., Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to 02/06/92 EPA 104(e) Notice Letter

DOCUMENT NUMBER: 44 AR PAGE NUMBER: 000719 - 000733
DOCUMENT DATE: 03/11/92
NUMBER OF PAGES: 015
AUTHOR: Robert Jacobsen, Vice President
COMPANY/AGENCY: Aero-Data Corporation
RECIPIENT: Jonathan Stewart, Fluor Daniel, Inc.
DOCUMENT TYPE: Correspondence and Attachment
DOCUMENT TITLE: "A Historical Aerial Photography Analysis of West Memphis Landfill Site, West Memphis, TN"

ADMINISTRATIVE RECORD INDEX

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 45 AR PAGE NUMBER: 000734 - 000743
DOCUMENT DATE: 03/18/92
NUMBER OF PAGES: 010
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: President, Chevron U.S.A., Inc., c/o The Corporation Company
DOCUMENT TYPE: Combined General/Special Notice Ltr./Info. Request Ltr.
DOCUMENT TITLE: 104(e) General Notice, 104(e) Information Request and Special Notice Letter (Enclosures omitted)

DOCUMENT NUMBER: 46 AR PAGE NUMBER: 000744 - 000915
DOCUMENT DATE: 03/18/92
NUMBER OF PAGES: 172
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: List of Addressees
DOCUMENT TYPE: Special Notice Letter
DOCUMENT TITLE: EPA Special Notice Letter, Draft RI/FS Work Plan and Draft Administrative Order on Consent for performance of Remedial Investigation/Feasibility Study (RI/FS)

DOCUMENT NUMBER: 47 AR PAGE NUMBER: 000916 - 000931
DOCUMENT DATE: 03/23/92
NUMBER OF PAGES: 016
AUTHOR: Gary Simpson, Attorney-at-Law
COMPANY/AGENCY: Attorney for Coastal Unilube
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Supplemental 104(e) General Notice Ltr. Response
DOCUMENT TITLE: Coastal Unilube's supplemental answers to questions 1 through 32 of EPA 02/06/92 CERCLA 104(e) Letter

DOCUMENT NUMBER: 48 AR PAGE NUMBER: 000932 - 000953
DOCUMENT DATE: 03/26/92
NUMBER OF PAGES: 022
AUTHOR: Ralph McFerrin, Owner
COMPANY/AGENCY: Tri-State Adhesives & Resins
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to EPA Notice Letter received on 03/23/92

ADMINISTRATIVE RECORD INDEX

FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 49 AR PAGE NUMBER: 002407 - 002414
DOCUMENT DATE: 03/26/92
NUMBER OF PAGES: 008
AUTHOR: Harold Lashner, Controller
COMPANY/AGENCY: Northern Shipping Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachments
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information Letter

DOCUMENT NUMBER: 50 AR PAGE NUMBER: 000954 - 000955
DOCUMENT DATE: 03/27/92
NUMBER OF PAGES: 002
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Cheryl Followell, Property Owner, West Memphis, AR
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: EPA response to Ms. Followell's 02/21/92 104(e) Response Letter

DOCUMENT NUMBER: 51 AR PAGE NUMBER: 000956 - 000957
DOCUMENT DATE: 03/27/92
NUMBER OF PAGES: 002
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Connie Brandenburg, Property Owner, West Memphis, AR
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: EPA response to Ms. Brandenburg's 02/21/92 104(e) Response Letter

DOCUMENT NUMBER: 52 AR PAGE NUMBER: 000958 - 000959
DOCUMENT DATE: 04/10/92
NUMBER OF PAGES: 002
AUTHOR: Steve Dehmer
COMPANY/AGENCY: Chevron Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice/Special Notice Ltr. Response
DOCUMENT TITLE: Response to 02/06/92 EPA 104(e) Notice Letter

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 53 AR PAGE NUMBER: 002415 - 002419
DOCUMENT DATE: 04/10/92
NUMBER OF PAGES: 005
AUTHOR: Steve Dehmer
COMPANY/AGENCY: Chevron Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information Letter/General Notice Letter dated 03/18/92 (Cover Letter also included in 01/26/93 Administrative Record as Document No. 000958-000959.)

DOCUMENT NUMBER: 54 AR PAGE NUMBER: 000960 - 000976
DOCUMENT DATE: 04/16/92
NUMBER OF PAGES: 017
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Citizens' Meeting
DOCUMENT TITLE: Copies of overhead projector transparencies from the "Citizens' Scoping Meeting" and RPM's notes indicating subject matter discussed

DOCUMENT NUMBER: 55 AR PAGE NUMBER: 000977 - 001008
DOCUMENT DATE: 04/21/92
NUMBER OF PAGES: 032
AUTHOR: Cheryl Followell
COMPANY/AGENCY: Property Owner, West Memphis, AR
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: 104(e) General Notice Letter Response
DOCUMENT TITLE: Response to EPA 02/06/92 104(e) Letter on behalf of Cheryl Followell and Connie Brandenburg

DOCUMENT NUMBER: 56 AR PAGE NUMBER: 001009 - 001070
DOCUMENT DATE: 04/22/92
NUMBER OF PAGES: 062
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Attached Addressee List
DOCUMENT TYPE: Correspondence and Attachment
DOCUMENT TITLE: "Location of Exploratory Trenches" and "Rationale for the Placement of Piezometers and Ground Water Monitoring Wells"

FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 57 AR PAGE NUMBER: 008504 - 008504
DOCUMENT DATE: 04/22/92
NUMBER OF PAGES: 001
AUTHOR: Lenice Watkins, Staff Writer
COMPANY/AGENCY: West Memphis Evening Times
RECIPIENT: Public
DOCUMENT TYPE: News Article
DOCUMENT TITLE: "Accused dumpers protest EPA pollution accusations"

DOCUMENT NUMBER: 58 AR PAGE NUMBER: 001071 - 001083
DOCUMENT DATE: 04/24/92
NUMBER OF PAGES: 013
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: Information received from Coastal Unilube 04/16/92 meeting

DOCUMENT NUMBER: 59 AR PAGE NUMBER: 001084 - 001757
DOCUMENT DATE: 04/29/92
NUMBER OF PAGES: 674
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniel, Inc.
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Work Plan
DOCUMENT TITLE: First revision of the RI/FS Work Plan

DOCUMENT NUMBER: 60 AR PAGE NUMBER: 001758 - 001782
DOCUMENT DATE: 04/29/92
NUMBER OF PAGES: 025
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Access Agreements
DOCUMENT TITLE: "Voluntary Access Agreements" signed by various land owners granting EPA access to property

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 61 AR PAGE NUMBER: 001783 - 001785
DOCUMENT DATE: 04/29/92
NUMBER OF PAGES: 003
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Attached List of Addressees
DOCUMENT TYPE: Cover Letter and Attached List (Work Plan not attached.)
DOCUMENT TITLE: Re: First revision of the RI/FS Work Plan which describes the work to be performed for South 8th Street

DOCUMENT NUMBER: 62 AR PAGE NUMBER: 001786 - 001786
DOCUMENT DATE: 05/04/92
NUMBER OF PAGES: 001
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: ROC
DOCUMENT TITLE: Meeting with the South 8th Street PRPs regarding the status of EPA's activities at the site

DOCUMENT NUMBER: 63 AR PAGE NUMBER: 001787 - 001795
DOCUMENT DATE: 05/07/92
NUMBER OF PAGES: 009
AUTHOR: Gary L. Simpson
COMPANY/AGENCY: Attorney for Coastal Unilube
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Supplemental 104(e) General Notice Ltr. Response
DOCUMENT TITLE: Coastal Unilube's third set of answers to question 1 through 32 of EPA 02/06/92 CERCLA 104(e) Letter supplementing their 02/25/92 and 03/23/92 responses

DOCUMENT NUMBER: 64 AR PAGE NUMBER: 002420 - 002429
DOCUMENT DATE: 05/11/92
NUMBER OF PAGES: 011
AUTHOR: Craig Carroll, OSC
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: B.J. Wynne, Regional Administrator, U.S. EPA Region 6
DOCUMENT TYPE: Memorandum and Attachment
DOCUMENT TITLE: Request for removal action ("Enforcement Confidential" attachment is not included)

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 65 AR PAGE NUMBER: 001796 - 001796
DOCUMENT DATE: 05/13/92
NUMBER OF PAGES: 001
AUTHOR: William P. Rainey
COMPANY/AGENCY: Attorney for Coastal Unilube
RECIPIENT: Rachel Blumenfeld, Office of Regional Counsel (ORC), U.S. EPA Region 6
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: Fencing of the South 8th Street Landfill Site

DOCUMENT NUMBER: 66 AR PAGE NUMBER: 001797 - 001826
DOCUMENT DATE: 05/22/92
NUMBER OF PAGES: 030
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: W.M. Gurley, Memphis, TN
DOCUMENT TYPE: Correspondence and copy of UAO issued to PRPs
DOCUMENT TITLE: Unilateral Administrative Order (UAO) for Removal Action

DOCUMENT NUMBER: 67 AR PAGE NUMBER: 001827 - 001829
DOCUMENT DATE: 05/26/92
NUMBER OF PAGES: 003
AUTHOR: Steve Dehmer
COMPANY/AGENCY: Chevron Corporation
RECIPIENT: Rachel Blumenfeld, ORC, U.S. EPA Region 6
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: "UAO for Removal Action"

DOCUMENT NUMBER: 68 AR PAGE NUMBER: 001830 - 001834
DOCUMENT DATE: 05/27/92
NUMBER OF PAGES: 005
AUTHOR: David Richman, Attorney for Sun Company, Inc., Sun Pipeline Co., and Sunray DX Oil Co.
COMPANY/AGENCY: Pepper, Hamilton & Scheetz
RECIPIENT: Rachel Blumenfeld, Assistant Regional Counsel, Office of Regional Counsel, U.S. EPA Region 6
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: Re: UAO for Removal Action

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 69 AR PAGE NUMBER: 001835 - 001837
DOCUMENT DATE: 05/27/92
NUMBER OF PAGES: 003
AUTHOR: Gary Simpson
COMPANY/AGENCY: Attorney for Coastal Corporation
RECIPIENT: Rachel Blumenfeld, ORC, U.S. EPA Region 6
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: UAO for Removal Action

DOCUMENT NUMBER: 70 AR PAGE NUMBER: 001838 - 001849
DOCUMENT DATE: 05/30/92
NUMBER OF PAGES: 012
AUTHOR: EPA Staff
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Site Files
DOCUMENT TYPE: Community Relations Plan
DOCUMENT TITLE: "Community Relations Plan for the South 8th Street Landfill Superfund Site"

DOCUMENT NUMBER: 71 AR PAGE NUMBER: 001850 - 001891
DOCUMENT DATE: 06/18/92
NUMBER OF PAGES: 042
AUTHOR: Charles T. Wehland
COMPANY/AGENCY: Jones, Day, Reavis & Pogue
RECIPIENT: Rachel H. Blumenfeld, ORC, U.S. EPA Region 6
DOCUMENT TYPE: Response to UAO
DOCUMENT TITLE: Requests that EPA amend the referenced Order so that Borden and Perkins Industries, Inc. are no longer named as respondents

DOCUMENT NUMBER: 72 AR PAGE NUMBER: 001892 - 001895
DOCUMENT DATE: 07/06/92
NUMBER OF PAGES: 004
AUTHOR: David Weeks, RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Craig Carroll, U.S. EPA Region 6
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: RPM's comments regarding the Removal Investigation Work Plan prepared by the PRPs

FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 73 AR PAGE NUMBER: 001896 - 001951
DOCUMENT DATE: 08/06/92
NUMBER OF PAGES: 056
AUTHOR: Helen Tracy, Law Department
COMPANY/AGENCY: Sun Company, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Supplemental Response to 104(e) Information Request Ltr.
DOCUMENT TITLE: Supplemental response by Sun Company Inc., Sun Pipeline Co., and Sunray DX Oil Co. to EPA's information request

DOCUMENT NUMBER: 74 AR PAGE NUMBER: 002430 - 002484
DOCUMENT DATE: 09/09/92
NUMBER OF PAGES: 053
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: See Attached Addressee List
DOCUMENT TYPE: 104(e) Request for Information/General Notice Letter
DOCUMENT TITLE: 1) Notification of potential liability incurred at the site and of possible participation in response activities; and 2) request to provide information regarding addressees' activities at the site

DOCUMENT NUMBER: 75 AR PAGE NUMBER: 002485 - 002485
DOCUMENT DATE: 09/14/92
NUMBER OF PAGES: 001
AUTHOR: W.N. Taylor III. President
COMPANY/AGENCY: Memphis Machine Works
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e)/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 76 AR PAGE NUMBER: 002486 - 002486
DOCUMENT DATE: 09/15/92
NUMBER OF PAGES: 001
AUTHOR: W.M. Gurley
COMPANY/AGENCY: Gurley Refining Company, Inc.
RECIPIENT: U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 77 AR PAGE NUMBER: 002487 - 002558
DOCUMENT DATE: 09/15/92
NUMBER OF PAGES: 072
AUTHOR: John Mueller, Region 6, TAT
COMPANY/AGENCY: Ecology and Environment, Inc.
RECIPIENT: Craig Carroll, OSC, Emergency Response Branch, U.S. EPA Region 6
DOCUMENT TYPE: Site Assessment and Attachments
DOCUMENT TITLE: Site Assessment: West Memphis Landfill Site, West Memphis, Crittenden County, AR

DOCUMENT NUMBER: 78 AR PAGE NUMBER: 002559 - 002559
DOCUMENT DATE: 09/16/92
NUMBER OF PAGES: 001
AUTHOR: Marcia K. Cowan, Associate Counsel
COMPANY/AGENCY: Kimberly-Clark Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 79 AR PAGE NUMBER: 002560 - 002560
DOCUMENT DATE: 09/18/92
NUMBER OF PAGES: 001
AUTHOR: Wendy S. Fisher, Vice President/General Counsel
COMPANY/AGENCY: Schilling Enterprises
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e)/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 80 AR PAGE NUMBER: 002561 - 002562
DOCUMENT DATE: 09/18/92
NUMBER OF PAGES: 002
AUTHOR: Monice Moore Hagler, City Attorney, Law Division
COMPANY/AGENCY: City of Memphis, Tennessee
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information Letter/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 81 AR PAGE NUMBER: 002563 - 002563
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 001
AUTHOR: Robert M. Myers, Secretary/Treasurer
COMPANY/AGENCY: Tri-State Mack
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 82 AR PAGE NUMBER: 002564 - 002564
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 001
AUTHOR: Lance S. Tolson, Attorney
COMPANY/AGENCY: Texaco, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 83 AR PAGE NUMBER: 002565 - 002565
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 001
AUTHOR: William C. Lowrey, Senior Attorney, Environmental & Manufacturing
COMPANY/AGENCY: Shell Oil Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 84 AR PAGE NUMBER: 002566 - 002567
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 002
AUTHOR: Allen T. Malone, Attorney
COMPANY/AGENCY: Law Offices of Apperson, Crump, Duzane & Maxwell (for Memphis Area Transit Authority)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 85 AR PAGE NUMBER: 002568 - 002568
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 001
AUTHOR: C. Barry Ward, Attorney
COMPANY/AGENCY: Law Offices of Glankler, Brown, Gilliland, Chase, Robinson & Raines (for Hull Dobbs Ford)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 86 AR PAGE NUMBER: 002569 - 002569
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 001
AUTHOR: Ben M. Hogan, President
COMPANY/AGENCY: Hogan Construction Company, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 87 AR PAGE NUMBER: 002570 - 002571
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 002
AUTHOR: James L. Conner II, Attorney
COMPANY/AGENCY: Brooks, Pierce, McLendon, Humphrey & Leonard, Attorneys at Law (for Halstead Industries, Inc.)
RECIPIENT: Rachel H. Blumenfeld, Office of Regional Counsel (ORC), U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 88 AR PAGE NUMBER: 002572 - 002573
DOCUMENT DATE: 09/21/92
NUMBER OF PAGES: 002
AUTHOR: Barbara A. Hindin, Attorney
COMPANY/AGENCY: Shaw, Pittman, Potts & Trowbridge (for Emerson Electric Co.)
RECIPIENT: Rachel H. Blumenfeld, ORC, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 89 AR PAGE NUMBER: 002574 - 002575
DOCUMENT DATE: 09/22/92
NUMBER OF PAGES: 002
AUTHOR: Brett Hughes, Senior Attorney
COMPANY/AGENCY: The Williams Companies, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 90 AR PAGE NUMBER: 002576 - 002576
DOCUMENT DATE: 09/22/92
NUMBER OF PAGES: 001
AUTHOR: Barry B. Walton, Senior Attorney
COMPANY/AGENCY: Tennessee Valley Authority (TVA)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 91 AR PAGE NUMBER: 002577 - 002578
DOCUMENT DATE: 09/22/92
NUMBER OF PAGES: 002
AUTHOR: Charlotte A. Knight, Attorney at Law
COMPANY/AGENCY: Memphis Light, Gas and Water Division
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 92 AR PAGE NUMBER: 002579 - 002579
DOCUMENT DATE: 09/28/92
NUMBER OF PAGES: 001
AUTHOR: Eugene F. Jordan, Associate General Counsel
COMPANY/AGENCY: Brown Group, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 93 AR PAGE NUMBER: 002580 - 002590
DOCUMENT DATE: 09/30/92
NUMBER OF PAGES: 010
AUTHOR: Craig Carroll, OSC
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Russell F. Rhoades, Director, Environmental Services Division, U.S. EPA Region 6
DOCUMENT TYPE: Action Memorandum
DOCUMENT TITLE: Request for removal action at the South Eighth Street Landfill (a.k.a. West Memphis Landfill) Site ("Enforcement Confidential" attachment is not included)

DOCUMENT NUMBER: 94 AR PAGE NUMBER: 002591 - 002592
DOCUMENT DATE: 10/06/92
NUMBER OF PAGES: 002
AUTHOR: Victor E. Toledo, Legal-Environmental Management
COMPANY/AGENCY: Greyhound Lines, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 95 AR PAGE NUMBER: 002593 - 002593
DOCUMENT DATE: 10/13/92
NUMBER OF PAGES: 001
AUTHOR: Bill Yendt, Manufacturing Engineer
COMPANY/AGENCY: Hoffinger Industries, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 96 AR PAGE NUMBER: 002594 - 002599
DOCUMENT DATE: 10/13/92
NUMBER OF PAGES: 006
AUTHOR: Donald E. Bourland, Esquire
COMPANY/AGENCY: Rickey, Bourland, Heflin, & Alverez, Attorneys at Law (for Federal Compress & Warehouse Co., Inc.)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 97 AR PAGE NUMBER: 002600 - 002601
DOCUMENT DATE: 10/15/92
NUMBER OF PAGES: 002
AUTHOR: Robert L. Hutton, General Counsel
COMPANY/AGENCY: Glankler, Brown, Gilliland, Chase, Robinson & Raines (for Chuck Hutton Chevrolet)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 98 AR PAGE NUMBER: 002602 - 002689
DOCUMENT DATE: 10/16/92
NUMBER OF PAGES: 088
AUTHOR: John Mueller, Region 6, TAT
COMPANY/AGENCY: Ecology and Environment, Inc.
RECIPIENT: Craig Carroll, OSC, Emergency Response Branch, U.S. EPA Region 6
DOCUMENT TYPE: Oversight Report
DOCUMENT TITLE: Potentially Responsible Party (PRP) Oversight Report

DOCUMENT NUMBER: 99 AR PAGE NUMBER: 002690 - 002699
DOCUMENT DATE: 10/16/92
NUMBER OF PAGES: 010
AUTHOR: Ronald T. Allen, Senior Counsel
COMPANY/AGENCY: Georgia-Pacific Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 100 AR PAGE NUMBER: 002700 - 002702
DOCUMENT DATE: 10/19/92
NUMBER OF PAGES: 003
AUTHOR: W. Brigham Klyce Jr., President
COMPANY/AGENCY: White Rose, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter

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FINAL

SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 101 AR PAGE NUMBER: 002703 - 002704
DOCUMENT DATE: 10/23/92
NUMBER OF PAGES: 002
AUTHOR: Steven Case, Attorney
COMPANY/AGENCY: McGrath, North, Mullin & Kratz, P.C. (for Armour Food Company)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 102 AR PAGE NUMBER: 002705 - 002708
DOCUMENT DATE: 10/23/92
NUMBER OF PAGES: 004
AUTHOR: Neal S. Brody, Senior Attorney
COMPANY/AGENCY: Atlantic Richfield Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 103 AR PAGE NUMBER: 002709 - 002716
DOCUMENT DATE: 10/26/92
NUMBER OF PAGES: 008
AUTHOR: Mary C. Bryant, Attorney
COMPANY/AGENCY: Brown & Bryant, P.C., Attorneys at Law (for Illinois Central Railroad)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 104 AR PAGE NUMBER: 002717 - 002720
DOCUMENT DATE: 10/27/92
NUMBER OF PAGES: 004
AUTHOR: Joseph M. Holden, Attorney
COMPANY/AGENCY: Brouse & McDowell (for Mohawk Rubber Company)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 105 AR PAGE NUMBER: 002721 - 002724
DOCUMENT DATE: 10/28/92
NUMBER OF PAGES: 004
AUTHOR: Thomas P. O'Brien Jr., Law Department
COMPANY/AGENCY: The Kroger Co.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 106 AR PAGE NUMBER: 002725 - 002730
DOCUMENT DATE: 10/28/92
NUMBER OF PAGES: 006
AUTHOR: James R. Sowell, Corporate Engineer
COMPANY/AGENCY: Baldwin Piano & Organ Company ("Baldwin")
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 107 AR PAGE NUMBER: 002731 - 002735
DOCUMENT DATE: 10/28/92
NUMBER OF PAGES: 005
AUTHOR: Robert M. Myers. Secretary-Treasurer
COMPANY/AGENCY: Tri-State Mack
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 108 AR PAGE NUMBER: 002736 - 002745
DOCUMENT DATE: 10/28/92
NUMBER OF PAGES: 010
AUTHOR: Gail Helfrick, Environmental Health and Safety Department, Superfund Response Group
COMPANY/AGENCY: Mobil Oil Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 109 AR PAGE NUMBER: 002746 - 002848
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 103
AUTHOR: Kenneth Lund, Attorney
COMPANY/AGENCY: Holme Roberts & Owen (for St. Louis Southwestern Railway Company, a.k.a. Cotton Belt Railroad)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachments
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter

DOCUMENT NUMBER: 110 AR PAGE NUMBER: 002849 - 002850
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 002
AUTHOR: Steven D. Stern, General Attorney, Corporate Law Department
COMPANY/AGENCY: Sara Lee Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 111 AR PAGE NUMBER: 002851 - 002859
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 009
AUTHOR: Dave Yesland, Environmental Support & Regulations
COMPANY/AGENCY: Shell Oil Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 112 AR PAGE NUMBER: 002860 - 002863
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 004
AUTHOR: Jess Askew III, Attorney
COMPANY/AGENCY: Rose Law Firm (for J.A. Riggs Tractor Company, Inc.)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 113 AR PAGE NUMBER: 002864 - 002880
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 017
AUTHOR: Richard J. Walsh, Esq.
COMPANY/AGENCY: Phillips Petroleum Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 114 AR PAGE NUMBER: 002881 - 002883
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 003
AUTHOR: Judie Koopmans, Legal Assistant
COMPANY/AGENCY: Owens/Corning Fiberglas Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 115 AR PAGE NUMBER: 002884 - 002892
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 009
AUTHOR: T.W. Ambler, General Attorney
COMPANY/AGENCY: Norfolk Southern Railway Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 116 AR PAGE NUMBER: 002893 - 002896
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 004
AUTHOR: Daniel S. Pupel Jr., Senior Attorney
COMPANY/AGENCY: Kellogg Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 117 AR PAGE NUMBER: 002897 - 002902
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 006
AUTHOR: Barbara A. Hindin, Attorney
COMPANY/AGENCY: Shaw, Pittman, Potts & Trowbridge (for Emerson Electric Co.)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 118 AR PAGE NUMBER: 002903 - 002907
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 005
AUTHOR: Ellen A. Green, Senior Legal Assistant
COMPANY/AGENCY: E.I. du Pont de Nemour & Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 119 AR PAGE NUMBER: 002908 - 002922
DOCUMENT DATE: 10/29/92
NUMBER OF PAGES: 015
AUTHOR: Lance S. Tolson, Attorney
COMPANY/AGENCY: Texaco, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachments
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 120 AR PAGE NUMBER: 002923 - 002927
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 005
AUTHOR: J.B. Malone, P.E., Head, Installation Branch, Restoration Branch
COMPANY/AGENCY: U.S. Department of the Navy (for Naval Air Station, Memphis)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 121 AR PAGE NUMBER: 002928 - 002934
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 007
AUTHOR: Clinton Willer, Colonel, Corps of Engineers, District Engineer
COMPANY/AGENCY: U.S. Department of the Army (for Memphis District, Corps of Engineers)
RECIPIENT: Allyn M. Davis, Director, Hazardous Waste Management Division, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachments
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 122 AR PAGE NUMBER: 002935 - 002935
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 001
AUTHOR: J. Patrick Boland, Counsel
COMPANY/AGENCY: Exxon Company, USA ("Exxon")
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 123 AR PAGE NUMBER: 002936 - 002939
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 004
AUTHOR: Walter W. Crim, Assistant Counsel
COMPANY/AGENCY: Union Oil Company of California dba Unocal Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter

DOCUMENT NUMBER: 124 AR PAGE NUMBER: 002940 - 002953
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 014
AUTHOR: Barry Turner, Deputy Attorney General
COMPANY/AGENCY: Office of Attorney General, State of Tennessee (for Memphis State University)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 125 AR PAGE NUMBER: 002954 - 002967
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 014
AUTHOR: Randall B. Womack, Attorney
COMPANY/AGENCY: Glankler, Brown, Gilliland, Chase, Robinson & Rains (for Shelby County Airport Authority)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 126 AR PAGE NUMBER: 002968 - 002987
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 020
AUTHOR: Frederick L. Hitchcock, Attorney
COMPANY/AGENCY: Strang, Fletcher, Carriger, Walker, Hodge & Smith (for Memphis Light, Gas & Water Division)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 127 AR PAGE NUMBER: 002988 - 003001
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 014
AUTHOR: Bruce M. Smith, Attorney
COMPANY/AGENCY: Law Offices of Apperson, Crump, Duzane & Maxwell (for Memphis Area Transit Authority)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 128 AR PAGE NUMBER: 003002 - 003003
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 002
AUTHOR: Carol A. Grissom, Attorney
COMPANY/AGENCY: Law Offices of Boone, Smith, Davis, Hurst & Dickman (for AMR Services)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 129 AR PAGE NUMBER: 003004 - 003009
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 006
AUTHOR: Jack C. Shih, Senior Environmental Engineer
COMPANY/AGENCY: Navistar International Transportation Corp.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachments
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 130 AR PAGE NUMBER: 003010 - 003012
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 003
AUTHOR: Neal T. Rountree, Attorney
COMPANY/AGENCY: The Goodyear Tire & Rubber Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 131 AR PAGE NUMBER: 003013 - 003022
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 010
AUTHOR: Eugenia Jones, Manager, Environmental Systems
COMPANY/AGENCY: Frito-Lay, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 132 AR PAGE NUMBER: 003023 - 003029
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 007
AUTHOR: Anne Blythe Little, Assistant General Counsel, Law Department
COMPANY/AGENCY: Burlington Northern Railroad
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 133 AR PAGE NUMBER: 003030 - 003030
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 001
AUTHOR: Steven J. Poplawski, Attorney
COMPANY/AGENCY: Law Firm of Bryan Cave (for Brown Shoe Company)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Request for extension of time to respond to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 134 AR PAGE NUMBER: 003031 - 003046
DOCUMENT DATE: 10/30/92
NUMBER OF PAGES: 014
AUTHOR: Barry B. Walton, Senior Attorney
COMPANY/AGENCY: TVA
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 135 AR PAGE NUMBER: 003047 - 003048
DOCUMENT DATE: 11/02/92
NUMBER OF PAGES: 002
AUTHOR: C.R. Wilcox, Director of Installation Operations
COMPANY/AGENCY: Department of the Army, Red River Army Depot
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 136 AR PAGE NUMBER: 003049 - 003057
DOCUMENT DATE: 11/06/92
NUMBER OF PAGES: 009
AUTHOR: Eugene F. Jordan, Associate General Counsel
COMPANY/AGENCY: Brown Group, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachments
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 137 AR PAGE NUMBER: 003058 - 003071
DOCUMENT DATE: 11/09/92
NUMBER OF PAGES: 014
AUTHOR: Diana Hull, Associate Division Counsel
COMPANY/AGENCY: Ryder System, Inc. (for Ryder Truck Rental, Inc.)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 138 AR PAGE NUMBER: 003072 - 003082
DOCUMENT DATE: 11/13/92
NUMBER OF PAGES: 011
AUTHOR: Nicholas W. Hetman, Senior Attorney
COMPANY/AGENCY: Texas Gas Transmission Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 139 AR PAGE NUMBER: 003083 - 003087
DOCUMENT DATE: 11/13/92
NUMBER OF PAGES: 005
AUTHOR: Virginia E. Carlson, Staff Counsel
COMPANY/AGENCY: The Hertz Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information Letter/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 140 AR PAGE NUMBER: 003088 - 003093
DOCUMENT DATE: 11/16/92
NUMBER OF PAGES: 006
AUTHOR: Clarence Gillespie III, Manager - Environmental Services
COMPANY/AGENCY: Fruehauf Trailer Corporation
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 141 AR PAGE NUMBER: 003094 - 003095
DOCUMENT DATE: 12/16/92
NUMBER OF PAGES: 002
AUTHOR: Bradford Wright, President
COMPANY/AGENCY: Western Real Estate Services
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Correspondence and Attachment
DOCUMENT TITLE: Information on date of incorporation of Mr. Wright's company

DOCUMENT NUMBER: 142 AR PAGE NUMBER: 003096 - 003256
DOCUMENT DATE: 01/07/93
NUMBER OF PAGES: 161
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: See Attached Addressee List
DOCUMENT TYPE: Notice of Decision Not to Use Special Notice Procedures
DOCUMENT TITLE: Notice of Decision Not to Use Special Notice Procedures and Draft Administrative Order on Consent for Engineering Evaluation/Cost Analysis

DOCUMENT NUMBER: 143 AR PAGE NUMBER: 003257 - 003268
DOCUMENT DATE: 01/15/93
NUMBER OF PAGES: 012
AUTHOR: Tom Metzler, President
COMPANY/AGENCY: AMR Combs, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e)/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 144 AR PAGE NUMBER: 003269 - 003272
DOCUMENT DATE: 02/08/93
NUMBER OF PAGES: 004
AUTHOR: William G. Ross Jr., Attorney
COMPANY/AGENCY: Brooks, Pierce, McLendon, Humphrey & Leonard (for Mohasco Corp. and Chromcraft Revington, Inc.)
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 145 AR PAGE NUMBER: 003273 - 003274
DOCUMENT DATE: 02/22/93
NUMBER OF PAGES: 002
AUTHOR: Richard Walsh, Esq.
COMPANY/AGENCY: Phillips Petroleum Company ("Phillips")
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Phillips' response to U.S. EPA Notice of Decision Not To Use Special Notice Procedures Letter dated 01/15/93

DOCUMENT NUMBER: 146 AR PAGE NUMBER: 003275 - 003275
DOCUMENT DATE: 02/24/93
NUMBER OF PAGES: 001
AUTHOR: Donna Mullins, PCB Case Development Officer
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: "Toxic Section Comments on Applicability of PCB Regulations to CERCLA Response Action"

DOCUMENT NUMBER: 147 AR PAGE NUMBER: 003276 - 003289
DOCUMENT DATE: 03/15/93
NUMBER OF PAGES: 014
AUTHOR: James Sowell, Corporate Engineer
COMPANY/AGENCY: Baldwin
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Supplemental Response Letter
DOCUMENT TITLE: Supplemental response to 10/28/92 Baldwin response to EPA's 104(e)/General Notice Letter dated 09/09/92

DOCUMENT NUMBER: 148 AR PAGE NUMBER: 003290 - 003389
DOCUMENT DATE: 03/16/93
NUMBER OF PAGES: 100
AUTHOR: Jack Courtney, Air Force Legal Services Agency, Environmental Law Division - Central Region
COMPANY/AGENCY: U.S. Air Force
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Cover Letter and Attachment
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 149 AR PAGE NUMBER: 003390 - 003391
DOCUMENT DATE: 03/24/93
NUMBER OF PAGES: 002
AUTHOR: Lara J. Zacny, Engineer II, Hazardous Waste Division
COMPANY/AGENCY: ADPC&E
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: Comments on "Site Characterization and Alternative Analysis" for the oily sludge pit

DOCUMENT NUMBER: 150 AR PAGE NUMBER: 002008 - 002048
DOCUMENT DATE: 03/29/93
NUMBER OF PAGES: 041
AUTHOR: Office of Waste Programs Enforcement
COMPANY/AGENCY: U.S. EPA - Washington, D.C.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Updated Compendium of Guidance Index from EPA Region 9
DOCUMENT TITLE: Compendium of CERCLA Response Selection Guidance Documents Index

DOCUMENT NUMBER: 151 AR PAGE NUMBER: 003392 - 003396
DOCUMENT DATE: 03/30/93
NUMBER OF PAGES: 005
AUTHOR: Wendy Fisher, Vice President/General Counsel
COMPANY/AGENCY: Schilling Enterprises
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter

DOCUMENT NUMBER: 152 AR PAGE NUMBER: 003397 - 003411
DOCUMENT DATE: 04/01/93
NUMBER OF PAGES: 015
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Gurley Refining Company, Inc., Memphis, TN
DOCUMENT TYPE: 104(e) Request for Information/General Notice Letter
DOCUMENT TITLE: Requests recipient to respond to 104(e) Request for Information/General Notice Letter

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 153 AR PAGE NUMBER: 003412 - 003413
DOCUMENT DATE: 04/20/93
NUMBER OF PAGES: 002
AUTHOR: Kenneth Ries, Director, Environment and Energy
COMPANY/AGENCY: Transportation Leasing Company
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 09/09/92, concerning Greyhound Bus Lines' involvement at the site

DOCUMENT NUMBER: 154 AR PAGE NUMBER: 003414 - 003416
DOCUMENT DATE: 04/22/93
NUMBER OF PAGES: 003
AUTHOR: W.M. Gurley
COMPANY/AGENCY: Gurley Refining Company, Inc.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Response Letter
DOCUMENT TITLE: Response to U.S. EPA 104(e) Request for Information/General Notice Letter dated 04/01/93

DOCUMENT NUMBER: 155 AR PAGE NUMBER: 003417 - 003417
DOCUMENT DATE: 04/23/93
NUMBER OF PAGES: 001
AUTHOR: Kenneth Ries, Director, Environment and Energy
COMPANY/AGENCY: Transportation Leasing Co.
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Supplemental Response Letter
DOCUMENT TITLE: Supplement to Transportation Leasing Co's. 04/20/93 response to EPA's 104(e) Request for Information/General Notice Letter about Greyhound Bus Lines' involvement at the site

DOCUMENT NUMBER: 156 AR PAGE NUMBER: 003418 - 003674
DOCUMENT DATE: 04/30/93
NUMBER OF PAGES: 257
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniel, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Technical Report and Analysis
DOCUMENT TITLE: "Site Characterization/Alternatives Analysis - Oily Sludge Pit and Ancillary Contaminated Media"

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 157 AR PAGE NUMBER: 003675 - 003692
DOCUMENT DATE: 05/17/93
NUMBER OF PAGES: 018
AUTHOR: Steve Dehmer
COMPANY/AGENCY: Chevron Research and Technology Company ("Chevron")
RECIPIENT: David Weeks, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: Re: Site Characterization and Alternatives Analysis

DOCUMENT NUMBER: 158 AR PAGE NUMBER: 008505 - 008533
DOCUMENT DATE: 05/24/93
NUMBER OF PAGES: 029
AUTHOR: Unspecified
COMPANY/AGENCY: U.S. EPA
RECIPIENT: General Public
DOCUMENT TYPE: Federal Register/Rules and Regulations
DOCUMENT TITLE: Federal Register/Vol. 58, No. 98/Rules and Regulations. "Land Disposal Restrictions for Ignitable and Corrosive Characteristic Wastes Whose Treatment Standards Were Vacated; Interim Final Rule"

DOCUMENT NUMBER: 159 AR PAGE NUMBER: 003693 - 003699
DOCUMENT DATE: 05/28/93
NUMBER OF PAGES: 007
AUTHOR: EPA Staff
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Agency Guidelines
DOCUMENT TITLE: "U.S. EPA Region 6 Guidelines to Define Effective Stabilization"

DOCUMENT NUMBER: 160 AR PAGE NUMBER: 003700 - 003993
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 294
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniel, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Final Report
DOCUMENT TITLE: Final Remedial Investigation - South 8th Street Landfill, West Memphis, AR - Revision 1

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 161 AR PAGE NUMBER: 003994 - 004445
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 462
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniel, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Remedial Investigation Appendexes
DOCUMENT TITLE: Appendexes A and B

DOCUMENT NUMBER: 162 AR PAGE NUMBER: 004446 - 005075
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 630
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniels, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Remedial Investigation Appendexes
DOCUMENT TITLE: Appendexes C-O

DOCUMENT NUMBER: 163 AR PAGE NUMBER: 005076 - 005982
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 907
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniels, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Remedial Investigation Appendexes
DOCUMENT TITLE: Appendexes P-V

DOCUMENT NUMBER: 164 AR PAGE NUMBER: 005983 - 006306
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 324
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniels, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Remedial Investigation Appendix
DOCUMENT TITLE: Appendix W

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
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DOCUMENT NUMBER: 165 AR PAGE NUMBER: 006307 - 007302
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 996
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniels, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Remedial Investigation Appendix
DOCUMENT TITLE: Appendix X

DOCUMENT NUMBER: 166 AR PAGE NUMBER: 007303 - 008241
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 939
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniels, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Remedial Investigation Appendexes
DOCUMENT TITLE: Appendexes Y-Z

DOCUMENT NUMBER: 167 AR PAGE NUMBER: 008242 - 008452
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 211
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniel, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Feasibility Study
DOCUMENT TITLE: Feasibility Study - South 8th Street Landfill, West Memphis. AR - Revision 1

DOCUMENT NUMBER: 168 AR PAGE NUMBER: 008534 - 008837
DOCUMENT DATE: 06/30/93
NUMBER OF PAGES: 304
AUTHOR: Staff Consultants
COMPANY/AGENCY: Fluor Daniel, Inc.
RECIPIENT: U.S. EPA Region 6 Superfund Site File
DOCUMENT TYPE: Baseline Risk Assessment
DOCUMENT TITLE: "Baseline Risk Assessment - Landfill Area - Human Health Evaluation"

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 169 AR PAGE NUMBER: 008838 - 008839
DOCUMENT DATE: 07/19/93
NUMBER OF PAGES: 002
AUTHOR: Judy Sarles, Staff Writer
COMPANY/AGENCY: West Memphis Evening Times
RECIPIENT: Public
DOCUMENT TYPE: News Article
DOCUMENT TITLE: "EPA says dump presents little threat to health"

DOCUMENT NUMBER: 170 AR PAGE NUMBER: 008840 - 008863
DOCUMENT DATE: 07/26/93
NUMBER OF PAGES: 024
AUTHOR: EPA Staff
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Public
DOCUMENT TYPE: Proposed Plan of Action
DOCUMENT TITLE: "EPA Announces Proposed Plan of Action"

DOCUMENT NUMBER: 171 AR PAGE NUMBER: 008864 - 008865
DOCUMENT DATE: 07/27/93
NUMBER OF PAGES: 002
AUTHOR: Judy Sarles, Staff Writer
COMPANY/AGENCY: West Memphis Evening Times
RECIPIENT: Public
DOCUMENT TYPE: News Article
DOCUMENT TITLE: "EPA puts dump site cleanup cost at $20 million"

DOCUMENT NUMBER: 172 AR PAGE NUMBER: 008866 - 008866
DOCUMENT DATE: 08/13/93
NUMBER OF PAGES: 001
AUTHOR: Joe Baker, Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Response to proposed plan

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
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DOCUMENT NUMBER: 173 AR PAGE NUMBER: 008867 - 008929
DOCUMENT DATE: 08/17/93
NUMBER OF PAGES: 063
AUTHOR: Jan Meyer, Court Reporter, Notary Public for the State of Tenn. at Large
COMPANY/AGENCY: Daniel, Dillinger, Dominski, Richberger, Weatherford & Parker - Court Reporters
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Public Hearing Transcript
DOCUMENT TITLE: "The South 8th Street Landfill Superfund Site Public Hearing, August 17, 1993, 7:00 p.m."

DOCUMENT NUMBER: 174 AR PAGE NUMBER: 008930 - 008931
DOCUMENT DATE: 08/18/93
NUMBER OF PAGES: 002
AUTHOR: Judy Sarles, Staff Writer
COMPANY/AGENCY: West Memphis Evening Times
RECIPIENT: Public
DOCUMENT TYPE: News Article
DOCUMENT TITLE: "Cleanup plan too costly, local residents tell EPA"

DOCUMENT NUMBER: 175 AR PAGE NUMBER: 008932 - 008940
DOCUMENT DATE: 08/24/93
NUMBER OF PAGES: 009
AUTHOR: Citizens Against Abusive Government
COMPANY/AGENCY: West Memphis, Ark.
RECIPIENT: U.S. EPA Region 6 Superfund Site Files
DOCUMENT TYPE: Public Comment Statement
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 176 AR PAGE NUMBER: 008941 - 008941
DOCUMENT DATE: 08/24/93
NUMBER OF PAGES: 001
AUTHOR: Roger Sumpter, Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Response to proposed plan

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 177 AR PAGE NUMBER: 008942 - 008942
DOCUMENT DATE: 09/01/93
NUMBER OF PAGES: 001
AUTHOR: EPA Staff
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Public
DOCUMENT TYPE: Public Comment Period Announcement (Published in West Mem
DOCUMENT TITLE: "U.S. EPA Extends Public Comment Period to September 24, 1993 for the S. 8th St. Landfill Superfund Site"

DOCUMENT NUMBER: 178 AR PAGE NUMBER: 008943 - 008944
DOCUMENT DATE: 09/01/93
NUMBER OF PAGES: 002
AUTHOR: Joe Baker, Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Honorable Jim Guy Tucker, Governor of Arkansas
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: Letter regarding site and EPA proposed plan

DOCUMENT NUMBER: 179 AR PAGE NUMBER: 008945 - 008946
DOCUMENT DATE: 09/02/93
NUMBER OF PAGES: 002
AUTHOR: Judy Sarles, Staff Writer
COMPANY/AGENCY: West Memphis Evening Times
RECIPIENT: Public
DOCUMENT TYPE: News Article
DOCUMENT TITLE: "More time due for talk on landfill"

DOCUMENT NUMBER: 180 AR PAGE NUMBER: 008947 - 008947
DOCUMENT DATE: 09/02/93
NUMBER OF PAGES: 001
AUTHOR: Jim Turner, Crittenden County Quorum Court
COMPANY/AGENCY: West Memphis, Ark.
RECIPIENT: Honorable Jim Guy Tucker, Governor of Arkansas
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: Letter regarding site and EPA proposed plan

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 181 AR PAGE NUMBER: 008948 - 008948
DOCUMENT DATE: 09/03/93
NUMBER OF PAGES: 001
AUTHOR: Eddie Brawley, Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 182 AR PAGE NUMBER: 008949 - 008950
DOCUMENT DATE: 09/07/93
NUMBER OF PAGES: 002
AUTHOR: Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Letter regarding site and general environmental concerns

DOCUMENT NUMBER: 183 AR PAGE NUMBER: 008951 - 008952
DOCUMENT DATE: 09/10/93
NUMBER OF PAGES: 002
AUTHOR: F. Wade Callicutt, Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 184 AR PAGE NUMBER: 008953 - 008953
DOCUMENT DATE: 09/15/93
NUMBER OF PAGES: 001
AUTHOR: Joe Baker, Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Randall Mathis, Director, Arkansas Department of Pollution Control & Ecology (ADPC&E)
DOCUMENT TYPE: Correspondence
DOCUMENT TITLE: Letter regarding site and EPA proposed plan

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 185 AR PAGE NUMBER: 008954 - 008968
DOCUMENT DATE: 09/16/93
NUMBER OF PAGES: 015
AUTHOR: Steve Dehmer
COMPANY/AGENCY: Chevron Research and Technology Company (Chevron)
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter w/Attachment
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 186 AR PAGE NUMBER: 008969 - 008970
DOCUMENT DATE: 09/17/93
NUMBER OF PAGES: 002
AUTHOR: Randall Mathis, Director
COMPANY/AGENCY: ADPC&E
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 187 AR PAGE NUMBER: 008971 - 008975
DOCUMENT DATE: 09/17/93
NUMBER OF PAGES: 005
AUTHOR: David Peeples, City Attorney
COMPANY/AGENCY: City of West Memphis, Ark.
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter and Enclosure
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 188 AR PAGE NUMBER: 008976 - 009123
DOCUMENT DATE: 09/21/93
NUMBER OF PAGES: 148
AUTHOR: Charlotte Knight, Attorney at Law
COMPANY/AGENCY: Memphis Light, Gas and Water Division
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Cover Letter w/Enclosure
DOCUMENT TITLE: Response to proposed plan

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
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DOCUMENT NUMBER: 189 AR PAGE NUMBER: 009124 - 009124
DOCUMENT DATE: 09/22/93
NUMBER OF PAGES: 001
AUTHOR: Staff Writer
COMPANY/AGENCY: West Memphis Evening Times
RECIPIENT: Public
DOCUMENT TYPE: News Article
DOCUMENT TITLE: "Huckabee joins local protest against EPA cleanup proposal"

DOCUMENT NUMBER: 190 AR PAGE NUMBER: 009125 - 009125
DOCUMENT DATE: 09/22/93
NUMBER OF PAGES: 001
AUTHOR: Joe Baker, Resident of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Letter regarding site and EPA proposed plan

DOCUMENT NUMBER: 191 AR PAGE NUMBER: 009126 - 009132
DOCUMENT DATE: 09/22/93
NUMBER OF PAGES: 007
AUTHOR: Citizens of West Memphis, Ark.
COMPANY/AGENCY: Unspecified
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Statements
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 192 AR PAGE NUMBER: 009133 - 009135
DOCUMENT DATE: 09/22/93
NUMBER OF PAGES: 003
AUTHOR: Abbot C. Widdicombe, President
COMPANY/AGENCY: William L. Johnson Co., Inc.
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter w/Attachment
DOCUMENT TITLE: Response to proposed plan

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
SITE NUMBER: ARD 980496723

DOCUMENT NUMBER: 193 AR PAGE NUMBER: 009136 - 009140
DOCUMENT DATE: 09/23/93
NUMBER OF PAGES: 005
AUTHOR: David Peeples, City Attorney
COMPANY/AGENCY: City of West Memphis, Ark.
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 194 AR PAGE NUMBER: 009141 - 009141
DOCUMENT DATE: 09/23/93
NUMBER OF PAGES: 001
AUTHOR: Jim Guy Tucker, Governor
COMPANY/AGENCY: State of Arkansas
RECIPIENT: Donn Walters, Community Relations Coordinator, U.S. EPA Region 6
DOCUMENT TYPE: Public Comment Letter
DOCUMENT TITLE: Response to proposed plan

DOCUMENT NUMBER: 195 AR PAGE NUMBER: 009142 - 009145
DOCUMENT DATE: 12/30/93
NUMBER OF PAGES: 004
AUTHOR: David Weeks, P.E., Remedial Project Manager
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: U.S. EPA Region 6 Superfund Files
DOCUMENT TYPE: Internal Analysis
DOCUMENT TITLE: "Past Record of Decision (ROD) Analysis - Stabilization/Solidification Conducted for South 8th Street Landfill Site"

DOCUMENT NUMBER: 196 AR PAGE NUMBER: 009146 - 009191
DOCUMENT DATE: 02/15/94
NUMBER OF PAGES: 046
AUTHOR: David Weeks, P.E., RPM
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Administrative Record
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: Remediation Goals at the South Eighth Street Landfill Site

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SITE NAME: SOUTH 8TH STREET LANDFILL SITE
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DOCUMENT NUMBER: 197 AR PAGE NUMBER: 009192 - 009401
DOCUMENT DATE: 09/29/94
NUMBER OF PAGES: 210
AUTHOR: Jane N. Saginaw, Regional Administrator
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Public
DOCUMENT TYPE: Record of Decision and Responsiveness Summary
DOCUMENT TITLE: Record of Decision and Responsiveness Summary

APPENDIX B
Basis for Remediation Goals

THE SELECTION OF REMEDIATION GOALS
at the
SOUTH 8TH STREET LANDFILL SITE
February 15, 1994

The selection of remediation goals (RGs) at the 8th Street site has been difficult because of inconsistencies between cleanup goals based on risk and those cleanup goals that have typically been used at other sites in the past (e.g. "policy goals"). The goals initially selected by the RPM were supposedly based on policy. However, once questioned, the RPM could not support the goal for carcinogenic PAHs with any firm policy statement. Upon further investigation, the RPM discovered that the policy based cleanup goals for PCBs and dioxin result in a residual risk greater than 1×10^{-4} if strictly applied to the risk scenario's developed for the baseline risk assessment in the absence of other relevant technical factors. Hence, an analysis was undertaken to provide senior management at EPA Region 6 with the information needed to select the RGs at the 8th Street Site.

BACKGROUND

The South 8th Street Landfill site is a 30 acre site located on the banks of the Mississippi River in West Memphis, Arkansas. It is comprised of a 3.5 acre oily sludge pit (waste is characteristically hazardous for pH and lead) and 16 acres of landfill. No other hot spots were found within the landfill. Based on the baseline risk assessment, the primary contaminants of concern at the site are: carcinogenic PAHs, PCBs and dioxin. The maximum concentration of these contaminants as detected in the oily sludge pit are provided as follows:

CONTAMINANT	CONCENTRATION (ppb)
Total PAH	approx. 109 ppm
PCB	approx. 14-38 ppm
TCDDE	0.651 ppb (TEF, only octa isomers, no 2,3,7,8 detected)

EPA evaluated the available land use data and determined that the baseline risk assessment should consider recreational and agricultural scenarios for the following reasons:

- The site is in the one year flood plain of the Mississippi River thereby precluding the construction of any residential or commercial facilities.
- The site was seriously considered as a possible location for a state park by the Arkansas Department of Parks and Recreation.

- There is currently a large RV PARK that borders the site on the north that is owned by the same landowner as the site.

- The site was used as a parking lot for an annual local festival where attendance was as great as 30,000 people.

- The RPM has personally observed numerous people, including children, playing near the river in the vicinity of the site before it was fenced.

- Aerial photography shows that the site was farmed as recently as 1986.

The receptors that were considered in the baseline risk assessment include: (1) current and future recreational visitors; (2) future recreational workers; and (3) current and future crop consumers. Current and future recreational visitors includes adults and children that visit the site for very short periods of time (14 days per year adult RME, 3 days AVG) to camp and engage in other recreational activities. The future recreational worker was based on the assumption that the site will either be turned into a state park, or the RV park will be significantly expanded to include the entire site. The recreational worker may be engaged in park maintenance activities such as mowing the grass, pond cleanout, and repair of park facilities. The current and future crop consumer scenario postulates that a family will grow vegetables and fruits at the site for private consumption and commercial sale. A detailed discussion of the risk associated with each of these scenarios can be found in the ROD. The results are also summarized in the top portion of the table included in Attachment 1.

EPA used the exposure assumptions developed in the baseline risk assessment to calculate RGs. Overall, the crop consumer risks were judged by the RPM to be too uncertain for the purpose of developing realistic RGs. Due to the large amount of conservatism built into the crop uptake models, the RGs that may be developed by utilizing the crop consumer scenario are significantly less than the analytical detection limits for the contaminants of concern (PAH, PCB, TCDDE). The risk for the recreational visitors is within the acceptable risk range. Therefore, the future recreational worker scenario was used to develop the risk based RGs.

In addition, the risk assessment assumes that subsurface soils are excavated and spread over the surface in the future in support of some recreational feature such as a pond. This was assumed primarily because a similar activity has actually occurred on one portion of the site. The landowner excavated a former disposal area (determined to be relatively clean during the RI) to prepare a fishing pond for his RV park visitors. He used the excavated material to facilitate the construction of an embankment around the pond and possibly to fill in low areas on the site.

ANALYSIS

This paper details of the differences between policy based RGs and risk based RGs through the following activities: (1) a comparison of policy based goals and their associated risks with goals based on the site specific risk scenario at a risk of 1 x 10^{-6} for both RME and AVG risks; (2) a comparison of 1 x 10^{-6} RG's based upon the recreational worker risk scenario with RG's based on standard residential and industrial exposure assumptions; (3) a review of relevant statutory, regulatory, and policy language concerning the development of RGs; (4) a consideration of specific technical concerns relative to analytical limitations and the remedy that will implemented at the site; and (5) a comparison of the recommended risk based RG's to the new soil screening numbers recently proposed by EPA HQ in a draft report entitled "Qualitative Analysis of Impact of Soil Numbers on the Superfund Process," dated September 30, 1993.

A comparison of the site risk, current policy based RGs and risk based RGs is presented in Attachment 1. This review shows that strict application of policy based goals in a vacuum will result in a residual risk at the site in excess of $1x10^{-4}$. The strict RME $1x10^{-6}$ risk based RGs are several orders of magnitude lower than the policy based RGs. In fact, the risk based RGs are so small, that for PAHs and TCDDE, the RG is less than the analytical detection limit for the contaminants in soil. The AVG $1x10^{-6}$ risk based RGs are relatively similar to the policy based RGs. The large difference between the supposed "policy" based and risk based RGs are due to several reasons that vary somewhat for each contaminant.

PAHs

In the case of the PAHs, a review of the "policy" based RG of 3 ppm revealed that this number is based on cleanup goals selected in past RODs (Attachment 2). The 3 ppm number does not consider multiple contaminants and multiple pathways at a specific site. Nor does the 3 ppm number correlate with either standard residential or industrial risk scenarios at a risk equal to 1 x 10^{-6}.

Attachment 3 clearly shows that a risk based approach utilizing standard residential and industrial exposure assumptions at a risk equal to 1 x 10^{-6} results in RGs of 0.09 ppm and 0.81 ppm respectively for carcinogenic PAH. In a standard residential exposure scenario, 3 ppm equates to a risk equal to 3 x 10^{-5}, without considering other contaminants of concern and risk pathways other than soil ingestion.

The difference between the site specific recreational worker risk based RG of 0.16 ppm and the standard industrial risk based RG of

0.81 ppm is readily apparent in Attachment 3. The primary difference between the standard industrial calculation and the recreational worker calculation utilized at the South 8th Street Site is the contaminant ingestion rate (50 mg/d vs. 480 mg/d).

The 480 mg/d rate utilized in the site specific baseline risk assessment was selected based on information contained in OSWER Directive 9285.6-03, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" (excerpt provided as Attachment 4). The standard rate of 50 mg/d is based upon indoor air studies and the 480 mg/d is based upon exposures during outdoor activities such as "yardwork". It was the opinion the RPM and contractor risk assessors that the 480 mg/d rate seemed to more accurately reflect an ingestion rate for a recreational worker working outside performing site maintenance activities than the 50 mg/d rate that is based on indoor exposures.

The EPA toxicologist did advise the RPM that the 480 mg/d rate was typically used for shorter exposure durations than the duration normally used to calculate industrial intake rates. In order to account for this factor, the risk assessment employed a fractional intake factor of 0.5 (based on professional judgement) to account for the fact that a worker will not spend his/her entire work day conducting "yardwork" type activities. In summation, the RPM made a risk management decision based on currently available information that the 480 mg/d rate more accurately reflected exposures associated with a recreational worker than the 50 mg/d rate.

Therefore, it is clear that application of the standard industrial exposure scenario will result in an 1×10^{-6} remediation goal of 0.81, which is considerably less than the policy based goal of 3 ppm. The 3 ppm is based upon a review of RGs used in past RODs and is not based on risk. The site specific risk based goal of 0.33 ppm presented in Attachment 1 is based on the detection limit of benzo(a)pyrene in soil. The actual site specific risk based RG is 0.16 ppm.

PCBs

For PCBs, the difference between the policy based goal of 10 ppm for industrial exposure scenarios and the 1×10^{-6} risk based site specific RG of 0.07 ppm results primarily in the way the risk calculations are executed. These differences are summarized in Attachment 5.

The policy based RG assumes that the concentration of PCBs in the soil will degrade over time. EPA's standard risk assessment methodology does not assume that contaminants will degrade over time. In addition, the policy RG for industrial scenarios is not based upon a specific set of exposure assumptions, but was

developed by simply multiplying the residential RG by a factor of 10.

In summation, there are numerous differences between the two sets of risk calculations presented in Attachment 5 that are used to develop the two different "worker type" RGs (10 ppm vs. 0.07 ppm). A review of those differences confirms that the site specific calculations result in contaminant intakes that are less than the contaminant intakes used to calculate the risk associated with the policy based goals. Therefore, the difference between the policy based RG of 10 ppm and the site specific, risk based, RG of 0.07 ppm is the result assuming that the concentration of PCBs degrade over time and the "factor of 10 approach" used to perform the risk calculation. Both of these methodologies are inconsistent with current EPA Region 6 risk assessment practices and the site specific baseline risk assessment.

Dioxin

Similar to PCBs, the cleanup concentrations EPA typically utilizes for dioxin are not based on current standard EPA risk assessment methodologies, but rather on a 1984 U.S. Public Health Service risk assessment conducted by Dr. Renate Kimbrough. Since the highest concentration of dioxin at the South 8th Street site (0.651 ppb, TCDDE) is less than the typical policy based action levels (1 ppb residential, 20 ppb commercial), establishing a cleanup goals for dioxin based upon policy is nonsensical when one considers that the site specific risk associated with 0.651 ppb is greater than 1 x 10^{-4}. The difference between the policy based goals for dioxin remediation of 1 pbb residential and 20 ppb industrial, and the site specific 1 x 10^{-6} risk based RG is not easily explained.

ONE PART PER BILLION

The 1 ppb RG is based upon a paper authored by Dr. Renate Kimbrough et.al. entitled "Health Implications of 2,3,7,8 - Tetrachlorodibenzodioxin (TCDD) Contamination of Residential Soil" that was published in the Journal of Toxicology and Environmental Health in 1984 and reprinted by the U.S. Public Health Service. In this paper the authors examined the results of rat studies from which a Virtual Safe Dose (VSD) was derived and developed risk estimates (based upon certain exposure assumptions) that showed 1 ppb is an appropriate action level for TCDD in a residential location. Referenced pages from Kimbrough's paper are provided in Attachment 6.

Several of the exposure assumptions used to calculate risk in the study are summarized along with typical EPA assumptions as follows:

1. The Kimbrough paper assumes three exposure routes,

ingestion, inhalation, and dermal absorption (p. 187). *EPA also evaluates all three routes when developing remediation goals for dioxin.*

2. The Kimbrough paper assumes that the concentration of TCDD will degrade over a 70-year lifetime with a half-life equal to 12 years (p. 189). *EPA risk assessments do not usually assume the degradation of contaminants over the exposure duration.*

3. The Kimbrough paper assumes that exposure will only occur six months of every year due to seasonal influences and varying activity patterns that are not conducive to exposure (p. 189). *EPA never utilizes such assumptions to estimate RME risk. EPA usually assumes the exposure frequency for a residential scenario to be 350 days per year for RME risk calculations and 250 days per year for RME industrial exposure scenarios.*

4. The Kimbrough paper assumes a wide range of ingestion rates for children, with some as low as 0 (children age 0-9 months) and as high as 10,000 mg/d (children age 1.5-3.5 yr). Child age rates are the same as adult (100 mg/d) beginning at age 5 (p. 190). *EPA assumes 200 mg for children to age 6 and 100 mg/day thereafter.*

5. The Kimbrough paper assumes a dermal absorption rate of 1% (p. 189). *EPA uses 3% to estimate the absorption of TCDD through the skin via direct contact.*

6. The Kimbrough paper assumes that air is exchanged at a rate of 15 m^3/day (p. 189). *EPA uses 20m^3/day to estimate adult exposures to TCDD via the air pathway for 30 yrs.*

The above noted differences and their effects on risk calculations are compared in a table provided as Attachment 7.

After reviewing data from two separate animal studies, Dr. Kimbrough calculated a VSD and, utilizing the exposure assumptions discussed above, determined the following:

1. If the most conservative toxicological results (i.e. Virtual Safe Dose (VSD) = 28 fg/kg b.w.*d at 1 x 10^{-6} risk) are used to estimate risk via exposure to an area 100% contaminated with 1 ppb TCDD, the risk is 2.3 x 10^{-5} (p. 191).

2. If the least conservative toxicological results (i.e. VSD = 1428 fg/kg b.w.*d at 1 x 10^{-6} risk) are used to estimate risk via exposure to an area 100% contaminated with 1ppb TCDD, the risk is less than 1 x 10^{-6} (somewhere around 4E-7), (p. 191; Figure 2, p. 186).

The risk associated with 1 ppb in a residential setting using standard EPA risk assumptions and methodologies is equal to 2.4×10^{-4}. The manner in which the risk varies between the three separate risk assessment methodologies is compared in the following table.

Comparison of Dioxin Risks as Determined by Three Different Methodologies

	Standard EPA	Lower Bound VSD	Upper Bound VSD
Risk	2.4×10^{-4}	2.3×10^{-5}	4×10^{-7}

It is clear from a review of the table that the risk associated with 1 ppb of dioxin may vary by up to three orders of magnitude depending on how the risk is calculated. Furthermore, it is quite evident that the least conservative data from the Kimbrough study is used to support the claim that 1 ppb is protective at a 1×10^{-6} risk.

TWENTY PARTS PER BILLION

In response to a question regarding TCDD cleanup levels at several sites in Region VII, ATSDR outlined the basis for the 20 ppb cleanup level in industrial areas in a letter dated July 30, 1987, (Attachment 8). Also addressed in this letter is the concept of using a 12 inch clean soil cover over soils contaminated with 5 to 10 ppb TCDD to provide a level of protection similar to 1 ppb TCDD.

Once again, ATSDR utilized radically different assumptions from those typically assumed most EPA Region 6 risk assessment to develop the 20 ppb RG. These differences are summarized as follows:

1. Exposure via ingestion or inhalation does not occur because a commercial site "would be frequented by adults who would primarily walk through the area" and that "It is unlikely that there would be any gardening".

2. The exposure frequency for dermal exposure to 1 gram of soil is 5 times per week for 6 months per year;

3. The exposure duration is 20 years.

4. The amount of TCDD absorbed through the skin = 1%; and

5. Only 10 % of the relevant area is contaminated with TCDD.

The dose calculated when using the above assumptions is 33 (fg/kg b.w.*d). If one compares the 33 fg/kg b.w.*d dose to Kimbrough's lower and upper bound VSDs of 28 and 1428 fg/kg b.w.*d, the dose associated with 20 ppb is within the 10-6 risk range.

ATSDR also addressed the concept of using dilution to support a subsurface soil RG of 5 to 10 ppb TCDD. ATSDR stated in the letter that leaving soils contaminated with 5 to 10 ppb in residential locations was acceptable so long as the contaminated soils were covered with at least 12 inches of clean soil. The rationale for this decision being that "the clean surface soil would represent a barrier restricting human access to contact with the contaminated soil. In the event that the soil was disturbed, the 12 inches of clean soil would be mixed with contaminated soil and the concentration at the surface would, at most, reach 1ppb."

In summary, the methodology used to develop the 20 ppb RG for commercial or industrial areas appears to be extremely inappropriate for the South 8th Street site and is radically different from the methodology typically utilized to estimate risk for industrial land use scenarios.

AUTHORIZED BASIS FOR CLEANUP DETERMINATIONS

In addition to outlining the differences between the policy based goals and the site specific goals, a discussion of EPA regulation and policy regarding the development of RGs was also conducted. The starting point for the evaluation is of course the statute itself which states in § 121 of CERCLA that a remedial action "shall attain a degree of cleanup of hazardous substances, ..., released into the environment and of control of further release at a minimum which assures protection of human health and the environment." This standard is very broad and was defined further in the NCP.

The NCP states at 40 CFR § 300.430 (e)(2)(i)(A)(2) that:

> *The 10E-6 risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.*

This was interpreted to mean that EPA should strive to achieve 1 x 10^{-6} cleanups and should deviate from this goal only if some specific rationale for deviating from the goal can be provided.

The preamble to the NCP at p. 8712 provides further detail regarding how RGs are to be established. In the context of developing and analyzing alternatives, the NCP states

> *the risk associated with potential alternatives, both during implementation and following completion of the remedial action, are assessed, based on the reasonable maximum exposure assumptions and any other controls necessary to ensure that exposure levels are protective and can be attained. These are generally assessed for each exposure route unless there are multiple exposure routes where combined effects may have to be considered.*

In regards to departing from a risk level of 10-6, the NCP states at 8717 that:

> *Preliminary remediation goals for carcinogens are set at a 10-6 excess cancer risk as a point of departure, but may be revised to a different risk level within the acceptable risk range based on the consideration of appropriate factors including, but not limited to: exposure factors, uncertainty factors, and technical factors. Included under exposure factors are: the cumulative effect of multiple contaminants, the potential for human exposure from other pathways at the site, population sensitivities, potential impacts to environmental receptors, and cross-media impacts of alternatives. Factors related to uncertainty may include: the reliability of alternatives, the weight of scientific evidence concerning exposures and individual and cumulative health effects, and the reliability of exposure data. Technical factors may include: detection/quantification limits for contaminants, technical limitations to remediation, the ability to monitor and control movements of contaminants, and background levels of contaminants. The final selection of the appropriate risk level is made when the remedy is selected based on the balancing of criteria.*

EPA guidance provides some additional information regarding this subject. OSWER Directive 9355.0-30, Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions (April 22, 1991), states on page 7 that:

> *Preliminary goals may be modified based on results of the baseline risk assessment, which clarifies exposure pathways and may identify situations where cumulative risk of multiple contaminants or multiple exposure pathways at the site indicate the need for more or less stringent cleanup levels than those initially developed as preliminary remediation goals.*

This guidance seems to indicate that preliminary goals (i.e. goals developed during scoping such as is the case with policy goals) may be modified based on the site specific risk assessment. However, this same policy states further that:

> *preliminary remediation goals and the corresponding cleanup*

levels may also be modified based on the given waste management strategy selected at the time of remedy selection that is based upon the balancing of the nine criteria used for remedy selection.

Finally, recent discussions concerning the use of central tendency in baseline risk assessments may also be applicable to the consideration of RGs at the site. The only currently available written information regarding this topic is found in a memorandum from Henry Longest to the Division Directors dated May 26, 1992 entitled "Implementing the Deputy Administrator's Risk Characterization Memorandum". The memo does not directly address the issue of RGs, but it does state that:

Regarding risk management, we will continue to use the RME scenario, as described in the preamble of the National Contingency Plan, in the remedial decision in evaluating what is necessary to achieve protection against risk to human health. The central tendency estimate will be used for informational purposes in discussing uncertainties.

CONCLUSION

The analysis quite clearly shows that RGs are to be based on risk in the absence of ARARs or when ARARs are not protective. Policy RGs are not ARARs. Therefore, there is no basis for utilizing policy RGs when those goals conflict with risk at a specific site. In the case of the South 8th Street site, the policy RGs conflict with the reasonable maximum exposure scenario risk at the site. Therefore, policy based goals should not be utilized as a basis for determining cleanup based solely on the rationale that the goals are appropriate because they are based on policy.

This is not to say that the various methodologies and assumptions used to develop the policy based goals are incorrect. One set of assumptions is likely as good as another thereby rendering arguments over such issues matters of professional opinion rather than technical fact. However, it appears to be technically inconsistent use one set of assumptions and methodologies to determine that a risk exist at a specific site and then use a radically different set of assumptions and risk methodologies to develop RGs. It is, therefore, the author's opinion (and the opinion of RAGs Part B - Development of Preliminary Remediation Goals) that site specific RGs should be developed based on the specific risk scenario utilized at a specific site.

Conversely, the preceding analysis also shows that EPA is not required to blindly specify that all cleanups achieve a 1×10^{-6} risk for every contaminant of concern. Several factors may be considered when establishing specific RGs within the risk range of 1×10^{-4} to 1×10^{-6}. Among the factors to be considered include

exposure factors, uncertainty factors, and technical factors. The NCP suggests that exposure factors and uncertainty factors are typically considered for rendering RGs that are even more **stringent** than the typical 1 x 10^{-6} cleanup. Only technical factors are typically considered to be an appropriate basis for amending RGs to a less stringent number.

At the South 8th Street site, the only technical factor discussed in the literature (NCP) that may provide grounds for revising cleanup levels upwards are detection/quantification limits. The detection limits that one could actually achieve in the field are likely to be greater that the MDLs cited in Attachment 1. Thus, in the absence of any other technical factors, the detection limits will control the degree of cleanup at the site, not the actual remediation goal.

In spite of the regulatory accuracy of the above analysis, it fails to consider the fact that the pit area will be backfilled with clean soil to a depth of up to 18 feet. First, the RI determined that the average depth of the sludge pit is 12 feet, with a maximum depth of 18 feet. It seems unlikely that anyone would excavate the pit area to a depth greater than 12′ to construct a recreational feature such as a fishing pond etc... Therefore, the likelihood that contaminated material will be excavated and spread over the site at some point in the future is quite slim.

Secondly, if the area is excavated to construct a fishing pond or some other recreational feature, the fact that part of the site has now been established as a wetland area will generally preclude the placement of the excavated material back onto the site per Section 404 of the CWA. The excavated material will likely be disposed in a landfill, used as cover for a landfill, or used for some other purpose where it would be mixed thoroughly before being subjected to human contact.

Finally, assuming in a worst case scenario that all of the clean fill material used to backfill the sludge pit is excavated including a one foot layer of material contaminated at policy based cleanup values, 833 cubic yards (150′ x 150′ x 1′) of the contaminated material will be mixed with at least 10,000 cubic yards of clean material thereby resulting in a reduction factor of 0.08. This factor, when applied to the policy based cleanup values and the actual dioxin concentration of the pit waste, has the following effects on risk:

	PAH (ppm)	PCB (ppm)	TCDD (ppb)	TOTAL
Cleanup Conc. In Pit Bottom	3	10	0.651	NA
Risk if Directly Accessible To Rec. Worker	1.8×10^{-5}	1.5×10^{-4}	1.8×10^{-4}	3×10^{-3}
Cleanup Conc. After Pit Bottom Mixed w/Clean Backfill	0.33* RG < DL	0.80	0.05	NA
Risk Assoc.w/ Pit Bottom After Mixed w/ Clean Backfill	2×10^{-6}	1×10^{-5}	1×10^{-5}	2×10^{-5}

Hence, when considering the reduction in contaminant concentration resulting from the mixing of the pit bottom with clean backfill, the policy based goals will result in a risk after cleanup that is within the acceptable risk range.

RECOMMENDATION

Based on the above information, it is recommended that EPA Region 6 set an RG of 3 ppm for PAHs, 10 ppm for PCBs and that no RG be established for TCDD as the existing concentrations will not present a risk if mixed with clean backfill. These concentrations will result in a risk that falls within the acceptable risk range and achieve consistenty across the Region in the development of cleanup goals.

The next issue one must now consider is the rationale for departing from 1×10^{-6}, since the proposed RGs will result in a residual risk of 2×10^{-5}. At a depth of 12 to 18 feet, it is likely that excavation will be become extremely difficult due to the pore pressure exerted by the ground water on the sides of the excavation. While it is possible to continue excavations at such depths, it is an extremely time consuming and expensive activity that will likely do very little to support the reduction of risk at the site. Therefore, a departure from a 1×10^{-6} RG may be warranted because of the technical impracticability of completing an excavation in the flood plain at significant depths due to bottom heave in the excavation.

Another issue one must consider is the affect the proposed RGs will have on ground water. EPA has deferred a final decision on the

ground water remedy at the site due to a lack of conclusive data linking contaminants in the ground water to the site. Furthermore, even if the ground water did present a risk, it may not be possible to remediate an aquifer located next to such a large recharge source as the Mississippi River.

The Organic Leaching Model was used during the RI to evaluate the potential for the contaminants in the pit to leach into the ground water. The modeling shows that there is no potential for leachate from the pit area to contain concentrations of PAHs that exceed MCLs or that may be outside the 1×10^{-6} risk range. The modeling does indicate, however, that leachate from the pit area could contain concentrations of PCBs in the leachate at the 1×10^{-5} risk range level, and the concentration of TCDDE in the leachate may exceed the MCL. However, this possibility is not likely as dioxin is extremely insoluble in water and the leachate concentration would most surely be diluted by the ground water to a level well below the MCL.

Finally, the recommended RGs were compared to the recently proposed default soil screening numbers proposed by EPA HQ in the table below.

CONTAMINANT	SITE RG (mg/kg)	SOIL TO GROUNDWATER SCREENING LEVEL (mg/kg)	INHALATION SCREENING LEVEL (mg/kg)	INGESTION SCREENING LEVEL (mg/kg)
PAH as BAPE	3	0.71	320	0.11
PCB	10	0.82	n/a	1
TCDDE	None	n/a	n/a	n/a

In general, the site specific risk based RGs that consider site specific technical factors are greater than the soil screening levels that are being considered by EPA HQ.

ATTACHMENT 1
REVIEW OF CLEANUP CONCENTRATIONS AND DECISION MATRIX

REVIEW OF CLEANUP CONCENTRATIONS
SOUTH 8TH STREET LANDFILL SITE
&
DECISION MATRIX

PARAMETER		PAH	PCB	TCDD	TOTALS	
Site Risk (RME)	Oral	6.7×10^{-4}	1.8×10^{-4}	8×10^{-5}	1×10^{-3}	1×10^{-3}
	Dermal	N/A	2.2×10^{-4}	1×10^{-4}	3×10^{-4}	
Site Risk (AVG)	Oral	6.7×10^{-5}	2.1×10^{-5}	9×10^{-6}	1×10^{-4}	1×10^{-4}
	Dermal	N/A	1×10^{-5}	5×10^{-6}	2×10^{-5}	
Site Risk Based 1×10^{-6} Cleanup Conc. (ppm) RME/AVG		0.16 / 1.50 Det. Lim = 0.33	0.07 / 0.93 Det. Lim = 0.03	0.000002 / 0.00006 Det. Lim = 0.000003		
MANAGER'S CHOICE (1) Policy Based Cleanup Concentration (ppm) / Remaining Risk		3 / 1.8×10^{-5}	10 / 1.5×10^{-4}	Cleanup not necessary because soil conc. < 20 ppb	3×10^{-4}	
MANAGER'S CHOICE (2) RME Risk Based Cleanup Concentration (ppm) / Remaining Risk		0.33* / 2×10^{-6} * det. lim. RG < det. lim.	0.07 / 1×10^{-6}	0.000003* 2 / 1×10^{-6} * det. lim. RG < det. lim.	5×10^{-6}	
MANAGER'S CHOICE (3) AVG Risk Based Cleanup Concentration (ppm) / Remaining Risk		1.50 / 1×10^{-6}	0.93 / 1×10^{-6}	0.00006 / 1×10^{-6}	3×10^{-6}	

ATTACHMENT 2
REVIEW OF SOME REMEDIATION GOALS
IN REGION 6

Prepared by Carl Edlund
U.S. EPA.
February 3, 1992

Carcinogenic PAH SURFACE MATERIAL REMEDIATION LEVELS

CURRENT SITUATION:

The Risk Assessment Guidance for Superfund (RAGS) has standardized most of the risk assessment assumptions used by EPA to set remediation goals at Superfund sites. This guidance has lead to greater consistency in remediation goals over the past two years (See examples of Wood Treating Site Action Level Graphs). However, site by site application of this guidance continues to result in wide variations of remediation goals. These variations are perceived by many agency critics as problematical.

PERCEIVED PROBLEMS:

- EPA is viewed as inconsistent, both over time and from site to site, by a variety of different interests.
- Concepts of risk assessment are not easily understood by the general public despite intensive education efforts by EPA.
- EPA is viewed as soft on PRP sites. Responsible party sites are much more likely to be in active commercial operation. EPA's AOC's and consent decrees give the agency much more assurance of future land use. Resulting remediation levels are generally less stringent than encountered for residential land use.

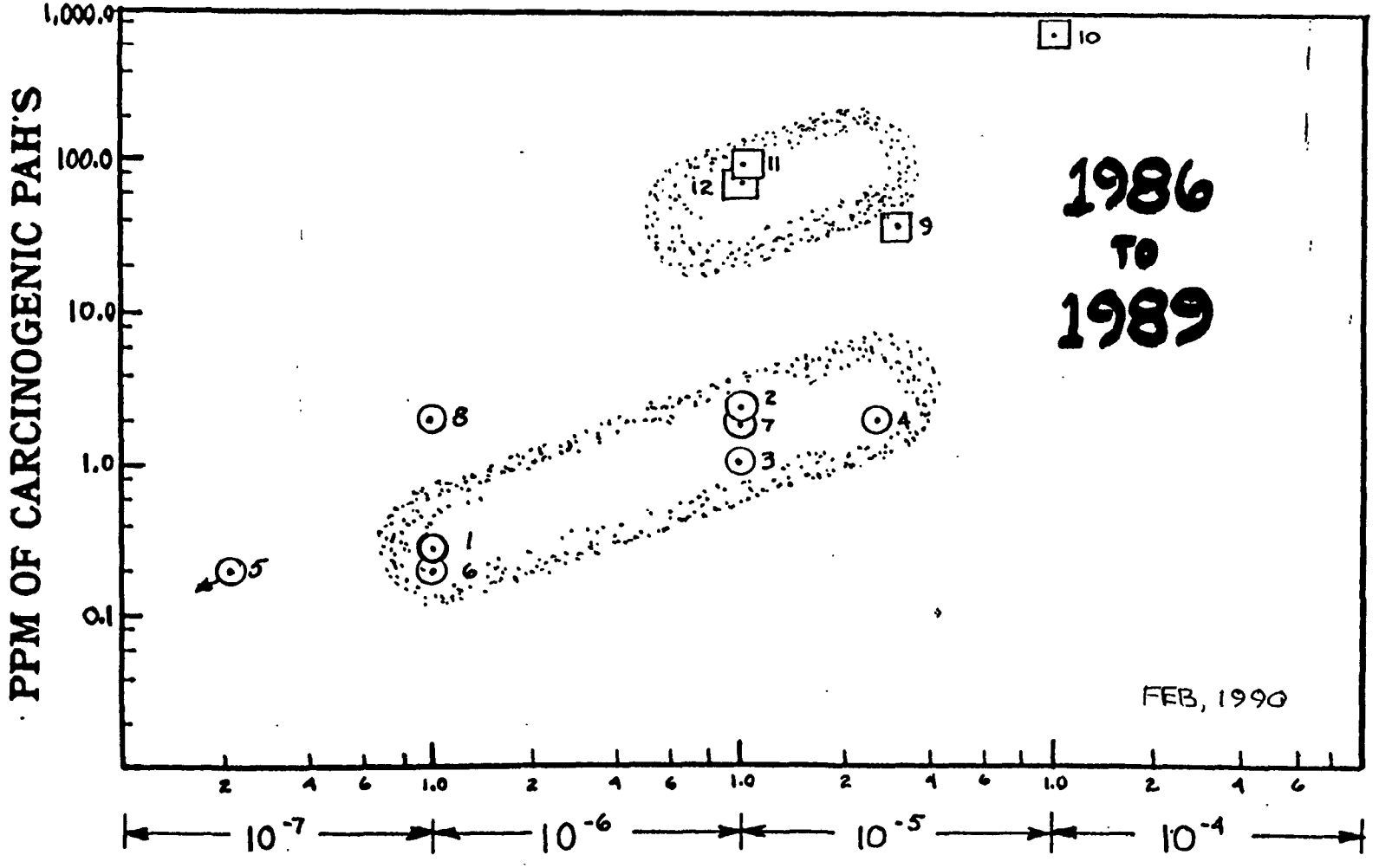
PROPOSED SOLUTION:

OSWER should publish simple, unambiguous, expected remedial levels for Superfund sites. An example for surface materials is:

> AT ALL SUPERFUND SITES THE EXPECTED REMEDIAL GOAL FOR THE TOP TWO FEET OF MATERIAL IS:
>
> - 3 PPM TOTAL CARCINOGENIC PAH'S FOR RESIDENTIAL EXPOSURES, OR
>
> -30 PPM TOTAL CARCINOGENIC PAH'S FOR INDUSTRIAL EXPOSURES

These levels are equivalent to risk of 1 X 10^{-5}, and is consistent with such standards as the PCB TSCA requirements. Deviations from these expectations would be explained in the ROD (e.g., ecological risk changing clean up level, deeper pockets of high contamination, etc). The difference of this approach from current guidelines is, that, instead of giving Regions the "plans for how to build cars" (the current RAGS guidance), OSWER would set expected performance of the "vehicle".

SOIL CLEANUP ACTION LEVELS
SUPERFUND WOOD-TREATING SITES



SOIL ACTION LEVELS VERSES RISK CARCINOGENIC PAH'S
AT SUPERFUND WOODTREATING SITES

SITE	ACTION LEVEL (PPM)	RISK	NOTES
	RESIDENTIAL EXPOSURES		
1. United Creosoting, Conroe, TX (9/89)	0.3	1×10^{-6}	A
2. Mid South Wood Prod., Mena, AR (11/86)	3.0	1×10^{-5}	
3. N. Cavalcade, Houston, TX (6/88)	1.0	1×10^{-5}	
4. Bayou Bonfouca, Slidell, LA (3/87)	2.0	3×10^{-5}	B
5. Midland Products, Ola, AR (3/88)	<0.2	$<10^{-7}$	C
6. Koppers, Orville, CA (12/89)	0.19	1×10^{-6}	
7. Cape Fear Wood, NC (6/89)	2.5	1×10^{-5}	
8. S. Md. Wood, MD (6/88)	2.2	1×10^{-6}	
	COMMERCIAL/INDUSTRIAL EXPOSURES		
9. United Creosoting, Conroe, TX (9/89)	40.0	3×10^{-5}	A
10. S. Cavalcade, Houston, TX (9/88)	<700	$<1 \times 10^{-4}$	D
11. Koppers, Texarkana, TX (9/88)	100	1×10^{-5}	
12. Libby Groundwater, Montana (12/88)	88	1×10^{-5}	

NOTES: A. PAH'S expressed as BaP equivalents

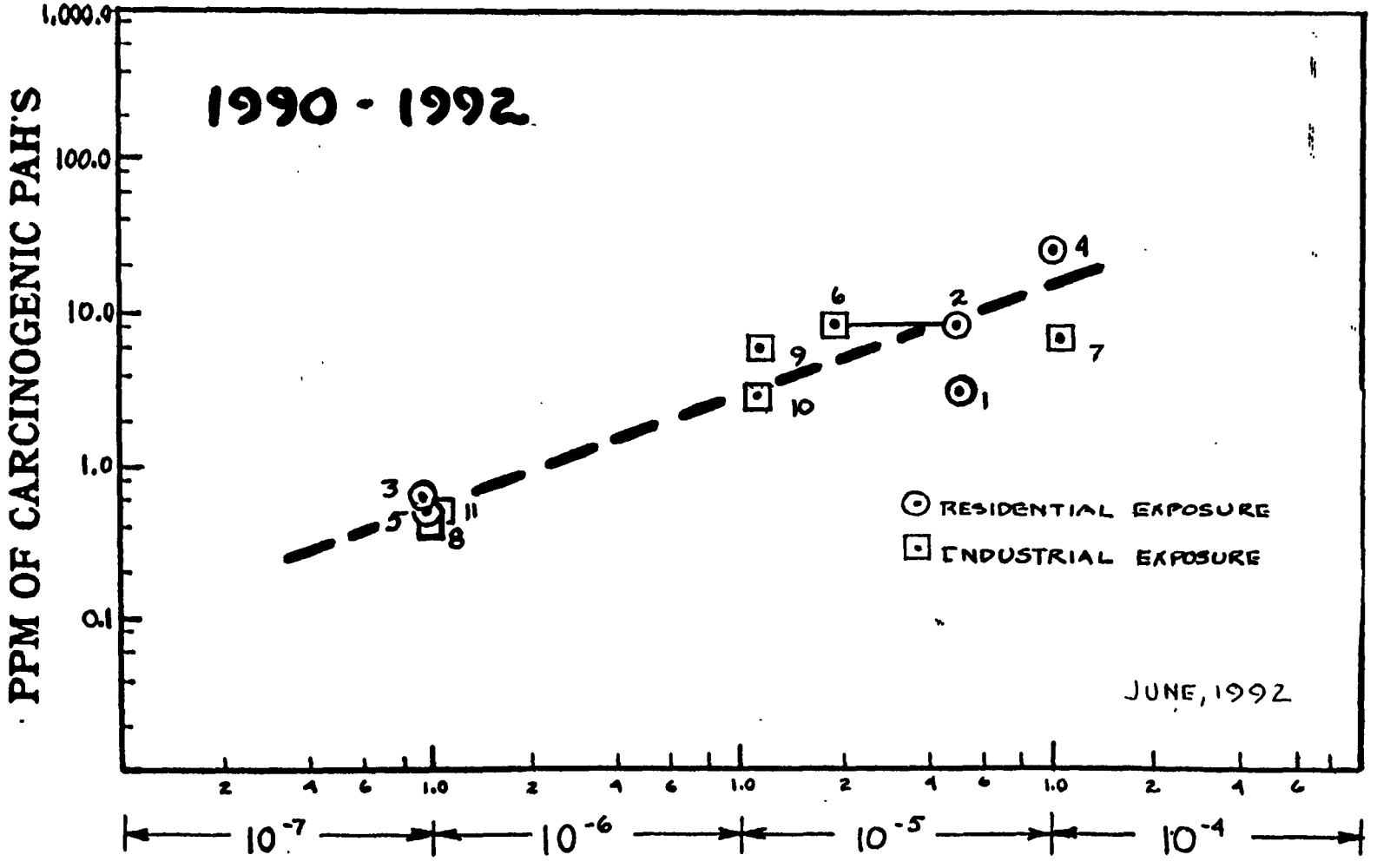
B. Carcinogenic PAH's represent 2% of total PAH's. ROD action level is 100 ppm total PAH's.

C. Action level driven by ARAR (not health risk), is 1.0 ppm PCP. Inputed PAH level is far below detection limits, health risk is far less than 10^{-6}.

D. Action level is 700 ppm PLUS no leachate from soils. (Risk and action levels will be less than stated.)

(FEB 1990)

SOIL CLEANUP ACTION LEVELS
SUPERFUND WOOD-TREATING SITES



SOIL ACTION LEVELS VERSUS RISK
CARCINOGENIC PAH'S AT SUPERFUND WOODTREATING SITES
1990 TO 1992

SITE	ACTION LEVEL	RISK	NOTE
RESIDENTIAL EXPOSURES			
1. Old Springfield Landfill, VT (9/90)	3 ppm	$5x10^{-6}$	
2. Myers Property, NJ (9/90)	10 ppm	(10^{-5})	A
3. Cabot/Koppers, FL (9/90)	0.6 ppm	$1x10^{-6}$	
4. Burlington Northern, MT (9/90)	36 ppm	$1x10^{-4}$	
5. J. H. Baxter, CA (9/90)	0.5 ppm	$1x10^{-6}$	
INDUSTRIAL EXPOSURES			
6. Imperial Oil, NJ (9/90)	10 ppm	(10^{-5})	A
7. Moss/Kerr McGee, IN (9/90)	6 ppm	10^{-4}	
8. Hastings Coal Gas, IA (9/90)	0.5 ppm	$(1x10^{-6})$	B
9. Arkwood, AR (9/90)	6 ppm	$1x10^{-5}$	
10. Texarkana Wood, TX (9/90)	3 ppm	$1x10^{-5}$	
11. Hastings GW, NB (9/90)	0.5 ppm	(10^{-6})	B
OTHER GOALS			
Greenwood Chemical, VA	5,000 ppm	Interim remedy to protect GW	
DuBoise Oil, FL	50 ppm	GW portion	

NOTES: A. New Jersey ARAR of 10 ppm
B. Detection limit governed selection of std.

ATTACHMENT 3
BENZO(A)PYRENE REMEDIATION
GOALS

Risk Calculations and Effect on Remediation Goals at the South 8th Street Site
Benzo(a)pyrene

Oral Ingestion (There is no inhalation risk)

STANDARD RESIDENTIAL (RME)	STANDARD INDUSTRIAL (RME)	SOUTH 8TH STREET Recreational Worker (RME)	SOUTH 8TH STREET Recreational Worker (AVG)
$Intake_c$ = (200 mg/d) * (1E-6 kg/mg) * (350 d/yr) * (6 yr)/(15 kg) * (25,550 d) I_c = 1.1E-6 kg/kg-d $Intake_a$ = (100 mg/d) * (1E-6 kg/mg) * (350 d/yr) * (24 yr)/ (70 kg) * (25,550 d) I_a = 4.7E-7 kg/kg-d I_T = 11E-7 + 4.7E-7 I_T = 15.7E-7 kg/kg-d Assume Risk = 1E-6 Slope Factor = $\frac{7.3 kg\text{-}d}{mg}$ Remediation Goal(RG) = 1E-6/(15.7E-7kg/kg-d)* (7.3kg-d/mg) RG = 0.09 ppm c = child, a = adult	Intake = (50 mg/d) * (1E-6 kg/mg) * (250 d/yr) * (25 yr)/(70 kg) * (25,550 d) I = 1.7E-7 kg/kg-d Assume Risk = 1E-6 Slope Factor = $\frac{7.3 kg\text{-}d}{mg}$ RG = 1E-6/(1.7E-7 kg/kg-d)*(7.3 kg-d/mg) RG = 0.61 ppm	Intake = (480 mg/d) * (1E-6 kg/mg) * (250 d/yr) * (25 yr) * (0.5^f)/(70 kg) * (25,550 d) I = 8.4E-7 kg/kg-d Assume Risk = 1E-6 Slope Factor = $\frac{7.3 kg\text{-}d}{mg}$ RG = 1E-6/(8.4E-7 kg/kg-d)*(7.3 kg-d/mg) RG = 0.16 ppm f = fractional factor to account for fact that worker will not be engaged in activities that involve the elevated inhalation rate or work in the contaminated area the entire work day.	Intake = (240 mg/d) * (1E-6 kg/mg) * (152 d/yr) * (9 yr) * (0.5^f)/(70 kg) * (25,550 d) I = 0.92E-7 kg/kg-d Assume Risk = 1E-6 Slope Factor = $\frac{7.3 kg\text{-}d}{mg}$ RG = 1E-6/(0.92E-7 kg/kg-d)*(7.3 kg-d/mg) RG = 1.50 ppm f = fractional factor to account for fact that worker will not be engaged in activities that involve the elevated inhalation rate or work in the contaminated area the entire work day.

ATTACHMENT 4
EXCERPT FROM OSWER DIRECTIVE 9285.6-03
"HUMAN HEALTH EVALUATION MANUAL"

ATTACHMENT B

ESTIMATING ADULT SOIL INGESTION
IN THE COMMERCIAL/INDUSTRIAL SETTING

Most of the available soil ingestion studies focus on children in the residential setting; however, two studies were found that address adult soil ingestion that also have application to the commercial/industrial setting (Hawley, 1985; Calabrese, et al., 1990).

Hawley (1985) used a number of assumptions for contact rates and body surface area to estimate the amount of soil and dust adults may ingest during a variety of residential activities. For indoor exposures, Hawley estimated levels based on contact with soil/dust in two different household areas, as follows: 0.5 mg/day for daily exposure in the "living space"; and 110 mg/day for cleaning dusty areas such as attics or basements. For outdoor exposures, Hawley estimated a soil ingestion rate during yardwork of 480 mg/day. The assumptions used to model exposures in the residential setting may also be applied to similar situations in the workplace. The amount of soil and dust adults contact in their houses may be similar to the amount an office or indoor maintenance worker would be expected to contact. Likewise, the amount of soil contacted by someone engaged in construction or landscaping may be more analogous to a resident doing outdoor yardwork.

Calabrese, et al. (1990) conducted a pilot study that measured adult soil ingestion at 50 mg/day. Although the study has several drawbacks (e.g., a limited number of participants and no information on the participants daily work activities), it included subjects that worked outside the home. It is also interesting to note that this measured value falls within the range Hawley (1985) estimated for adult soil ingestion during indoor activities.

From these studies, 50 mg/day was chosen as the standard default value for adult soil ingestion in the workplace. It was chosen primarily because it is a measured value but also because it falls within the range of modeled values representing two widely different indoor exposure scenarios! The 50 mg/day value is to be used in conjunction with an exposure frequency of 250 days/year and an exposure duration of 25 years. For certain outdoor activities in the commercial/industrial setting (e.g., construction or landscaping), a soil ingestion rate of 480 mg/day may be used; however, this type of work is usually short-term and is often dictated by the weather. Thus, exposure frequency would generally be less than one year and exposure duration would vary according to site-specific construction/maintenance plans.

ATTACHMENT 5
POLY-CHLORINATED BIPHYENL
REMEDIATION GOALS

Risk Calculations and Effect on Remediation Goals at the South 8th Street Site
PCBs

The PCB Policy assumes that the contaminants degrade over the exposure period resulting in an average PCB concentration that is used in the risk calculations. EPA risk assessments do not normally account for degredation of the contaminant over the exposure period. Also, the policy is based on risk from PCBs only and does not account for multiple contaminants at one site. Finally, separate residential and industrial exposure scenarios were not calculated by the Policy, rather the Policy simply multiplied the residential cleanup goal (1 ppm) by 10 to account for an industrial exposure scenario.

PCB Policy (Oral)	PCB Policy (Dermal)	SOUTH 8TH STREET Recreational Worker (RME)	SOUTH 8TH STREET Recreational Worker (AVG)
$Intake_c$ = (200 mg/d) * (1E-6 kg/mg) * (365 d/yr) * (6 yr)/(16 kg) * (25,550 d) I_c = 1.1E-6 kg/kg-d $Intake_a$ = (100 mg/d) * (1E-6 kg/mg) * (365 d/yr) * (24 yr)/ (70 kg) * (25,550 d) I_a = 4.9E-7 kg/kg-d I_T = 11E-7 + 4.9E-7 $I_{T(oral)}$ = 15.9E-7 kg/kg-d According to Policy Risk Calculations, 1.0 ppm = 2E-6 risk 10.0 ppm = 2E-5 Calcs used adsorption factor of 30% c = child, a = adult	$Intake_c$ = (0.4m^2/d) * (10,000 $cm^2/1m^2$) * (2.77 mg/cm^2) * (132 d/yr) * (15 yr) * (1E-6 kg/mg)/(38 kg) * (25,550 d) I_c = 2.3E-5 kg/kg-d $Intake_a$ = (0.31m^2/d) * (10,000 $cm^2/1m^2$) * (2.77 mg/cm^2) * (52 d/yr) * (12 yr) * (1E-6 kg/mg)/(70 kg) * (25,550 d) I_a = 3E-6 kg/kg-d $I_{T(dermal)}$ = 26E-6 kg/kg-d According to Policy Risk Calculations, 1.0 ppm = 7E-6 risk 10.0 ppm = 7E-5 Calcs used adsorption factor of 10% c = child, a = adult	$Intake_{oral}$ = Same as BAP I_o = 8.4E-7 kg/kg-d I_{dermal} = (0.5m^2/d) * (10,000 cm^2/m^2) * (1.0 mg/cm^2) * (250 d/yr) * (25 yr) * (1E-6 kg/mg) * (0.06)/ (70 kg) * (25,550 d) I_d = 1.0E-6 kg/kg-d SF_o = 7.7 kg-d/mg SF_d = 8.1 kg-d/mg Assume Risk = 1E-6 RG = 1E-6/[(8.4E-7 kg/kg-d) * (7.7 kg-d/mg)] + [(1E-6 kg/kg-d) * (8.1 kg-d/mg)] RG = 0.07 ppm = 1E-6 risk Neglecting dermal risk, RG = 0.15 ppm = 1E-6	$Intake_{oral}$ = Same as BAP I_o = 0.92E-7 kg/kg-d I_{dermal} = (0.5m^2/d) * (10,000 cm^2/m^2) * (0.2 mg/cm^2) * (152 d/yr) * (9 yr) * (1E-6 kg/mg) * (0.06)/ (70 kg) * (25,550 d) I_d = 0.046E-6 kg/kg-d SF_o = 7.7 kg-d/mg SF_d = 8.1 kg-d/mg Assume Risk = 1E-6 RG = 1E-6/[(0.92E-7 kg/kg-d) * (7.7 kg-d/mg)] + [(0.046E-6 kg/kg-d) * (8.1 kg-d/mg)] RG = 0.93 ppm = 1E-6 risk Neglecting dermal risk, RG = 1.41 ppm = 1E-6

ATTACHMENT 6
EXCERPTS FROM "HEALTH IMPLICATIONS OF 2,3,7,8 -
TETRACHLORODIBENZODIOXIN (TCDD)
CONTAMINATION OF
RESIDENTIAL SOIL"

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PUBLIC HEALTH SERVICE

HEALTH IMPLICATIONS OF 2,3,7,8-TETRACHLORODIBENZODIOXIN (TCDD) CONTAMINATION OF RESIDENTIAL SOIL

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Extrapolations from animal toxicity experiments (including carcinogenicity and reproductive effects) to possible human health effects can be used to estimate a reasonable level of risk for 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD). Extrapolations are derived from: (1) review of published studies, (2) a complex set of assumptions related to human exposure to contaminated soil, and (3) estimates of (a) a dose response curve, (b) appropriate margins of safety, and/or (c) applicable mechanisms of action.

One ppb of 2,3,7,8-TCDD in soil is a reasonable level at which to begin consideration of action to limit human exposure for contaminated soil.

SUMMARY

From the available literature dealing with the toxic effects of 2,3,7,8-tetrachlorodibenzodioxin (TCDD), only reports on a few chronic feeding studies in rodents can be used for risk assessment calculations. The smallest lower confidence bound on the virtually safe dose by the linear derived multistage model using an added cancer risk of 1/1,000,000 is calculated to be 28 fg/kg body weight·d (body weight = b.w.). This

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Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or by the U.S. Department of Health and Human Services.

The statistical analysis of the rodent carcinogenicity data was performed by Dr. Christopher Portier, Biometry and Risk Assessment Program, National Institute of Environmental Health Sciences, P.O. Box 12233, Research Triangle Park, North Carolina 27709. Dr. Paul J. Wiesner, David L. Forney, Linda W. Anderson, and Debra J. Kinney assisted in the preparation of the document and the coordination of the reviewers' comments.

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calculation is based on data for hepatocellular carcinoma or neoplastic nodules. The increased cancer risk of 1/1,000,000 based on data for tissue less sensitive than liver would not be expected to occur until doses as high as 1428 fg/kg b.w.·d were administered. The corresponding levels for an increased risk of 1/100,000 are 276 fg to 14.3 pg/kg b.w.·d (Figs. 1 and 2). These calculations assume that a linear dose-response relationship exists for carcinogens (such as TCDD) that, based on current evidence, are thought to be primarily promoters. However, the dose-response curve for promoters may not be linear, causing an overestimate of the risk. The model was used on a hypothetical basis, and the cancer risk for TCDD should be reevaluated as the data base enlarges. Human exposure would primarily occur by the dermal and the oral route.

To estimate human TCDD intake after exposure to TCDD-contaiminated soil in residential areas, we calculated estimates for dermal, ingestion, and inhalation doses. With these estimates (the assumptions on which they are based are outlined in the text) the best estimate of a daily dose at 1 ppb in residential soil (assuming uniform distribution of TCDD in soil at 1 ppb) is calculated to be 44.6 pg/d (or 636.5 fg/kg b.w.·d for a person weighing 70 kg). In consideration of the range of the estimated VSD and because of the unlikelihood that all of the conservative exposure assessment assumptions will be realized on a continuous or lifetime basis, we have concluded that residential soil levels greater than 1 ppb TCDD pose a level of concern. The appropriate degree of concern for which management decisions are made should also consider an evaluation of the specific circumstances at each contaminated site.

Exposure in contaminated residential areas would be greater than in

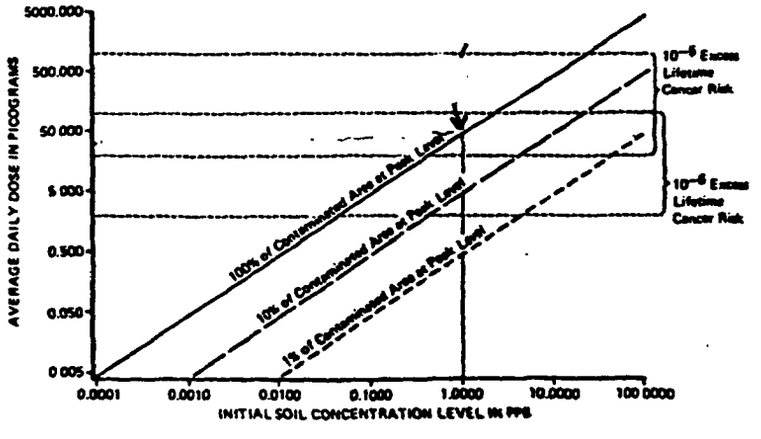


FIGURE 1. This figure illustrates the average daily dose of TCDD that would be received if 100, 10, or 1% of the accessible soil were contaminated with the peak recorded level of TCDD. The boundaries for an excess lifetime cancer risk for 10^{-5} and 10^{-6} are also illustrated.

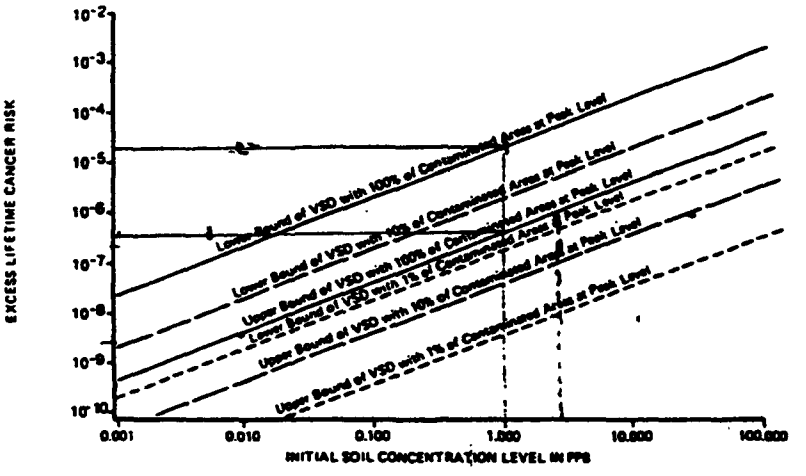


FIGURE 2. This figure illustrates the lower and upper bounds of the virtually safe dose for a lifetime excess cancer risk. This information was derived from the calculations developed from animal data (Tables 8 and 9). At the concentration of 1 ppb, if 100% of the accessible soil contained TCDD at this concentration, the area of risk bordered by the upper and lower bound of the virtually safe dose does not represent an unacceptable cancer risk given the fact that the background cancer incidence in the general population is of a much higher order of magnitude. If less than 100% of the soil was contaminated, this risk would even be further reduced. However, at levels much above 1 ppb the risk would become unacceptable.

only occasionally frequented commercial areas. In residential areas, levels at or above 1 ppb TCDD in soil cannot be considered safe and represent a level of concern. In certain commercial areas, higher levels may present an acceptable risk to nonoccupationally exposed individuals. On ranges and pastures, however, lower soil levels may still be of concern, since TCDD accumulates in the tissues of grazing cattle and rooting swine.

BACKGROUND

In the early 1970s, a waste-oil dealer in Missouri disposed of waste material containing 2,3,7,8-tetrachlorodibenzodioxin (TCDD) in high concentrations by mixing this material with salvage oil and spraying it on dirt roads and riding arenas. The contamination of the riding arenas by TCDD was established in 1975 (Carter et al., 1975). Until recently, investigators had not realized the extent to which several other areas, many of them residential, were also contaminated with TCDD. Thus far, concentrations measured in soil in these areas have ranged from less than 1 ppb to over 1000 ppb. Once it was determined that TCDD was present in residential areas, it had to be decided what level represented an unacceptable risk to the population living in these contaminated areas. This document presents

In addition, questions of continued habitability must also include considerations of the potential for limiting or eliminating ongoing exposures.

Developing a level of concern about an unacceptable risk due to exposure to TCDD poses significant difficulties because TCDD has such unique properties, as outlined in the preceding pages of this paper.

In the past, as a first approach, several groups have used a series of risk-assessment estimates based on several of these factors to determine what an "acceptable" risk for exposure to TCDD would be. As more information on the toxicity of this chemical has become available, these levels have generally been reduced.

To determine whether a specific concentration of TCDD in soil presents a risk to humans, we must first examine how humans might absorb TCDD from such soil. Unfortunately, the amount of any chemical present in soil that may be absorbed by humans coming in contact with the soil is not well known. Most risk assessments that have been made in the past have been made for such media as food, where it is assumed that a certain amount of food with a certain concentration of the chemical in it is consumed; for air, where how much air is inhaled simply needs to be calculated; or for chemicals in water, where the only number needed is the amount of water consumed—although, as far as water-quality criteria are concerned, the bioaccumulation of chemicals in fish from contaminated water is also considered. Unfortunately, the analogous series of estimates is more complicated for soil.

Basically, three exposure routes must be considered: dermal absorption through direct contact with the soil, ingestion of soil, and the inhalation of dust to which TCDD is attached. Vapors may be an additional, probably minor, route of exposure. Another issue, which does not directly enter into the current risk assessment, is the fact that TCDD in the environment could eventually end up in the food chain, particularly in fish. If TCDD enters a food chain, there is an unknown additional source of exposure which must be added to the risk of those individuals exposed to contaminated soil and of a larger, undefined population.

Regarding dermal absorption, there is some evidence that TCDD binds to the soil and would not be as easily available for absorption. (Vegetation covering contaminated soil may also decrease TCDD availability.). Information on bioavailability, however, is currently limited and may vary for different types of soil. According to the literature (Poiger and Schlatter, 1980, and a personal communication), anywhere from 1 to 10% of the TCDD in the soil may be absorbed through the skin, and this percentage is likely to depend on the TCDD concentration in the soil (i.e., it may be greater at higher concentrations) and on the type of soil. When Poiger and Schlatter (1980) applied soil with a dose of 350 ng TCDD to the backs of rats, 1.7 ± 0.5% of the dose was found in the liver; at a dose of 26 ng, about 0.05% of the dose was found in the liver. The authors do not state

in the article how long the soil was left in contact with the skin of the rats,[1] except that after 24 h it was not possible to recover all of the applied dose from the skin surface. Therefore, the subsequent estimates will allow for this range of skin absorption factors.

In regard to the portion of total dose due to ingestion of soil particles, feeding studies in animals suggest that 30% or more of the TCDD adsorbed on soil will be absorbed in the gastrointestinal tract (E. E. McConnell et al., 1984). Poiger and Schlatter (1980) found 16–24% of the administered dose of TCDD in the liver. According to Fries and Marrow (1975), this represents about 70% of the body burden of TCDD.

In regard to inhaled doses, little information is available on the amount of dust that may be present in the air in situations of known soil contamination; measurements in Seveso showed that the amount of dust in air was 0.14 mg/m^3 air (DiDomenico et al., 1980). No dust levels in air whose sole source is soil are available from air monitoring stations. Soil, vegetable matter, and particles from other sources such as car exhaust are measured as particulate matter. The use of particulate matter would highly overestimate dust derived from soil. In riding arenas or in relatively drier areas, dust levels would be possibly higher.

On the other hand, immediately after a rainfall there would probably be less dust. In the same investigation, it was shown that TCDD levels in dust were comparable to those found in soil. Another unknown is the amount of material that could be carried into the house from the outside. It is conservatively assumed that the exposure to dust inside a house surrounded by contaminated soil is similar to the exposure that would occur if people spent their entire time in contact with the contaminated soil outside. (One of the CDC consultants commented that the assumption that indoor levels will equal outdoor levels appears unnecessarily conservative.) An average adult at rest exchanges approximately 10 m^3 air/24-h-period, and this would increase with mild activity to 18–24 m^3/d, and to 40 m^3/d with hard physical labor. Finally, it is assumed that whatever TCDD is inhaled adsorbed to dust particles is absorbed either through deposition in the respiratory tract or by ingestion after being brought up by the ciliary action of the respiratory tract epithelial cells.

Several comments were received from CDC consultants on exposure estimates: e.g., how much soil does a young child eat when playing outside? how much soil gets onto the skin during gardening activities? how much soil gets onto the skin of children playing football or other games? Unfortunately, there is no documentation in the literature that clarifies the problems raised. For illustrative purposes, 1 g soil less than 1 mm thick can be spread over an area of 4–5 cm^2 or 1½–2 in^2. Ten grams of soil less than 1 mm thick can be spread over an area of about 15 cm^2 or about 6 in^2. (The volume of dirt will vary somewhat with moisture content.) The soil used in calculating the above surface areas was

[1] 24 h. (Poiger, 1984, personal communication.)

Georgia clay that had been stored for several months at room temperature.

All of the calculations regarding exposure are based on the assumption that humans have access to and contact with the contaminated soil and that a percentage of the TCDD present in the soil is absorbed. The frequency of access and contact must also be considered, and for dermal exposure it must be remembered that clothing will afford some protection. The doses calculated below are, in some sense, worst-case estimates for the concentrations used.

A large number of estimated total daily doses can be derived from the many combinations of the exposure route-specific doses (given different sets of assumptions as to absorption rates, soil contamination, etc.). However, in an attempt to derive a more accurate estimate of exposure to and uptake from contaminated soils, a simulation analysis was performed utilizing a further set of assumptions, which are most likly to be obtained in reality. For instance, TCDD is suggested to have an environmental half-life of approximately 10–12 yr. Therefore, the simulation model assumed that soil contamination levels would decrease in a log-linear fashion with a 12-yr half-life following the equation

$$\mathrm{TCDD}_t = e^{(a - 0.00016t)}$$

where TCDD_t = current soil level on day t (ppb)
a = ln (initial soil contamination level, ppb)
t = number of days elapsed since initial soil contamination measurement

Consideration of the route-specific uptakes does not require an assumption of constant exposure but merely postulates an a priori reasoned absolute daily amount of soil contact. For inhalation, we assumed that airborne dust is contaminated at the same level as surrounding outside soil and that 15 m^3 air is exchanged per day. In regards to ingestion, based on preliminary results of bioavailability studies, a GI absorption rate of 30% from soil seems most tenable. In addition, the amount of soil that the average person is likely to ingest will be dependent on characteristic activity patterns, which, in turn, are closely dependent on age. Based on work done studying lead uptake from contaminated soils, a reasonable pattern of soil ingestion (which still maintains conservative estimates) for specific age groups was constructed and is presented in Table 5. Based on animal experimentation, the best estimate for dermal absorption of TCDD is approximately 1% (especially in the low ppb contamination ranges). Reasoning for an age-dependent pattern of deposition of soil on exposed skin similar to soil ingestion was used to derive Table 6. Finally, it was assumed that these exposures would be likely to take place only 6 mo of the year because of seasonal influences and varying activity patterns.

The simulation model was run using a computerized iterative procedure by daily increments to estimate total lifetime dose using the following formula:

$$\text{Total lifetime dose} = \sum_{t=1}^{T} \text{TCDD}_t\ (\text{ING}_t \times \text{GI} + \text{DERM}_t \times \text{ABS} + \text{INH} \times \text{DUST})\ \text{SEAS}$$

where T = expected lifespan (d)
ING_t = age-specific amount of soil ingested at time t
GI = % absorbed through gastrointestinal tract
DERM_t = age-specific amount of soil deposited on skin at time t
ABS = % absorbed through skin
INH = amount of air exchanged per day
DUST = concentration of dust in air
SEAS = "dummy" variable for seasonal access to outdoor contaminated areas (i.e., =1 for fair-weather months and 0 for cold weather months)

For the sake of brevity, extreme total daily dose estimates were compiled for two divergent levels of TCDD soil contamination (1 ppb and 100 ppb). Based on the assumptions set forth above, at an initial soil contamination of 1 ppb in residential areas, the average daily TCDD dose to an individual over a 70-yr lifetime would be 44.6 pg. This is equivalent to 636.5 fg/kg b.w.·d for a 70-kg person. For soils initially contaminated at 100 ppb, the average daily dose is estimated at 4.5 ng or 63.7 pg/kg b.w. for a 70-kg individual (Fig. 1).

In addition, it must be recognized that not all soil is contaminated uniformly in a given area. At the 1-ppb level the dose (and the resulting risk) would be considerably reduced if only 1% or 10% of the accessible soil contained TCDD at concentrations of 1 ppb and the rest of the soil were not contaminated (illustrated in Fig. 1).

Risk Assessment

The critical step in assessing individual risks at these estimated dose levels must incorporate a comparison to known (or estimated) "safe" levels of exposure in relation to clearly defined health effects end points.

The National Research Council of Canada (NRCC) has recently published a report reviewing available toxicity data for TCDD and related compounds and various procedures for calculating a "virtually safe dose"

TABLE 5. Estimated Daily Soil Ingestion Patterns by Age

Age group	Soil ingested
0–9 mo	0 g
9–18 mo	1 g
1½–3½ yr	10 g
3½–5 yr	1 g
5 yr	100 mg

TABLE 6. Estimated Daily Deposition of Soil on Skin by Age

Age group	Amount of skin
0–9 mo	0 g
9–18 mo	1 g
1½–3½ yr	10 g
3½–15 yr	1 g
15 yr	100 mg

Since the no-observable-effect levels for reproduction, immune toxicity, and various other toxic effects are not established in various species, a conservative approach for chronic toxicity in general is in order. The study by Murray et al. (1979) suggested that 0.001 μg/kg•d is a no-observed-effect level for reproduction in rats. Nisbet and Paxton (1982) recalculated the data developed by Murray et al. (1979), using results from different generations as independent variables. They concluded that 0.001 μg/kg b.w.•d was still an effect level. However, the study by Murray et al. (1979) shows a very varied fertility index among the controls through different generations; in addition, TCDD body burdens of the dams are greatly affected by lactation, introducing another variable. CDC consultants Drs. Hoel, Van Ryzin, and Portier also reviewed these data and concluded that there was insufficient evidence for an effect at 0.001 μg/kg b.w.•d. For these reasons, this study was not used for risk assessment calculations, but only the chronic toxicity studies which demonstrated a carcinogenic response in rodents were used.

Subhuman primates (which are much more susceptible to the effects of TCDD) show an effect on reproduction if fed for 6 mo at a daily dose of 1.8 ng/kg. If the toxicology data from subhuman primates are used, then a 1000-fold safety factor would have to be used, since the lowest dose of 1.8 ng/kg•d was not a no-observed-effect level and was not obtained from a chronic feeding study. Thus, a daily dose rate of 0.0018 ng/kg—corresponding to a total daily dose of 144 pg—would be tolerable for an 80-kg person. For a 60-kg person, the tolerable total daily dose would be 108 pg. Thus, at the daily dose likely to be obtained as estimated above for a soil level of 1 ppb (44.6 pg/d), these extrapolations from reproductive studies in subhuman primates appear to suggest a situation of no excess risk in humans. However, at virtually all other estimated levels of daily dose (i.e., under more severe sets of assumptions or the higher level of TCDD in soil), one might expect adverse reproductive health effects.

As shown in Fig. 2, the upper-bound cancer risk estimate of 1.4 pg/kg b.w.•d for an increased risk of 1×10^{-6} over a 70-yr lifetime (assuming 100% of contaminated area is at peak recorded level) is more than the amount of TCDD (637 fg/kg b.w.•d) that could theoretically be absorbed from soil initially contaminated with TCDD at 1 ppb, under the simulation model as discussed above. For the estimates illustrated in Fig. 2, the excess lifetime cancer risk for exposure to residential soil with a peak TCDD contamination level of 1 ppb ranges over 4 orders of magnitude, from above 10^{-5} to below 10^{-8}. At the lower bound for the VSD of 28 fg/kg b.w.•d (or 1.960 pg/70-kg person•d), it would take just over 3 yr to accumulate a total dose sufficient to increase an individual's lifetime risk of developing cancer by 1 in a million, using the estimates derived herein and assuming 100% of the contaminated area is at the peak recorded level). Over a 70-yr lifetime, this would amount to a 0.000023 absolute

increase (equivalent to 0.01% relative increase) over one's "normal" 25% probability of developing cancer in the United States (RR = 25.0023/25 = 1.0001).

It must be stressed that the exposure assessments used in estimating risks for carcinogenicity and reproductive health effects contain critical assumptions that are not likely to be actually encountered. Most prominent of these is the assumption of uniform levels of contamination throughout the living space. In fact, areas with elevated TCDD levels are likely to be found in specific, well-defined locations that have concomitant unique use and access characteristics. Therefore, in an area where access is less than total, the actual daily exposure will be lower. Similarly, different usage patterns of affected areas (e.g., sports activities, gardening, horseback riding) or an individual's characteristics (e.g., pica in children) are not likely to lead consistently to worst-case situations and will have differing effects on the determination of total cumulative dose. It could be further argued that the daily dose rate is more important than the cumulative total dose. It appears, however, that exposure has to be for a sufficiently long time for cancer to develop since short exposure periods may result in recovery (Farber, 1974), or would not appreciably increase the cancer risk over background (Office on Smoking and Health, 1982). We have therefore concluded that a soil level of 1 ppb TCDD in residential areas is a reasonable level at which to express concern about health risks.

Implications for Risk Management

Therefore, where residential soil levels exceed 1 ppb, risk-management decisions on habitability and limiting exposure may range from recommendations to avoid identified "hot spots," limit specific activities in these areas (if possible), and to temporarily relocate while contamination clean-up and onsite stabilization operations are performed to permanent relocation and access restriction for a given site. In addition, such recommendations will have to be prepared in terms of situations that range from the need for near-term action to those of a less urgent nature. In all of these scenarios, however, these decisions must be made on a site-specific basis, as indicated by the complexities and variability of circumstances discussed in this document.

Although from these calculations levels of TCDD below 1 ppb are, for practical purposes, considered not to reach a level of concern, several additional considerations related to the risk assessment calculations should be pointed out to decision-makers involved in risk management:

1. The calculations for this level and the judgment that this level is a reasonable level for concern assume that exposure probably will not be consistent for a lifetime, since TCDD will slowly degrade, and that people will not be exposed extensively to the soil on a continuous daily basis. For instance, it is anticipated that during cold or rainy

ATTACHMENT 7
TCDD REMEDIATION GOALS

Risk Calculations and Effect on Remediation Goals at the South 8th Street Site
Dioxin

Residential (RME)	Industrial (RME)	SOUTH 8TH STREET Recreational Worker (RME)	ATSDR Remediation Goals Industrial Worker
$Intake_{oral}$ = Same as BAP I_o = 15.7E-7 kg/kg-d $Intake_{Cdermal}$ = (0.18m^2/d) * (10,000 $cm^2/1m^2$) * (1.0 mg/cm^2) * (350 d/yr) * (6 yr) * (1E-6 kg/mg) * (0.03)/(15 kg) * (25,550 d) I_o = 3.0E-7 kg/kg-d $Intake_{Adermal}$ = (0.5m^2/d) * (10,000 $cm^2/1m^2$) * (1.0 mg/cm^2) * (350 d/yr) * (24 yr) * (1E-6 kg/mg) * (0.03)/(70 kg) * (25,550 d) I_a = 7.0E-7 kg/kg-d $I_{T(dermal)}$ = 1.0E-6 kg/kg-d I_h = 3.1E-11 kg/kg-d SF = 1.56E5 kg-d/mg Assume Risk = 1E-6 RG = 1E-6/[(15.7E-7 kg/kg-d) * (1.56E5 kg-d/mg)] + (5.2E-7 kg/kg-d * 1.56E5 kg-d/mg) + (3.1E-11 kg/kg-d) * (1.56E5 kg-d/mg)] RG = 0.002 ppb	$Intake_{oral}$ = Same as BAP I_o = 1.7E-7 kg/kg-d $Intake_{dermal}$ = (0.5m^2/d) * (10,000 $cm^2/1m^2$) * (1.0 mg/cm^2) * (250 d/yr) * (25 yr) * (1E-6 kg/mg) * (0.03)/(70 kg) * (25,550 d) I_a = 5.2E-7 kg/kg-d $I_{inhalation(h)}$ = (1/4.63E+9m^3/kg) * (20 m^3/d) * (250 d/yr) * (25 yr)/(70 kg) * (25,550 d/yr) I_h = 1.51E-11 kg/kg-d SF = 1.56E5 kg-d/mg Assume Risk = 1E-6 RG = 1E-6/[(1.7E-7 kg/kg-d) * (1.56E5 kg-d/mg)] + (5.2E-7 kg/kg-d * 1.56E5 kg-d/mg) + (1.51E-11 * 1.56E5 kg-d/mg)] RG = 0.009 ppb Neglecting ingestion & inhalation risk, RG = 0.012 ppb = 1E-6 risk	$Intake_{oral}$ = Same as BAP I_o = 8.4E-7 kg/kg-d $Intake_d$ = Same as RME I_d = 5.2E-7 kg/kg-d $I_{inhalation(h)}$ = (1/4.63E+9m^3/kg) * (18 m^3/d) * (250 d/yr) * (25 yr)/(70 kg) * (25,550 d/yr) I_h = 4.9E-12 kg/kg-d SF = 1.56E5 kg-d/mg Assume Risk = 1E-6 RG = 1E-6/[(8.4E-7 kg/kg-d) * (1.56E5 kg-d/mg)] + [(5.2E-7 kg/kg-d) * (1.56E5 kg-d/mg)] + [(4.9E-12) * (1.56E5 kg-d/mg)] RG = 0.005 ppb = 1E-6 risk Neglecting ingestion and inhalation risk, RG = 0.012 ppb = 1E-6	Standard EPA risk calculations were not performed. RG of 20 ppb is based on the Kimbrough risk assess-ment. Exposure assumptions used to develop the RG are: 1. No risk due to ingestion or inhalation. 2. Exposure freqency = 120 d/yr 3. Exposure duration = 20 years 4. Only 10% of area is contaminated. 5. I_d = 3.3E-17 kg/kg-d RG = 20 ppb

ATTACHMENT 8
LETTER FROM ASTDR REGARDING TCDD RGs FOR
INDUSTRIAL SITES

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

196

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

July 30, 1987

Mr. David Wagoner
Director
Waste Management Division
EPA VII
Kansas City, Kansas 66101

Dear Mr. Wagoner:

This letter is in response to your request for elaboration on the mathematics underlying the development of support for the 20 ppb cleanup level for certain Missouri dioxin sites as proposed in the letter from Mr. Morris Kay to Dr. Renate Kimbrough dated January 16, 1987. In Dr. Kimbrough's January 22, 1987 response she indicated that the proposed cleanup activities would restore the areas so that they would no longer be of concern for public health. In the enclosed memorandum from Dr. Vernon N. Houk, Director, Center for Environmental Health (CEH) dated May 8, 1987, the basic CEH guidance established for these sites was listed. In order to provide you with the assumptions and calculations underlying the CEH guidance I have included the following material from Dr. Kimbrough.

In 1984, Kimbrough et al., published a paper which examined the potential for exposure to TCDD in the environment. Since that time, new information has become available which appreciably alters the basic assumptions dealing with both the amount of soil young children ingest and the amount of absorption of TCDD from Missouri soil within the intestine. It now appears that the amount of soil ingested by small children is less than 10 grams and is more in the order of 100-2000 mg over a 24-hour period, (Binder et al., 1986). While Kimbrough et al., assumed that 30 percent of TCDD bound to ingested soil was bioavailable, subsequent tests with soil from different areas in Missouri have shown that 60 to 80 percent of TCDD may be absorbed following ingestion (McConnell et al., Science 223:1077-1079, 1984). The nature of these changes are essentially offsetting so that for Missouri soils the 1 ppb concern level in residential areas has not changed.

It has been established recently that TCDD bioavailability following ingestion of TCDD contaminated soil varies a great deal and depends on a variety of factors, such as:

- The concentration of TCDD in the soil;
- The length of time the TCDD was in contact with the soil; and
- The composition of the soil [Umbreit et al., Science 232:497499 (1986), and Umbreit et al., Society Toxicology meeting abstract 1273 (1986)].

However, the level of concern established by Kimbrough et al., as 1 ppb for residential areas has not changed because of these findings.

Based on the assumptions presented in the paper by Kimbrough et al., it can be concluded that soil in residential areas contaminated with 5 to 10 ppb of TCDD would not present a hazard if covered with 12 inches of clean soil. The rationale being that the clean surface soil would represent a barrier restricting human access to contact with the contaminated soil. In the event that the soil was disturbed, the 12 inches of clean soil would be mixed with contaminated soil and the concentration at the surface would, at most, reach 1 ppb. Thus, the risk in these areas, even after mixing of the subsurface contaminated soil with the clean cover soil would be comparable to that in other residential areas where the concentration of TCDD is 1 ppb or less at the surface. This approach would be acceptable in residential areas where the soil has not been physically disturbed by human activities.

Experience has shown, that concentrations decrease dramatically with depth in areas where the TCDD was applied to the surface. The 5 to 10 ppb/12-inch cover cleanup level would therefore be appropriate for sites like Castlewood, Times Beach, and Piazza Road. The 5 to 10 ppb would not be acceptable for residential areas where fill has been brought in from highly contaminated areas and where the levels of contamination may actually be inverted, resulting in increasing concentrations with depth.

The article of Kimbrough et al., focused primarily on residential exposure. However, the methods used to assess exposure in other situations were briefly discussed, (see pages 82-85). Basically the dose a person will receive depends on his or her activities and the ability of the TCDD to detach from the soil and enter the body. Thus, at sites which are not residential, the levels of concern may be different. For instance at a commercial site:

- Children would not play on a daily basis;
- It would be frequented by adults who would primarily walk through the area;
- It is unlikely that there would be any gardening; and
- There might be some short-term exposure during construction.

Thus, it is reasonable to assume that there would be little or no exposure. In a worst case scenario, dermal exposure of an adult to 1 gram of soil 5 times a week for 6 months per year could be assumed.

Although through ingestion of TCDD contaminated soil the amount of TCDD absorbed can be substantial, this is not true for skin absorption. As discussed in the paper by Kimbrough et al., (pp. 71-74), the most likely

amount that would be absorbed would be 1 percent or less of the TCDD on the soil. Thus, the dose received from one gram of soil containing 20 ppb (20 ng/gram of soil) on the skin would be 0.2 ng or 200 picograms (pg). The dose, on a kilogram body weight basis, would be 200 pg divided by 70 kg or roughly 3 pg/kg. However, since for these small concentrations the cumulative dose is more important than the daily doses, it must also be considered that the dosing is intermittent and not for a lifetime. Furthermore, the contamination of the area is not uniform and allowances would have to be made for the percent of contamination at different concentrations.

If only 10 percent of the area were contaminated at a concentration of 20 ppb then contact with contaminated soil would not be 100 percent but the corresponding fraction thereof (10 percent in this case). Thus, the daily dose if averaged out over a lifetime, taking the above assumptions of 5 days exposure for 6 months per year for 20 years as a basis, would result in an average daily dose of 330 femtograms/kg body weight. However, if only 10 percent of an area were contaminated at 20 ppb, then the dose would more likely be one-tenth of that or 33 femtograms/kg. Thus, such contamination with the exposure scenario outlined above would represent an acceptable risk based on the paper by Kimbrough et al., (1984).

It would not, however, be acceptable to leave higher levels of contaminated soil even with a cover of 12 inches. Leaving such soil with concentrations higher than 20 ppb could pose a threat to health and the general environment if the soil were disturbed in the future.

Kimbrough et al., (1984), stated that inhalation of TCDD bound on soil was negligible (pp. 71-72). Some work has recently been advanced that TCDD volatilizes to some extent from soil (Monsanto data, Schroy et al.). However this has not been substantiated by others (Yanders et al.), and only involves the surface area immediately above the soil but not the normal breathing zone of people. Furthermore, there is also re-absorbtion and slight movement into the lower layers of the soil. Particularly, such exposures would be even more unlikely in areas which have vegetation or where the surface is covered in some other fashion. In any case, volatilization of TCDD would not contribute to the overall exposure of people frequenting the area.

In summary, these proposed levels would not deviate from the general concept presented and developed in the paper by Kimbrough et al., (1984). When the paper was developed all available information on human health effects was taken into consideration. Since that time additional health studies have been performed. They have not provided any information which would suggest that TCDD is more toxic to humans than was assumed in 1984.

Recently, the information on human health effects was reviewed (Kimbrough, R.D., and Houk, V.N., Effects of Chlorinated Dibenzodioxin as Chapter 5 in Solving Hazardous Waste Problems, ACS Symposium Series 338. ACS Washington, D.C., 1987). Chloracne and some acute health effects have been found in highly exposed workers. However, there is no evidence that low level exposure such as that which might result from TCDD in soil at a concentration of 1 ppb would result in any acute or chronic clinical or subclinical effects.

Sincerely yours,

Barry L. Johnson

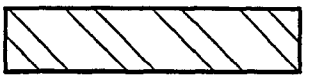
Barry L. Johnson, Ph.D.
Associate Administrator

APPENDIX C
Material Key, Oily Sludge Pit

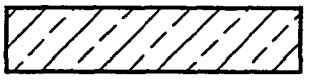
KEY

TAN SANDY (LIGHT BROWN)

BROWNISH SANDY SOIL

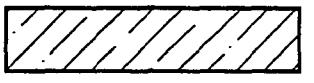


BROWN GRANULAR SOIL



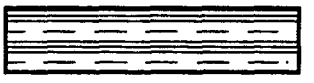
BROWN – GREY SANDY SOIL

DARK BROWN GRANULAR SOIL



GREY SANDY SOIL

GREY CLAY



GREY TO BLACK SOIL

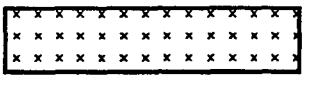
BLACK CHARRED OR BLACK GRANULAR

MUNICIPAL SOLID WASTE

INDUSTRIAL WASTE

RUBBLE/CONSTRUCTION WASTE

OILY WASTE



	KEY RECORD OF DECISION SOUTH 8TH STREET LANDFILL WEST MEMPHIS, ARKANSAS
DIRECTORY: P:\ENVIRO\06639630\ENV	FILE No. KEY-EPA REV.0