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Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R04-91/082
August 1991

EPA

Superfund Record of Decision:

Tri-City Industrial Disposal, KY

50272-101

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SUPERFUND RECORD OF DECISION
ri-City Industrial Disposal, KY
First Remedial Action - Final

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15. Supplementary Notes

16. Abstract (Limit: 200 words)
The 349-acre Tri-City Industrial Disposal site is an inactive industrial waste landfill located in Brooks, Bullitt County, Kentucky. Land use in the area is predominantly agricultural and residential. The estimated 300 people who reside within 1 mile of the site use ground water from a thin unconfined limestone aquifer as their drinking water supply. Ground water discharges via several springs including the Cox and Klapper Springs. From 1964 to 1967, Tri-City Industrial Services, Inc., used the site to dispose of industrial waste including scrap lumber, fiberglass insulation materials, drummed liquid wastes, and bulk liquids that were poured onto the ground. In 1968, State officials reported that highly volatile liquid wastes resembling paint thinners were disposed of onsite. The site was a source of citizen complaints about the condition of the landfill, explosions, fires, and smoke during the disposal operations. A number of State and EPA investigations were conducted between 1965 and 1989, which identified contaminants including PCBs, phenols, metals, and various organic compounds in onsite soil, wastes, and residential springs. In 1988, EPA provided local residents with an alternate water supply, and conducted an emergency removal action to excavate and remove

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Tri-City Industrial Disposal, KY
First Remedial Action - Final
Contaminated Medium: gw
Key Contaminants: VOCs (DCE, PCE, TCE, toluene, vinyl chloride)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 314
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

stract (Continued)

approximately 165 drums in generally good condition, other crushed and empty drums, metal containers, auto parts, 400 gallons of free liquids, and over 800 cubic yards of suspected contaminated soil. This Record of Decision (ROD) addresses ground water contamination as Operable Unit 1 (OU1). Should the confirmatory sampling of soil, sediment, and air conducted in OU1 reveal unacceptable levels of hazardous contaminants, additional measures may be necessary and will be implemented as OU2. The primary contaminants of concern affecting the ground water are VOCs including DCE, PCE, TCE, toluene, and vinyl chloride.

The selected remedial action for this site includes installing a carbon adsorption system at the Cox Spring; treating contaminated ground water using carbon adsorption and discharging the treated ground water to tributaries downstream of the springs; conducting a leachability test to determine whether spent carbon is a hazardous waste; regenerating, or treating and disposing of spent carbon offsite; continuing to provide potable water to residents who previously used contaminated ground water as potable water until acceptable levels are reached; confirmatory sampling of soil, sediment, and ambient air to assess the effectiveness of EPA's 1988 Emergency Removal Action; long-term monitoring of ground water, surface water, sediment, and ecology; implementing a worker health and safety program; and implementing institutional controls including ground water use restrictions. The estimated present worth cost for this remedial action is $2,098,000, which includes an annual O&M cost of $89,890 for years 0-1, $70,686 for years 2-3, and $66,330 for years 4-30.

'RFORMANCE STANDARDS OR GOALS: Chemical-specific ground water clean-up goals are ɜed on SDWA MCLs or non-zero MCLGs, and include PCE 5 ug/l (MCL), TCE 5 ug/l (MCL), toluene 1,000 ug/l (MCL), and xylenes 10,000 ug/l (MCL).

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

TRI-CITY INDUSTRIAL DISPOSAL SITE
OPERABLE UNIT #1
BROOKS, BULLITT COUNTY, KENTUCKY

PREPARED BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV
ATLANTA, GEORGIA

TRI-CITY INDUSTRIAL DISPOSAL SITE
BROOKS, BULLITT COUNTY, KENTUCKY

DECLARATION FOR THE RECORD OF DECISION
OPERABLE UNIT #1

SITE NAME AND LOCATION

Tri-City Industrial Disposal Site
Brooks, Bullitt County, Kentucky

STATEMENT OF BASIS AND PURPOSE

This decision document represents the selected remedial action for Operable Unit #1 at the Tri-City Industrial Disposal Site in Brooks, Kentucky, which was developed 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) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based upon the contents of the Administrative Record for the Tri-City Industrial Disposal Site.

At this time, the Commonwealth of Kentucky generally concurs with the selected remedy for Operable Unit #1.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF SELECTED REMEDY

This operable unit is the first remedial action for the Site. This remedy addresses clean-up of the groundwater (as it discharges to the surface as springs) by eliminating or reducing, through treatment, engineering, and institutional controls, the risks posed by the Site.

The major components of the selected remedy include:

- Treatment of groundwater having contaminant concentrations in excess of Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs);

- Continued provision of potable water to residents affected by groundwater containing contaminant concentrations in excess of MCLs and non-zero MCLGs;

- Restrictions on the usage of groundwater for domestic purposes until monitoring indicates that the water is of sufficient and consistent quality for human consumption;

- Confirmatory sampling of site soils, sediment, and ambient air to ensure that all possible areas of contamination are investigated; and,

- Long-term monitoring of groundwater, surface water, sediment, and ecology to identify additional site-related impacts.

Should the confirmatory sampling included in Operable Unit #1 reveal unacceptable levels of hazardous contaminants, the additional measures necessary to mitigate any threat to human health and the environment will be implemented as Operable Unit #2.

STATUTORY DETERMINATIONS

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

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

Patrick M Tobin

for Greer C. Tidwell, Regional Administrator

AUG 2 8 1991

Date

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TRI-CITY INDUSTRIAL DISPOSAL SITE
BROOKS, BULLITT COUNTY, KENTUCKY

THE DECISION SUMMARY

1.0 SITE LOCATION AND DESCRIPTION

1.1 Site Location

The Tri-City Industrial Disposal Superfund Site (the "Site") is located in the community of Brooks in north-central Bullitt County, Kentucky, approximately 15 miles south of Louisville (see Figure 1). The Site consists of approximately 349 acres and it is located on the south side of State Highway 1526 (also known as Brooks Hill Road), approximately four miles west of U.S. Interstate 65 (see Figure 2). The geographical coordinates for the Site are 38°2'50.9" north latitude and 85°46'06.1" west longitude.

1.2 Site Description

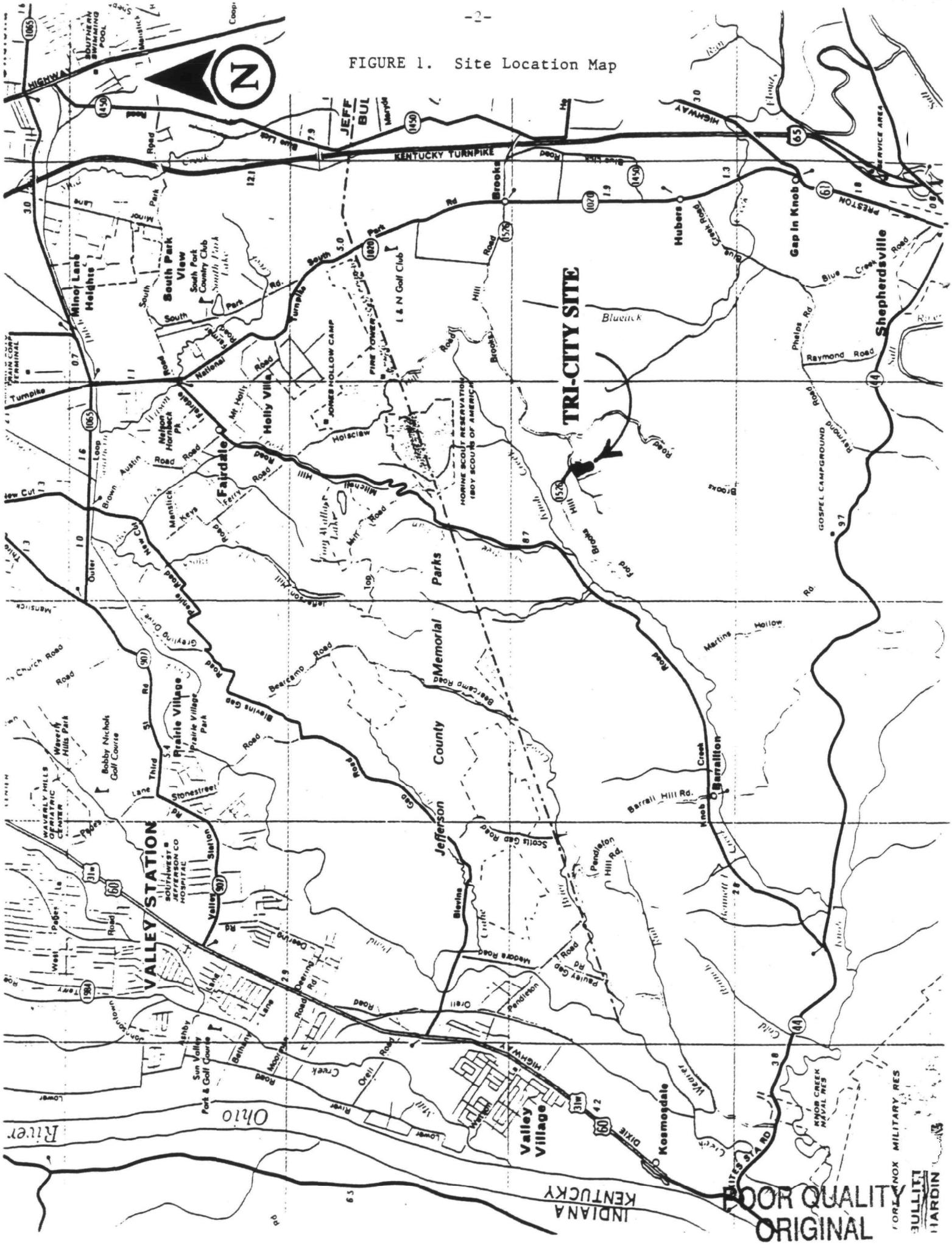
The Site is located in the Blue Grass Region of the Interior Low Plateaus Physiographic Province. The Blue Grass Region lies within the Ohio River drainage basin and it is an area of generally rolling uplands ranging in elevation from less than 800 feet above mean sea level (msl) in the northwest to about 1000 feet in the southeast. The Site is within the Knobs Regional Subdivision of the Blue Grass Region.

The climate in the Blue Grass Region is moderate with a mean annual temperature of 67°F. The average annual summer temperature is 75°F, and the average annual winter temperature is 35°F. The average annual precipitation in Bullitt County is 55 inches and the mean annual lake evaporation is 35 inches, resulting in a net precipitation of 20 inches.

Approximately 300 people live within one mile of the Site. The Site and surrounding area are rural and the land use is predominantly agricultural and residential. Several residences exist on and adjacent to former disposal areas at the Site, and a portion of the Site is used for agricultural purposes (i.e., pastures and small gardens). Other areas of the Site are covered with grass and trees.

Notable surface features on-site include a shallow trench partially filled with water at the southern end of the Site that is approximately 240 feet long and 80 feet wide, and two shallow ponds (each less than 1/8 of an acre), which are used to water livestock.

FIGURE 1. Site Location Map



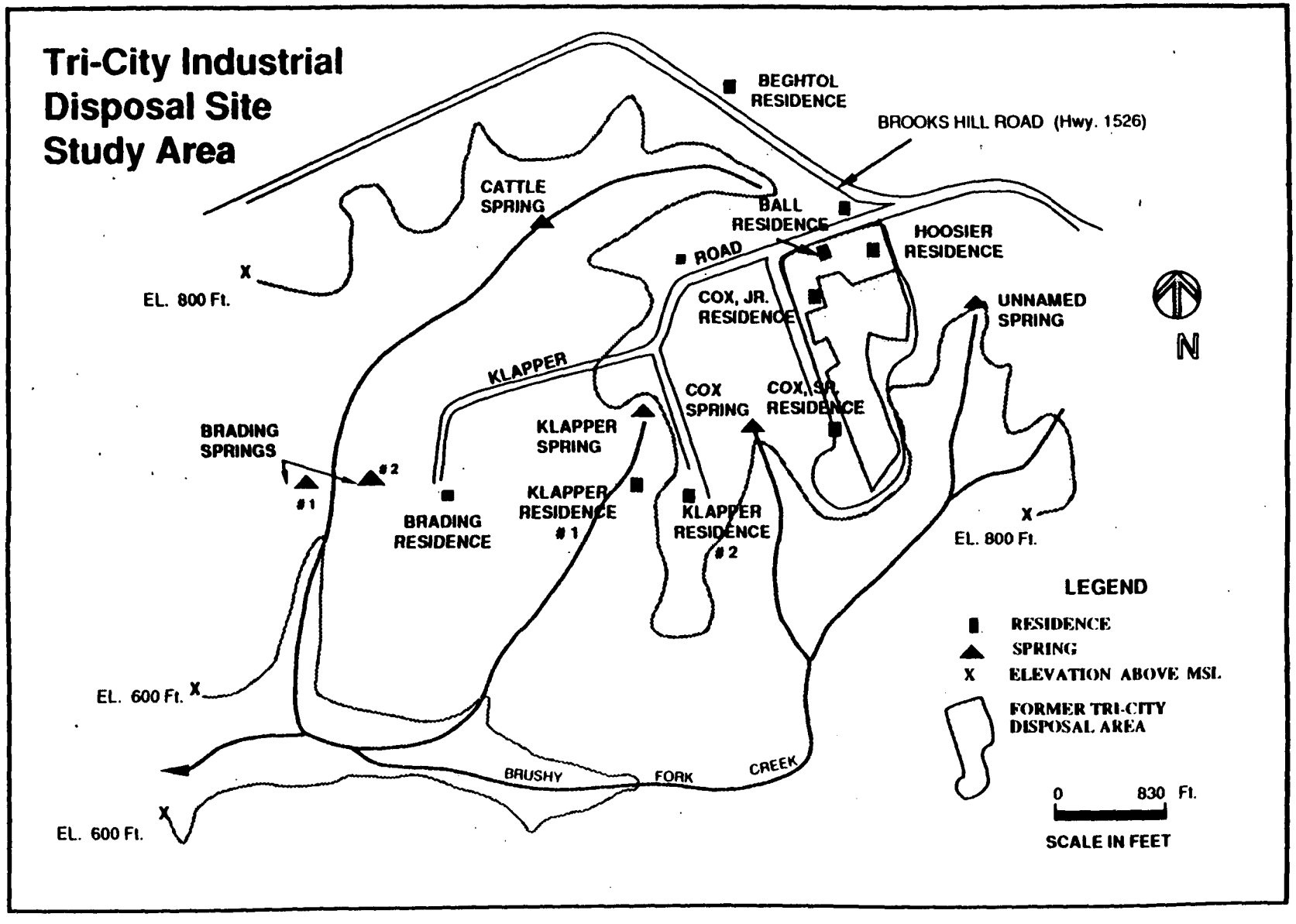


FIGURE 2. Site Layout

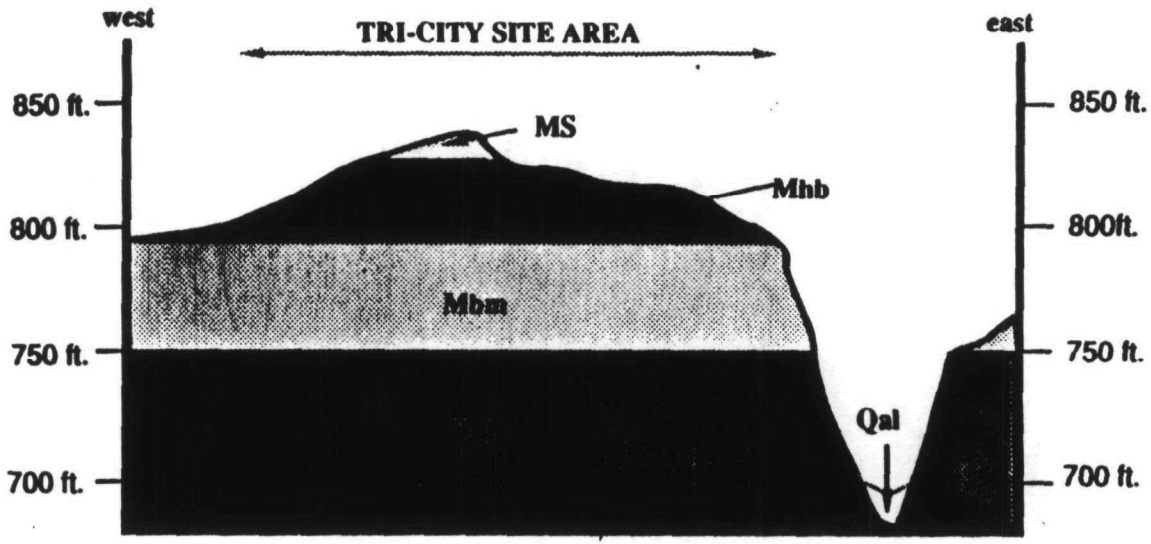
Situated on a broad ridge known as the Beghtol Ridge, the Site slopes moderately to the south. The elevations across the Site range from 800 feet to 840 feet above msl. The southern boundary and portions of the eastern and western boundaries drop into steep, vegetated ravines having bottom elevations ranging from 600 feet to 800 feet above msl within 400 horizontal feet from the Site.

The original soils of the Site are classified as Crider silt loams which are formed on long, steep hillsides and broad, gently sloping to moderately steep ridgetops and shoulder slopes above deep valleys. Crider soils are described as deep and well drained with upper loamy zones and clayey subsoils.

The underlying geology of the area consists of limestones, dolomites, siltstones, and silty shales in the upland Knob area, and terrace deposits in the lowland valleys. The geologic formations underlying the Site include, in stratigraphic order (top to bottom), the Salem Limestone, the Harrodsburg Limestone, and members of the Borden Formation. Figure 2 shows the stratigraphy of the area. Formation thickness in the vicinity of the Site ranges from 18 to 25 feet based on the geologic map. Karst features are not developed at the Site due to the significant amount of siltstone and shales interbedded within the limestones underlying the Site.

The groundwater at the Site primarily flows through fractures and bedding planes that have been preferentially enlarged by solutioning and where dolomitization has enhanced the porosity and permeability of the aquifer. Groundwater discharges via springs and seeps that sporadically occur where the geologic units that comprise the aquifer are exposed. Although the springs and seeps in the shallow limestone aquifer tend to stop flowing during dry periods, they do produce sufficient quantities of water for domestic use with the assistance of a cistern. Springs are used as water supply sources more frequently than drilled wells due to the sporadic and unpredictable occurrence of water in the members.

The Site is drained to the west, south, and east by Brushy Fork Creek, which is a perennial stream. The springs and seeps at the Site represent sources of groundwater which contribute to surface water runoff to Brushy Fork Creek. The source for the creek is a small spring approximately 3,000 feet southeast of the Site and located at an elevation of approximately 750 feet above msl. Brushy Fork Creek flows westward for approximately two miles, where it joins Knob Creek and becomes part of the Ohio River drainage network.



LEGEND

	Qal	QUATERNARY ALLUVIUM
	MS	SALEM LIMESTONE
	Mhb	HARRODSBURGH LIMESTONE
BORDEN FORMATION	Mbm	MULDRAUGH MEMBER
	Mbh	HOLTSCLAW MEMBER

EBASCO SERVICES INCORPORATED

GENERALIZED GEOLOGICAL CROSS SECTION
TRI-CITY INDUSTRIAL DISPOSAL SITE
BULLITT COUNTY, KENTUCKY

FIGURE 3

Brushy Fork Creek is used seasonally for recreational purposes and for the irrigation of nearby crops. The creek appears to be a healthy stream supporting diverse communities of macroinvertebrates and small fish. Adequate feeding habitat for endangered species of bats and the bald eagle were determined to not exist within the stream reach of Brushy Fork Creek and the tributaries which are affected by the Site.

The Site is not located in a 100-year floodplain. And, the U.S. Fish and Wildlife Service (FWS) has determined that Brushy Fork Creek is not a habitat for endangered species. The FWS has also determined that the Site is not on a wetland, nor does it affect a wetland.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Site History

The Site was an industrial waste landfill known to have been operated by Tri-City Industrial Services, Inc. from late 1964 to late 1967. The majority of the material reportedly disposed of at the Site was industrial in origin from several Louisville, Kentucky industries. The bulk of the waste consisted of scrap lumber and fiberglass insulation materials. The remaining waste consisted of drummed liquid wastes and bulk liquids that were poured onto the ground. In 1968, State officials reported that highly volatile liquid wastes resembling paint thinners were disposed of on-site.

Records indicate that a site attendant was present at the Site at least during a portion of the time the landfill was operated. The duties of the site attendant included pushing each day's collection of refuse over the working face of the landfill into the surrounding ravines. In at least one instance, the attendant was instructed to pour liquid waste material directly onto the ground to help alleviate fire and explosion hazards.

The Site was a source of local citizen complaints and concerns to state and county government officials on numerous occasions during the disposal operations. In 1965, residents near the Site first complained to local officials regarding the unkempt condition of the landfill, explosions, fires, and smoke which was said to irritate eyes, make breathing difficult, and have an offensive odor. Additionally, deposition of ash and charred debris on neighboring properties led to a civil lawsuit for creating a public nuisance.

The Bullitt County Health Department, County Attorney, and the Commonwealth of Kentucky Department of Fish and Wildlife Resources (then the Division of Fisheries) along with the Department of Health (then the Division of Environmental Health) investigated these complaints. An indictment, served to Tri-City Industrial Services, Inc. and others in November 1967, resulted in the arrest of the company's president, Mr. Harry Kletter, on the nuisance charge. After Mr. Kletter's arrest, a settlement was negotiated whereby the charges would be dropped if the company agreed to stop disposing of and burning waste at the Site. At about the same time as the arrest, a fire erupted on the Site that burned for two years. Tri-City Industrial Services, Inc. reportedly ceased all waste disposal activity shortly after the fire began.

2.2 Initial Investigations

EPA's involvement with the Site commenced in September 1985 following notification by the Kentucky Natural Resources and Environmental Protection Cabinet (the "Cabinet"). The Cabinet conducted a Preliminary Assessment (PA) of the Site in September 1985 and recommended a high priority for inspection. The Cabinet performed a Site Investigation (SI) in April 1987 to determine the Site's eligibility for inclusion on EPA's National Priority List (NPL). The investigation included identification of several private, potable water supplies near the Site and multi-media sampling (waste, soil, and groundwater). Several hazardous substances were detected in on-site soils and wastes, including PCBs, phenols, heavy metals, and various organic compounds. One residential spring, utilized by the Klapper family as a source of potable water, located several hundred yards west of the Site was sampled and it contained levels of tetrachloroethene (also known as perchloroethylene, or PCE) above Maximum Contaminant Levels (MCLs).

Following the Cabinet's release of the sampling results, EPA conducted additional sampling and provided an alternate water supply to the two Klapper residences in May 1988. EPA also discovered that another spring closer to the Site was being used as a source of potable water by Mr. and Mrs. William D. Cox, Sr. Bottled water was supplied to the Cox, Sr. residence until sampling results were obtained. Sampling of the Cox Spring was included in a May 1988 survey of potable water sources conducted by EPA within an approximate one-half mile radius of the Site. The sampling confirmed again the presence of PCE in the Klapper Spring, and elevated levels of PCE and trichloroethene (TCE) were found in the Cox Spring. This survey identified the two Klapper residences and the Cox, Sr. residence as the only affected households within the investigated area. The provision of bottled water to the Cox, Sr. residence and two Klapper residences is an ongoing action funded by EPA.

The findings of the potable water survey prompted EPA to conduct an additional study in June 1988, the emphasis of which was to assess the Site's potential impact on area residents via ingestion of groundwater, inhalation of soil particulates, and direct contact. Sample locations included sensitive areas such as yards, gardens, and potable water supplies. Samples collected included five composite surface soil samples, three waste samples, and four groundwater samples.

The Site was proposed for inclusion on the NPL on June 24, 1988 (53 FR 23988) based primarily on the potential hazard from contaminated groundwater. The Site became final on the NPL on March 31, 1989 (54 FR 13302) with a Hazard Ranking Score (HRS) of 33.82.

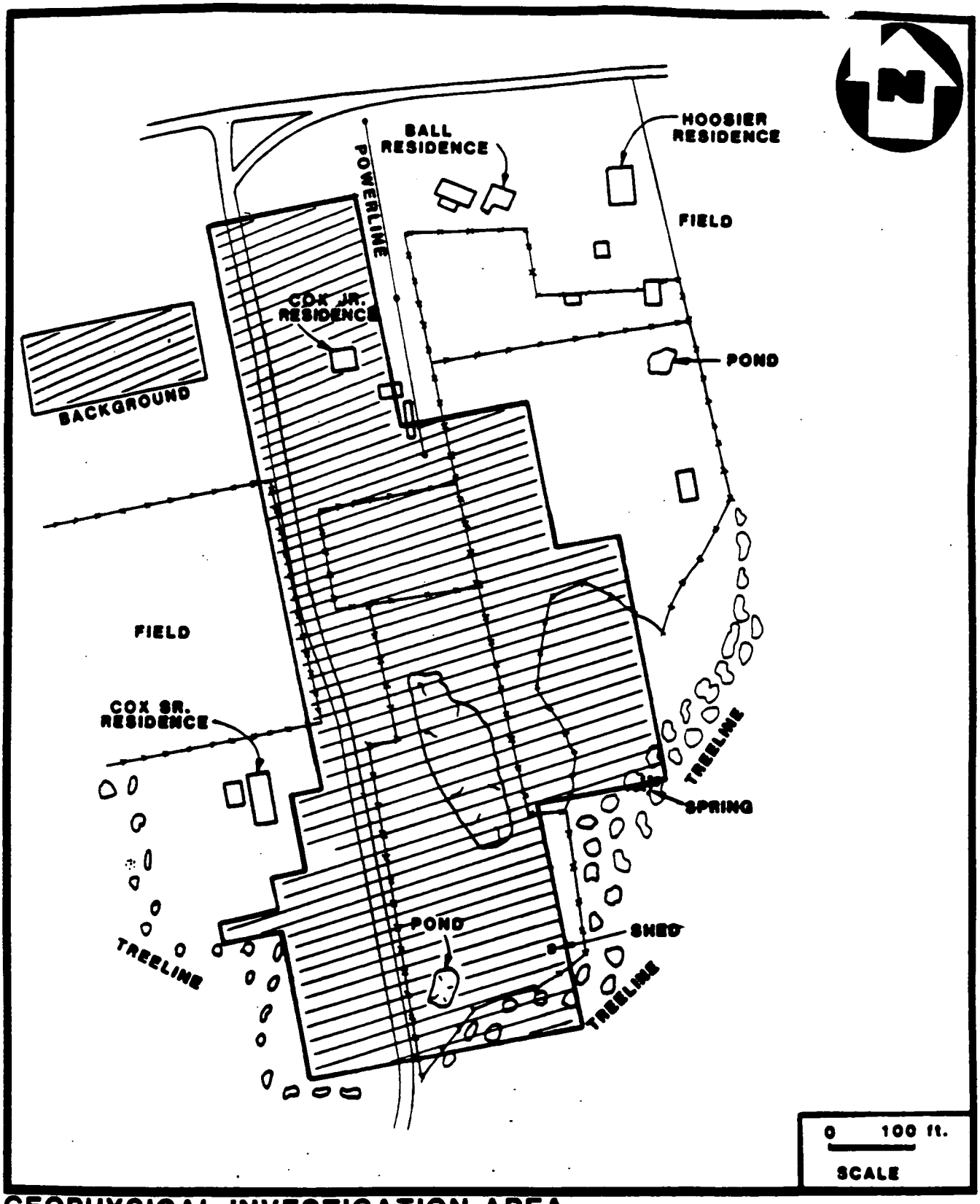
2.3 Removal Actions

The Site received further attention in June 1988 when EPA responded to a telephone call from the Cox, Sr. family regarding a "black ooze" emanating from their side yard. EPA's Technical Assistance Team (TAT) contractor, Roy F. Weston, collected two samples from the reported stained area and also from a solid material resembling paint waste. The samples indicated elevated levels of xylene, toluene, ethylbenzene, and lead.

NUS Corporation, EPA's Field Investigation Team (FIT) contractor, conducted a geophysical survey and field analytical screening procedures (FASP) at the Site in August 1988 to delineate waste disposal areas and provide additional subsurface information. Magnetometry, resistivity, and electromagnetic terrain conductivity surveys were performed during the geophysical investigation. The study area is shown in Figure 4. The electromagnetic and magnetic anomalies are shown in Figures 5 and 6, respectively.

To complement and substantiate the information collected during the geophysical survey, FASP were also conducted. The FASP techniques employed were gas probes and subsurface soil sample collection with analyses for volatile organic compounds (VOCs). The locations for FASP were selected from those geophysically anomalous areas yielding the highest electromagnetic and magnetic readings.

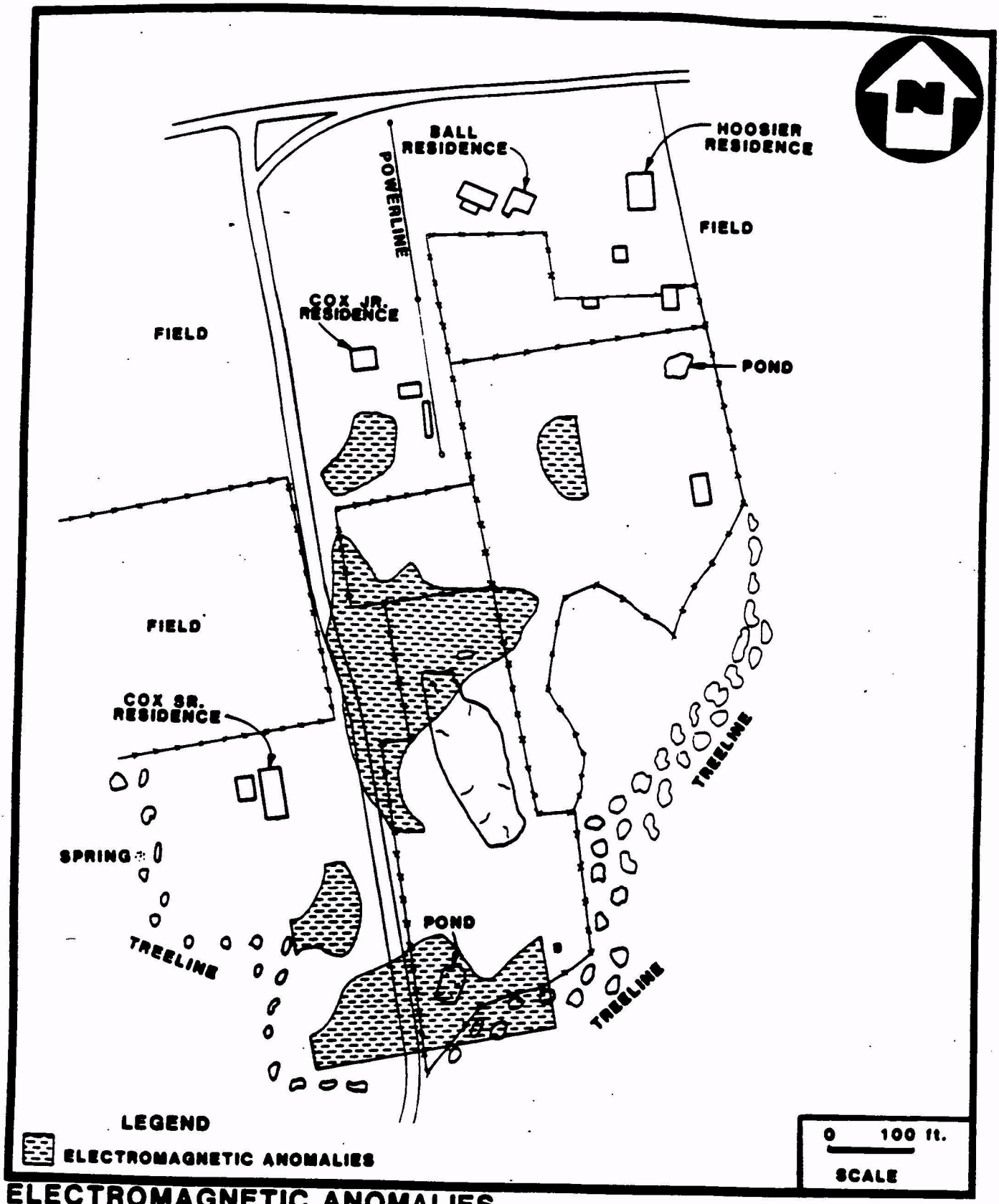
The results of the FASP study tended to substantiate the geophysical findings by detecting VOCs in significant concentration close to the anomalies. Given the correlation between the two surveys, the disposal of the waste was apparently concentrated in the southern half of the landfill.



GEOPHYSICAL INVESTIGATION AREA
TRI-CITY INDUSTRIAL DISPOSAL
BROOKS, BULLITT COUNTY, KENTUCKY

FIGURE 4

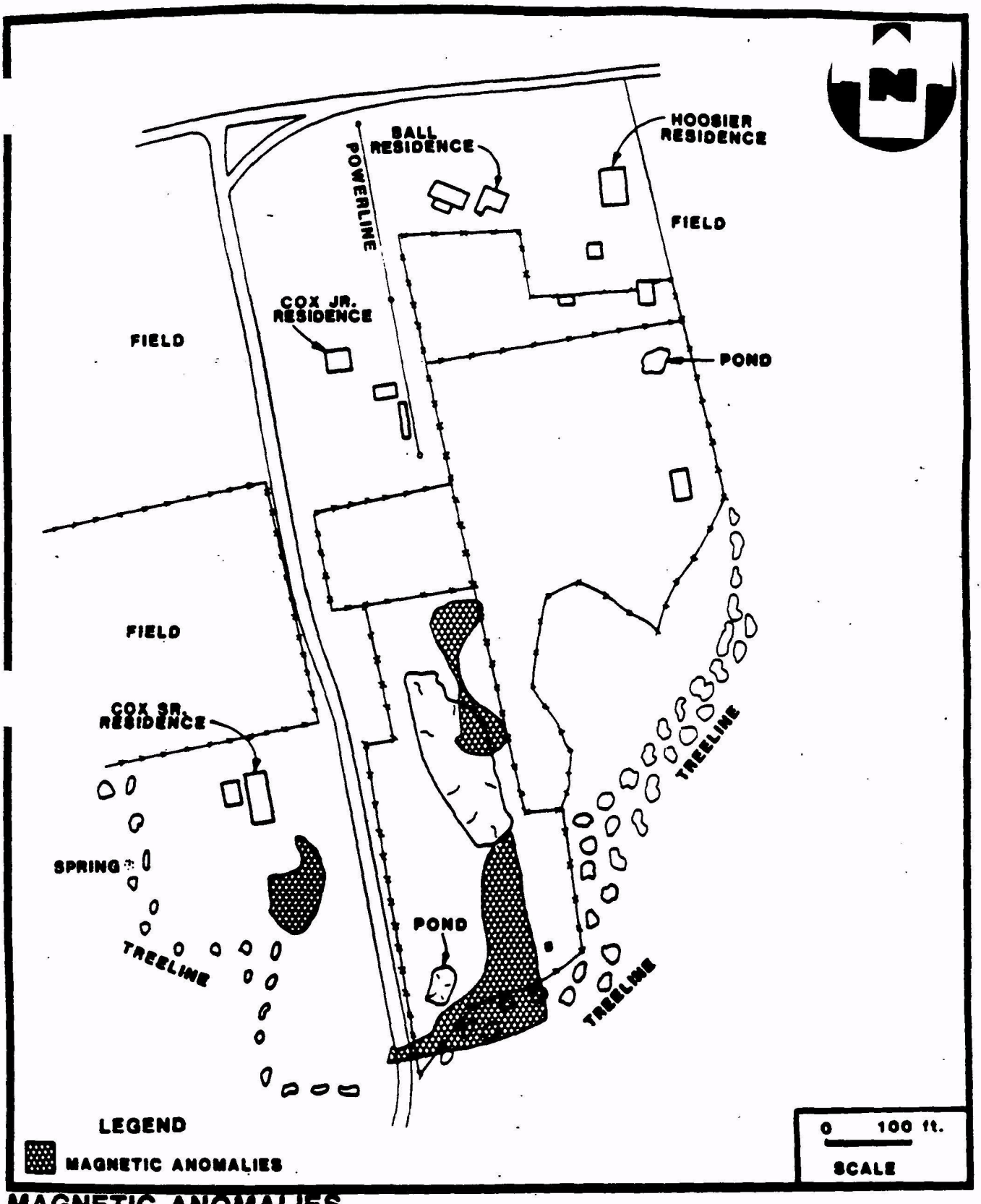
NUS CORPORATION



ELECTROMAGNETIC ANOMALIES
TRI-CITY INDUSTRIAL DISPOSAL
BROOKS, BULLITT COUNTY, KENTUCKY

FIGURE 5

NUS CORPORATION



MAGNETIC ANOMALIES
TRI-CITY INDUSTRIAL DISPOSAL
BROOKS, BULLITT COUNTY, KENTUCKY

FIGURE 6

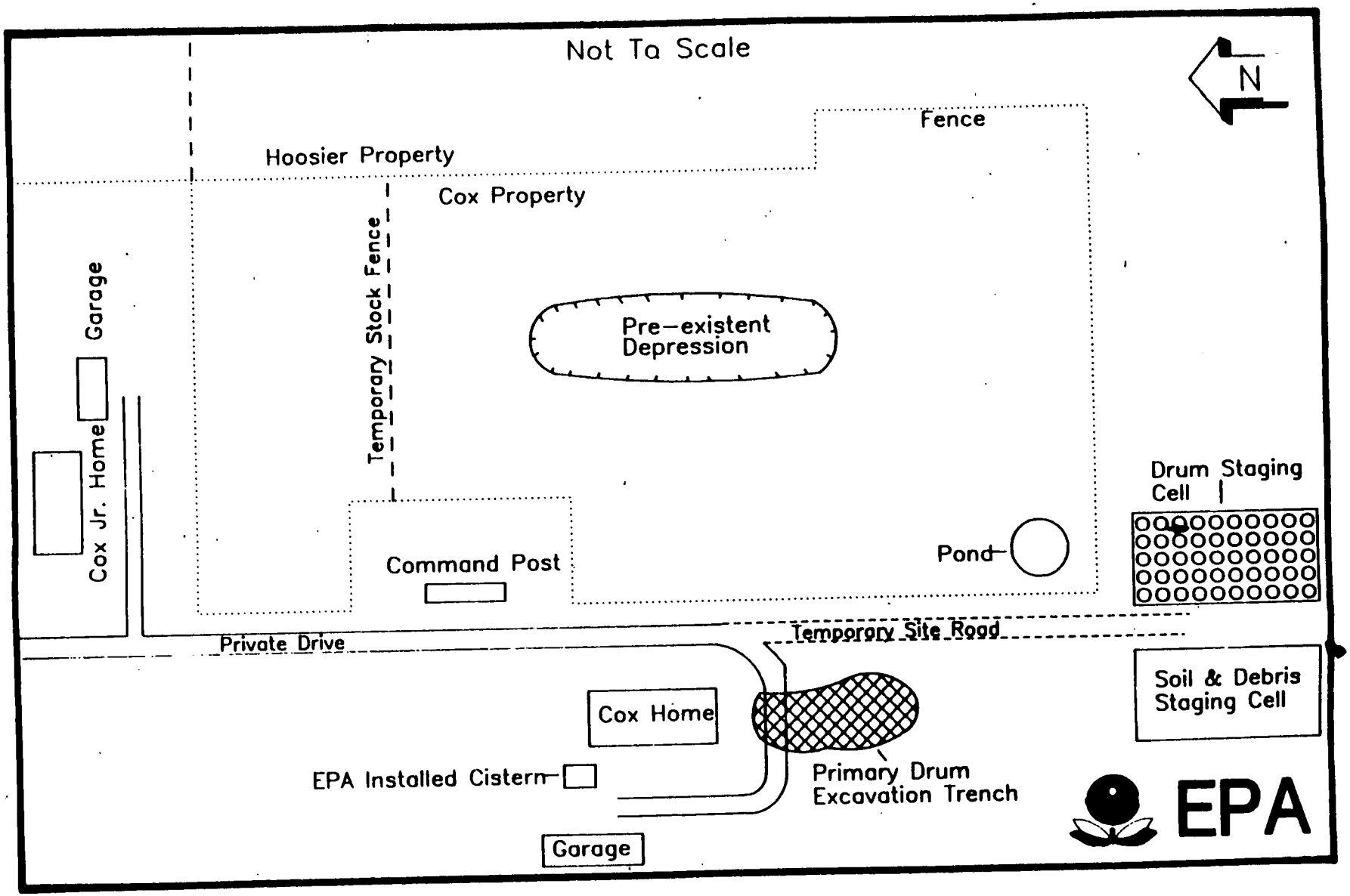
Based on the results of the sampling conducted by EPA's TAT contractor and the proximity of the contamination to the Cox, Sr. residence, EPA conducted an Emergency Removal Action in August and September 1988 to excavate and remove approximately 165 drums (full or partially full) that were in generally good condition, many crushed and empty drums, metal containers of various sizes, auto parts, 400 gallons of free liquids, and over 800 cubic yards of suspected contaminated soil. The resulting trench in the side yard was approximately ten feet deep, twelve to fifteen feet wide, and thirty feet long. As shown in Figure 7, the trench extended northward through a portion of the driveway.

Following completion of the removal trench, numerous test trenches were excavated to identify additional waste disposal areas. The results of the geophysical surveys were used to aid in determining the trenching locations. As shown in Figure 8, the trenches were excavated in the Cox, Sr. side yard, throughout a pasture east of the Cox, Sr. residence, and on the Hoosier's property, which is a five to seven acre tract east of the pasture that was sold by Mr. Cox, Sr. A limited number of empty drums and drums containing solids were excavated and staged, but no additional liquids were located. Primarily, the operators encountered waste fiberglass insulation and ash, indicating the historical fires. Many of the geophysical anomalies were insulation and wire. The test excavation was discontinued in September 1988 and the trenches were backfilled and graded.

2.4 Remedial Investigation/Feasibility Study

EPA began a Remedial Investigation (RI) in July 1989 to characterize the Site and determine the nature and extent of contamination. Since the geophysical survey and FASP indicated that the disposal of waste was concentrated in the southern half of the landfill, the field activities of the RI were concentrated in that area. Figure 9 shows the RI sampling locations with respect to the approximate waste disposal areas based on two aerial photographs taken in May 1966 and January 1967.

Phase I of the RI was performed in July 1989 and the activities included site topographic mapping, a surficial geological assessment, surface water and sediment sampling, spring sampling, surface soil sampling, and an aquatic biota survey. Phase II of the RI was conducted from September to November 1989 and the activities included ground surveying, temporary soil borings, subsurface soil sampling, subsurface geophysical investigations, groundwater investigations, aquifer tests, and air monitoring. All work was conducted by EPA's REM III contractor, Ebasco Services, Inc.



WESTON MAJOR PROGRAMS Region IV TAT

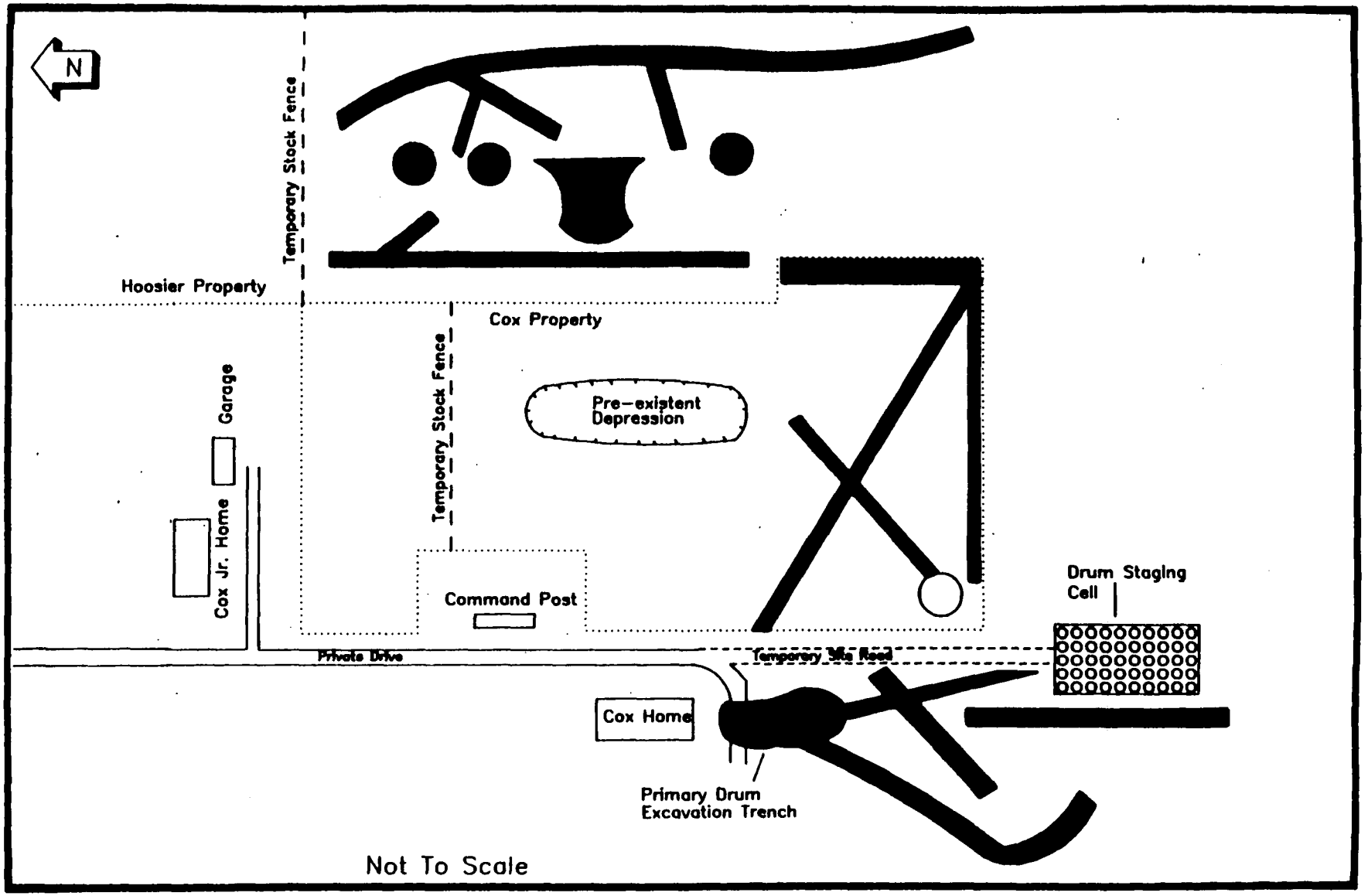
ACTIVITY DESCRIPTION: Site Sketch Indicating Key Features of the Removal Action, Brooks, Kentucky

SITE: Tri-City Industrial Disposal Site

TDD NO.: 04-8810-20 PCS# 2020

DATE: July 1989

Figure 7



WESTON MAJOR PROGRAMS Region IV TAT

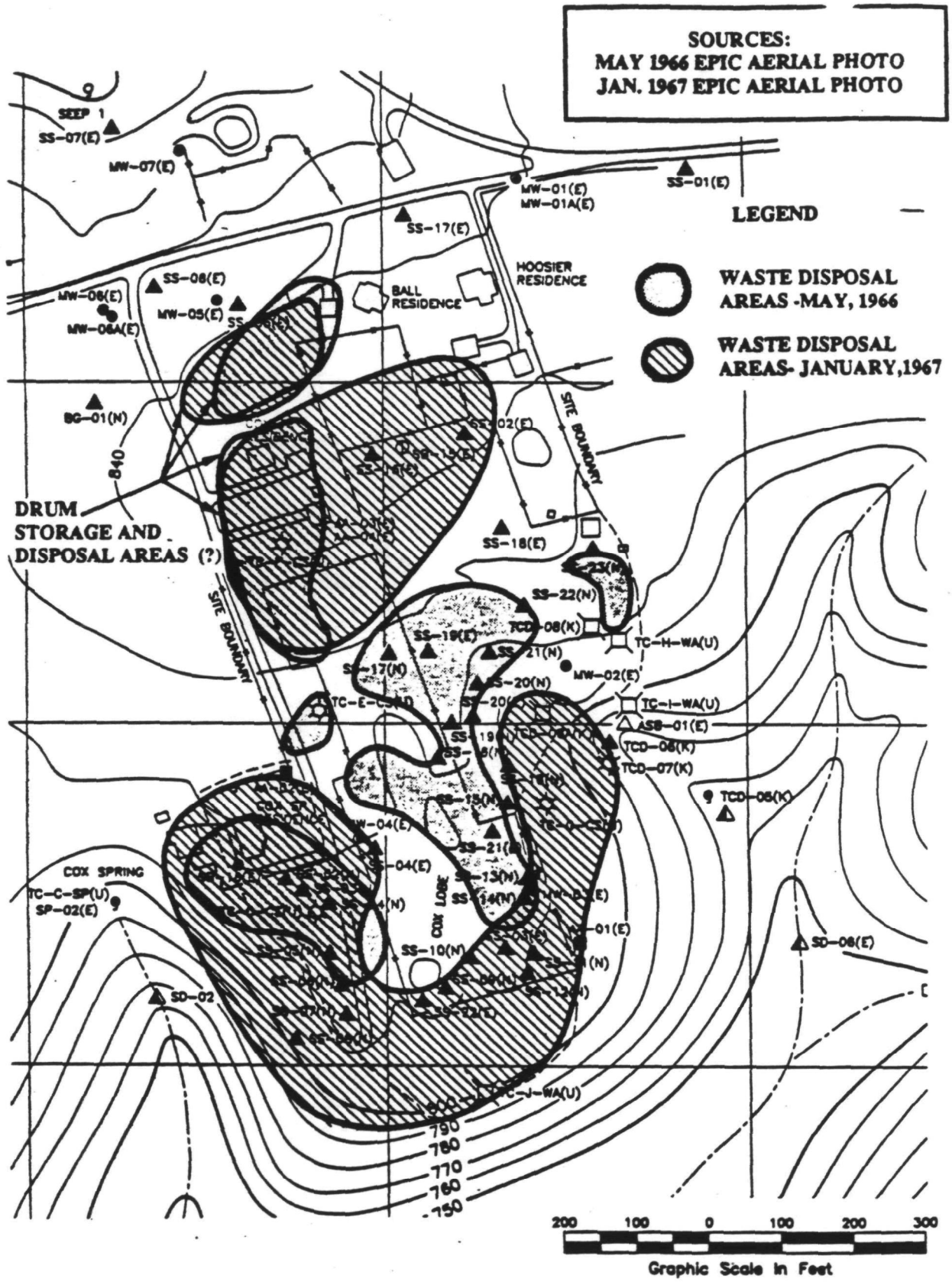
SITE: Tri-City Industrial Disposal Site

ACTIVITY DESCRIPTION: Size Edited Site Sketch With Approximated Test Pits and Trenches Shaded

TDD NO.: 04-8810-20 PCS# 2020

DATE: July 1989

Figure 8



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EBASCO SERVICES INCORPORATED

APPROXIMATE WASTE DISPOSAL AREAS COMPARED TO SAMPLING LOCATIONS TRI-CITY INDUSTRIAL DISPOSAL SITE BULLITT COUNTY, KENTUCKY

FIGURE 9

During the RI, six groundwater monitoring wells were installed and sampled. The installation of seven other wells was attempted, but the wells were not completed because of insufficient groundwater. Four springs were sampled, and six surface water samples were taken from Brushy Fork Creek and the two tributaries that discharge to the creek. Twelve sediment samples were collected in the areas of the springs and Brushy Fork Creek. Twenty surface soil samples and twenty-five subsurface soil samples were collected. In addition, sixteen air samples were collected at three locations that were selected based on prevailing wind directions and the locations of residents.

EPA conducted additional sampling of several springs, including the Cox and Klapper Springs, and one monitoring well in December 1990 to verify sampling conducted during the RI.

Ebasco Services, Inc., under EPA's Alternative Remedial Contracting Strategy (ARCS) IV contract, also conducted the Feasibility Study to develop and evaluate remedial alternatives for addressing the Site's known contamination problems. The FS was completed in April 1991, and EPA released the RI and FS Reports to the public in May 1991.

The Potentially Responsible Parties (PRPs) were notified in writing in November 1988 and May 1989 via special notice letters and given the opportunity to conduct the RI/FS with EPA oversight. However, none of the parties elected to undertake these activities.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Community Relations Plan (CRP) for the Tri-City Site was finalized in May 1989. This document included a list of contacts and interested parties throughout government and the local community. The CRP also established communication pathways to ensure timely dissemination of pertinent information.

A fact sheet describing the Site and the nature of the RI/FS process was distributed to the public in May 1989. EPA held an availability session in Shepherdsville, Kentucky on June 1, 1989 to discuss the RI/FS activities and site-related concerns with the community.

The RI and FS Reports were released to the public on May 2, 1991. The Proposed Plan Fact Sheet, which described EPA's preferred alternative for remediation of the Site, was distributed on April 19, 1991. The information used by EPA to select a response action under CERCLA, including the previously mentioned documents, has been included in the Administrative Record at the information repositories located in the Ridgway

Memorial Library in Shepherdsville, Kentucky and the Records Center in EPA's Region IV office in Atlanta, Georgia.

A public comment period was held from May 2, 1991 to June 1, 1991. In addition, a public meeting was held on May 9, 1991 to present the results of the RI/FS and to discuss the preferred alternative as presented in the Proposed Plan Fact Sheet for the Site. All comments received by EPA during the public comment period, including those expressed verbally at the public meeting, are addressed in the Responsiveness Summary contained in Appendix C of this document. The comments from the Commonwealth of Kentucky and EPA's response are included in Appendix B.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

The Tri-City Site has been divided into two operable units. Operable Unit #1 will include the remediation of contaminated groundwater and confirmatory sampling to identify any unacceptable levels of hazardous contaminants in areas of the Site not otherwise addressed. Operable Unit #2 will involve the additional measures necessary to mitigate any threat to human health or the environment identified during the confirmatory sampling in the first operable unit.

The remedy selected in this ROD is for Operable Unit #1 and it addresses the contaminated groundwater as it discharges to the springs. Contaminated groundwater poses the known major threat to human health and the environment at the Site due to the risk associated with ingestion of water containing volatile organic compounds at levels above MCLs and non-zero Maximum Contaminant Level Goals (MCLGs). Institutional controls will be implemented to restrict potable usage and monitor springs in the area of the Site until the water is of sufficient and consistent quality for human consumption. Potable water will continue to be provided to affected residents.

Operable Unit #1 also includes confirmatory sampling of site soils, sediment, and ambient air to identify and define additional areas of the Site that constitute a threat to human health and the environment. Long-term monitoring of the groundwater, springs, surface water, sediment, and ecology will be implemented to identify any site-related impacts.

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 Site Geology and Hydrogeology

The local geology in the area of the Tri-City Site is dominated by sedimentary rocks of Mississipian age. These

include, in stratigraphic order (top to bottom), the Salem Limestone, the Harrodsburg Limestone, and members of the Borden Formation (the Muldraugh Member, the Holtsclaw Siltstone Member, and the Nancy Member). The stratigraphy of the area is shown in Figure 2.

The Salem Limestone is described as interbedded limestone and shale which forms the caprock on most of the hills in the Knob Region west of Sun Rise Ridge. Formation thickness in the vicinity of the Site ranges from 18 to 25 feet based on the geologic map. The contact of the Salem Limestone with the underlying Harrodsburg Limestone is generally distinct and weathers to a silicified bed of granular fossil-fragmented limestone.

The Harrodsburg Limestone forms the caprock on most of the ridges and consists of light gray to yellowish gray fossil-fragmented limestone weathering to a reddish, cherty clay soil. The contact of the Harrodsburg Limestone with the underlying Muldraugh Member of the Borden Formation is a clearly marked lithologic change and is possibly unconformable.

The surficial, thin limestone aquifer is composed of the Salem Limestone and the Harrodsburg Limestone. This aquifer is unconfined and it varies from 10 to 50 feet in thickness. The groundwater moves along preferential flow pathways within the irregular contact between the partially decomposed and completely decomposed rock (the overburden), thin fractures, and solution channels along bedding planes. Springs and seeps sporadically occur where the geologic units that comprise the aquifer are exposed and mark the discharge points for the preferential flow pathways.

The Muldraugh Member is the upper unit of the Borden Formation and it consists of dolomitic siltstone, silty dolomite, and limestone. Quartz geodes are common in the dolomitic siltstone and are a distinguishing feature of the upper Muldraugh. A distinctive glauconite seam overlies the limestone and is present in areas where the limestone is absent. As a result, the glauconite seam is mapped as the base of the Muldraugh Member.

The Holtsclaw Siltstone Member underlies the Muldraugh Member and it is composed of siltstone and silty shale. The siltstone in the Holtsclaw Member contains iron-stained, medium gray, calcareous concretions. Locally, the Holtsclaw Member has a silty shale near the top of the unit which is similar to the underlying Nancy Member. The contact between the Holtsclaw Member and the Nancy Member is gradational with interbedding over an interval as great as 40 feet. The Nancy Member is composed of silty shale and it is stratigraphically equivalent to the Holtsclaw Member in the area of the Site.

Groundwater flows through interconnected fractures, bedding planes, and dissolution pathways in the various members of the Borden Formation. The extent of hydraulic connection, if any, between the members is not known. The siltstone and limestone units of these members produce sufficient water supplies for domestic use. However, springs are used as water supply sources more frequently than drilled wells due to the sporadic and unpredictable occurrence of water in the members.

The data for the Tri-City Site indicates that most of the recharge to the aquifers occurs on the north side of Beghtol Ridge. Movement of groundwater is believed to be to the south-southwest, moving down-dip along bedding planes and following available permeable pathways. Groundwater discharges via springs and seeps which are predominantly located on the south and west sides of Beghtol Ridge.

With the exception of bedrock outcrop occurrences along dissecting streams, and at a limited number of other locations, surface deposits at the Site consists of soils derived from the weathering of the Salem Limestone and Harrodsburg Limestone, or an artificial fill comprised of disposal debris and locally derived cover. Based on drilling and soil boring logs, the unconsolidated zone ranges from 8.5 to 27 feet over the Site with thinner overburden deposits in the northeast corner of the Site and along the steep hillsides. The average depth to bedrock is approximately 18 feet and maximum depths to bedrock were in borings at the base of the hillsides.

Recharge to the aquifers occurs either by infiltration of precipitation into the overburden or by infiltration of the runoff directly into the aquifers. Infiltration through the overburden to the partially decomposed rock of the Salem Limestone/Harrodsburg Limestone aquifer is probably limited by the low permeability and the thickness. Infiltration is probably greater in the northern part of the Site (near the Cox, Jr. and Hoosier residences) where the overburden is approximately 5 feet thick due to past earthmoving operations, than in the southern part of the Site. The low permeability and greater thickness of the overburden also explains why the ponds excavated in the southern part of the Site usually contain water during periods when springs and seeps go dry.

Some hydraulic communication between the different aquifers at the Site has been apparent. Hydraulic communication between the overburden and the Salem Limestone/Harrodsburg Limestone aquifer is evident based on the springs and drilling. Springs discharging from the Harrodsburg Limestone have been impacted by contaminants buried in and/or poured onto the overburden. Water or contaminants percolating through the overburden or wastes

disposed on-site, or water infiltrating along the base of the overburden, could enter the Salem Limestone/Harrodsburg Limestone aquifer at the contact between the overburden and the partially weathered rock to contaminate the aquifer.

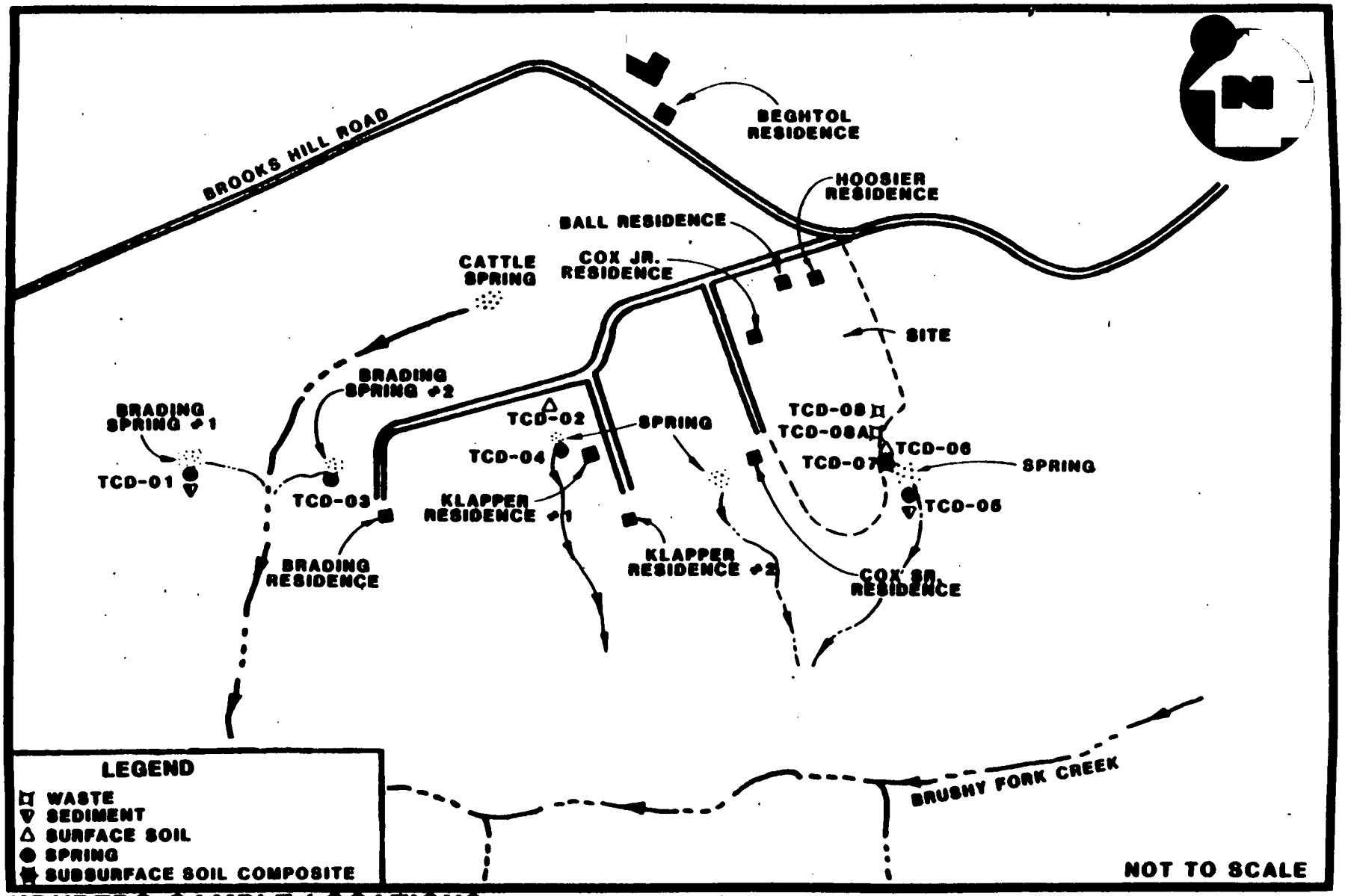
Insufficient data exists to determine whether the Salem Limestone/Harrodsburg Limestone aquifer and the Muldraugh Member of the Borden Formation are hydraulically connected. The contact between the two aquifers is marked by solutioning in the Harrodsburg Limestone, which indicates that the Muldraugh Member is more resistant. However, the extent of jointing or fracturing in the Muldraugh Member or at the contact is not known.

5.2 Nature of Contamination

The primary wastes of concern have been the drummed and bulk liquids disposed of at the Site. The Cabinet's investigation in April 1987 included the collection of two waste samples from deteriorated drums protruding through the surface soil in the ravine on the eastern side of the Site. These two samples, although located near each other, had significant differences in composition. Sample TCD-08 contained much greater concentrations of organic contaminants, with phenol, 4-methylphenol, and 2,4-dimethylphenol at 2860 ppm, 7813 ppm, and 1553 ppm, respectively. Sample TCD-08A contained phenol and 4-methylphenol at concentrations less than 13 ppm. Sample TCD-08A had significantly higher concentrations of inorganic contaminants, exhibiting arsenic, chromium, lead, and mercury at 3.2 ppm, 49.3 ppm, 33.7 ppm, and 7.44 ppm, respectively. Each of these contaminants was detected in sample TCD-08, but in concentrations that ranged from 4.45 ppm to 0.024 ppm. Figure 10 shows the sampling locations during the Cabinet's investigation.

During the additional study conducted by EPA in May 1988 three waste samples were collected from partially exposed drums along the eastern and southern boundaries of the former disposal area. The sample locations are shown in Figure 11. The inorganic analyses of these samples revealed a number of contaminants, including chromium, copper, lead, mercury, zinc, and cyanide, which were common to all three samples. Of these contaminants, lead was the most predominant contaminant with concentrations of 78 ppm to 390 ppm in the three samples. Organic analyses were not conducted.

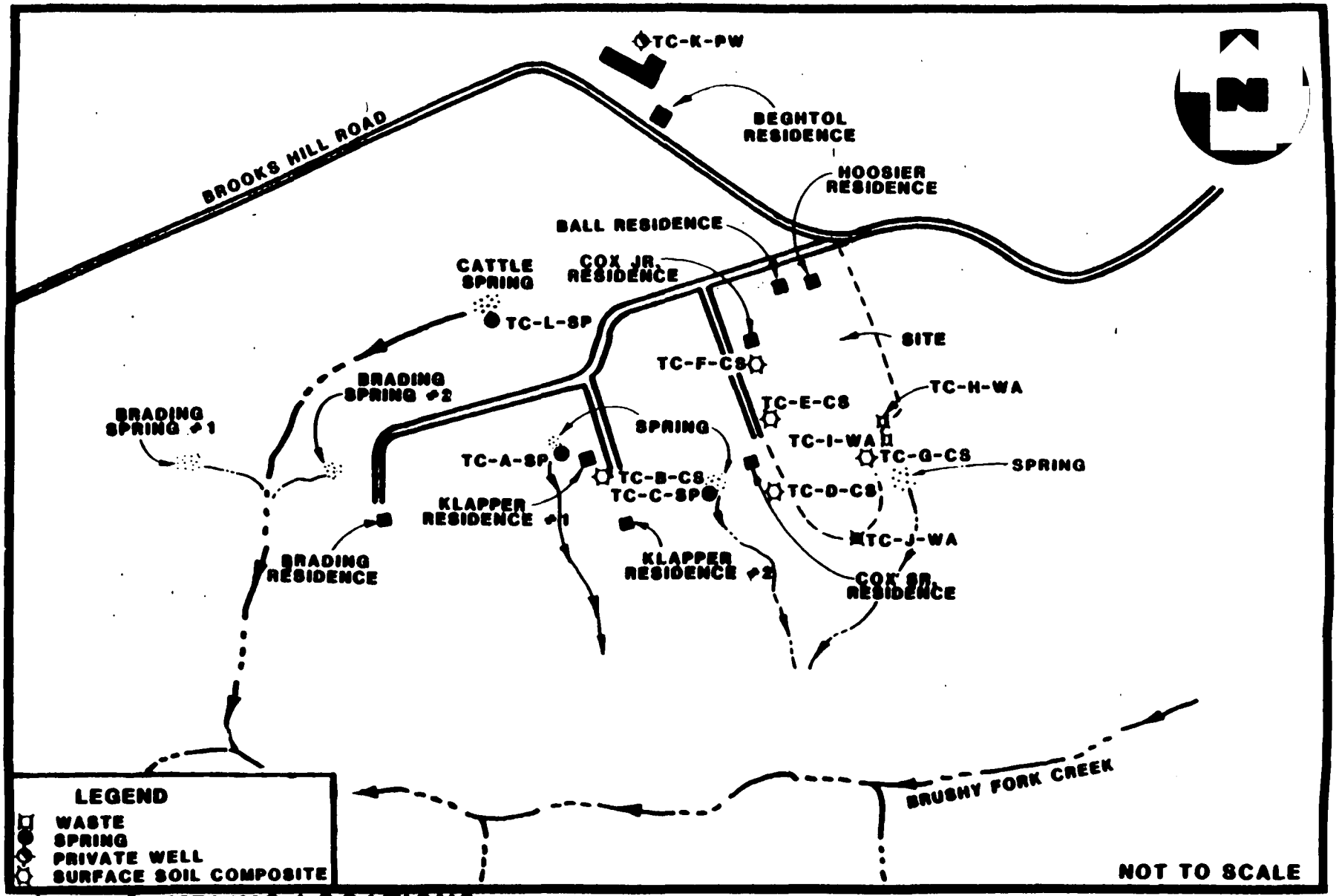
Waste samples were also collected by EPA during the Emergency Removal Action conducted in August and September 1988. The hazardous materials indentified during the removal included PCE, toluene, ethyl benzene, xylene, polychlorinated biphenyls (PCBs), and lead.



KDNREPC SAMPLE LOCATIONS
TRI-CITY INDUSTRAL DISPOSAL
BROOKS, BULLITT COUNTY,KENTUCKY

FIGURE 10

NUS CORPORATION



USEPA SAMPLING LOCATIONS
TRI-CITY INDUSTRAL DISPOSAL
BROOKS, BULLITT COUNTY,KENTUCKY

FIGURE 11

NUS CORPORATION

5.3 Extent of Contamination

Previous investigations at the Tri-City Site have included sampling of groundwater, soils, surface water, sediments, and ambient air. The findings, by medium, are discussed below.

5.3.1 Groundwater

Groundwater, as it discharges to the surface as springs, has been the predominant medium of concern at the Site because of its use as a source of potable water. Groundwater has been sampled in five separate events, one conducted by Kentucky and four by EPA. The Kentucky investigation in April 1987 included four groundwater samples, one each from Brading Spring #1, Brading Spring #2, the Klapper Spring, and the unnamed spring on the southeastern slope of the former disposal area. All of the springs, except for the unnamed spring, have been used as sources of potable water. Brading Spring #1 is topographically separated from the Site and is considered representative of background conditions. Figure 10 shows the sampling locations during the Cabinet's investigation.

The Kentucky investigation revealed organic contamination above background levels in the Klapper Spring and the unnamed spring. However, only the levels of tetrachloroethene (PCE) exceeded Maximum Contaminant Levels (MCLs). Metals levels did not exceed MCLs. The analytical results are summarized in Table 1. Current and proposed MCLs and MCLGs that are pertinent to the Site are listed in Table 2.

EPA conducted further sampling of the Klapper Spring in May 1988. The results showed PCE at 133 ppb in the spring sample and 50 ppb in the tap sample, levels which again exceeded MCLs. Results of a screening of potable water sources conducted by EPA in May 1988 again indicated the presence of PCE in the Klapper Spring. In addition, PCE was detected in the Cox Spring. Concurrent sampling done by the Cabinet and also analyzed in the state's laboratory revealed levels of PCE above MCLs in the tap and spring samples from the Cox, Sr. and Klapper residences. This analysis also showed levels of TCE above MCLs in the spring and tap samples collected from the Cox, Sr. residence.

EPA collected four groundwater samples in late May 1988 as part of an additional study to determine the impact of the Site. These samples were collected from the Klapper Spring, the Cox Spring, the Cattle Spring, and a private well near the Beghtol residence. The sample locations are shown in Figure 11. The most significant findings were the analytical results

TABLE 1
KENTUCKY SITE INVESTIGATION, APRIL 1987
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF ANALYTICAL RESULTS (IN PPM)
GROUNDWATER SAMPLES

PARAMETERS	BRADING NO. 1	BRADING NO. 2	KLAPPER SPRING	UNNAMED SPRING
Arsenic	<0.001	0.001	<0.001	0.003
Barium	0.013	0.017	0.003	0.093
Cadmium	<0.001	<0.001	<0.001	<0.001
Chromium	0.001	0.001	0.001	0.004
Lead	<0.001	<0.001	<0.001	0.006
Mercury	<0.0001	<0.0001	<0.0001	<0.0001
Selenium	<0.001	0.006	0.006	0.005
Trans-1,2-Dichloroethene	<0.005	<0.005	<0.001	0.0028
1,1,1-Trichloroethane	<0.005	<0.005	0.0012	0.002
Trichloroethene (TCE)	<0.005	<0.005	<0.001	0.0018
Tetrachloroethene (PCE)	<0.005	<0.005	0.311	0.143
1,1-Dichloroethene	<0.005	<0.005	0.0011	<0.001

TABLE 2
CURRENT AND PROPOSED MCLs AND MCLGs (in PPB)

PURGEABLE ORGANICS	MCL	MCLG
Chloroform	100	- -
1,1-Dichloroethene	7	7
Cis-1,2-Dichloroethene	70	70
Trans-1,2-Dichloroethene	100	100
Tetrachloroethene (PCE)	5	0
Toluene	1,000	1,000
1,1,1-Trichloroethane	200	200
Trichloroethene (TCE)	5	0
Vinyl Chloride	2	0
Xylenes	10,000	10,000
EXTRACTABLE ORGANICS		
Bis (2-ethylhexyl) Phthalate	4*	0*
INORGANICS		
Cadmium	5	5
Lead	15**	0
Nickel	100*	100*

* indicates a proposed MCL or MCLG

** indicates the action level established in 56 FR 26460, June 7, 1991

- - indicates that a MCL or MCLG has not been established

from the Cox Spring sample. Four volatile organic compounds, including PCE and TCE, were found at levels that exceeded MCLs. PCE was again found in the Klapper Spring at an estimated value that exceeded MCLs. One phthalate was found in the Cattle Spring at a level higher than the MCL. No contamination was found in the well sample. The results of the organic analyses are summarized in Table 3. Metals levels in the spring samples did not exceed MCLs. The results of the inorganic analyses are summarized in Table 4.

Samples from four springs were collected in July 1989 by EPA's contractor, Ebasco Services, during the Remedial Investigation. A total of five samples, including one duplicate from the Cox Spring, were collected from the Cox Spring, the Klapper Spring, the Cattle Spring, and Brading Spring No. 2. The sampling locations are shown in Figure 12. Only the samples from the Cox Spring showed volatile organic contamination, with the levels of four compounds exceeding MCLs. No semivolatile organics or pesticides were found in the spring samples. A summary of the organic analyses of the spring samples is shown in Table 5. Metals levels in the spring samples did not exceed MCLs. The results of the inorganic analyses are summarized in Table 6.

During Phase II of the RI, the installation of thirteen monitoring wells was attempted. However, only six wells provided sufficient water for completion. The attempted and completed groundwater monitoring well locations are shown in Figure 13. The well MW-02 is screened in the Harrodsburg Limestone formation and the Muldraugh Member of the Borden Formation. MW-04 and MW-08 are screened in the Muldraugh Formation, and MW-05 is screened in the Salem Limestone formation. MW-11 and MW-12 are screened in the Nancy Member of the Borden Formation.

PCE was detected in monitoring well MW-04 at 10 ppb, a level which is twice the MCL. Estimated quantities of total xylenes were found in two samples collected from monitoring well MW-08, but the levels were well below the MCL. No pesticides or semivolatile organic compounds were found in the monitoring well samples.

Cadmium was detected in the sample from MW-12 at a level slightly above the MCL. Lead was detected in five well samples from two different water formations at levels that ranged from 5 to 32 ppb. Lead was not detected in the formations immediately underlying the Site. Nickel was found in five well samples from three water formations at levels that ranged from 100 to 170 ppb. Both metals occur naturally in the area of the Site, which is a sedimentary environment dominated by limestones, shales, and siltstones. The results of the inorganic analyses of the samples from the groundwater monitoring wells are summarized in Table 7.

TABLE 3
USEPA GROUNDWATER INVESTIGATION, MAY 1988
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF ORGANIC ANALYSES (IN PPB)

Parameters	Cox	Klapper	Cattle	Beghtol Well
PURGEABLE ORGANICS				
Chloroform	2.2J	50U	5.0U	5.0U
1,1-Dichloroethane	2.5J	50U	5.0U	5.0U
1,1-Dichloroethene	1.2J	50U	5.0U	5.0U
Cis-1,2-Dichloroethene	74J	50U	5.0U	5.0U
Trans-1,2-Dichloroethene	0.92J	50U	5.0U	5.0U
Tetrachloroethene (PCE)	560	48J	5.0U	5.0U
Toluene	5.0U	50U	9.4	5.0U
1,1,1-Trichloroethane	8.1	50U	5.0U	5.0U
Trichloroethene (TCE)	69J	50U	5.0U	5.0U
Vinyl Chloride	2.9J	50U	5.0U	5.0U
O-Xylene	5.0U	50U	5.0U	5.0U
(M- and/or P-) Xylene	5.0U	50U	5.0U	5.0U
EXTRACTABLE ORGANICS				
Benzo (A) Anthracene	10U	10U	10U	10U
Benzo (B and/or K) Fluoranthene	10U	10U	10U	10U
Bis (2-ethylhexyl) Phthalate	10U	10U	10	10U
Chrysene	10U	10U	10U	10U
Fluoranthene	10U	10U	10U	10U
Phenanthrene	10U	10U	10U	10U
Pyrene	10U	10U	10U	10U

U indicates that the material was analyzed for but not detected; the number is the minimum quantitation limit.

TABLE 4
USEPA GROUNDWATER INVESTIGATION, MAY 1988
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF INORGANIC ANALYSES (IN PPB)

PARAMETERS	COX	KLAPPER	CATTLE	BEGHTOL WELL
Aluminum	230	220	43,000	120
Barium	30	16	340	41
Calcium	100,000	63,000	100,000	100,000
Chromium	10U	10U	40	10U
Copper	10U	10U	39	12
Cyanide	4U	8U	4U	4U
Iron	200	170	52,000	50U
Lead	40U	40U	40U	40U
Magnesium	6700	4300	11,000	28,000
Manganese	140	10U	3200	10U
Nickel	20U	20U	40	20U
Potassium	2000U	2000U	4700	2000U
Sodium	6400	4600	13,000	29,000
Zinc	50	76	180	22

U indicates that material was analyzed for but not detected;
the number is the minimum quantitation limit.

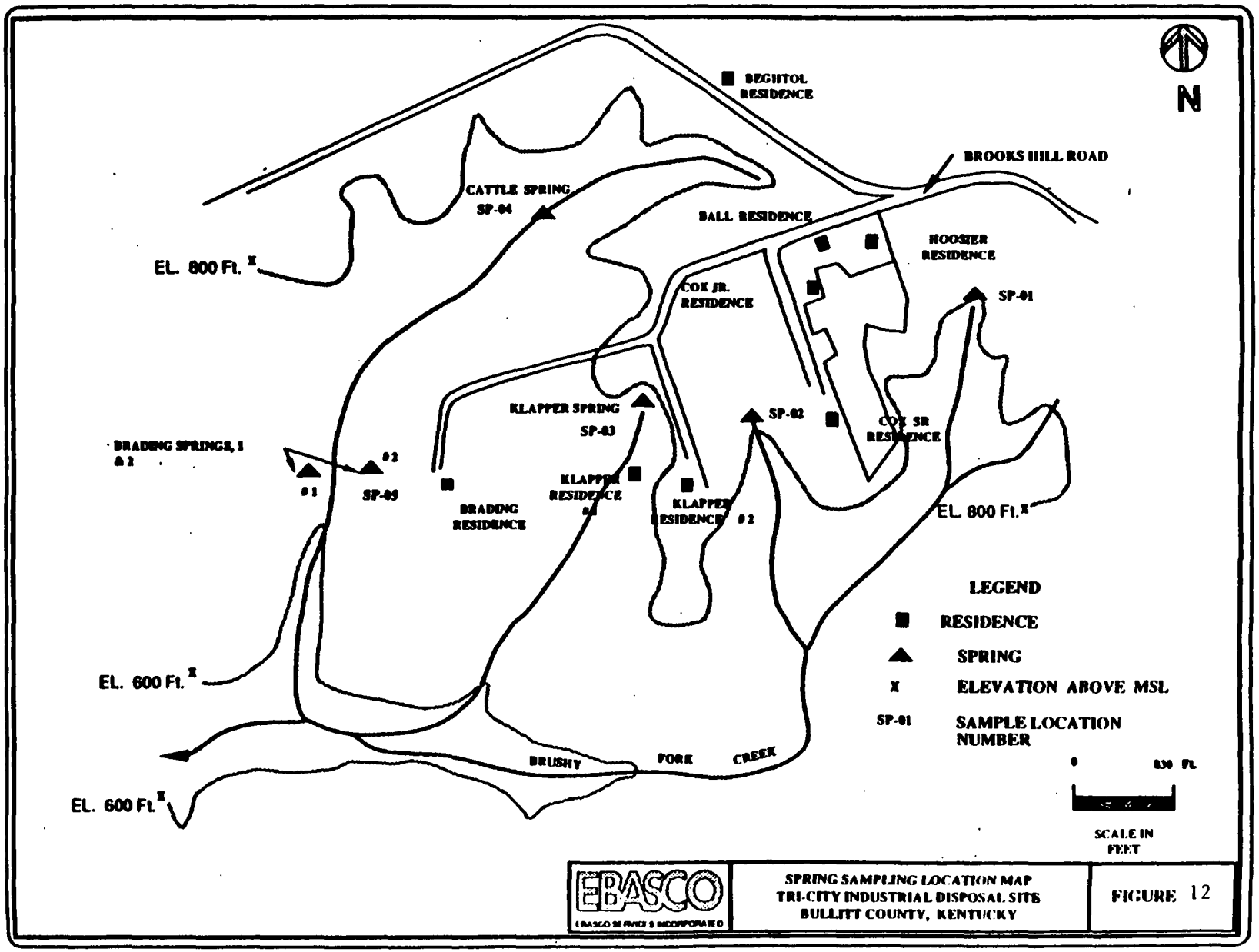

N
BEGHTOL RESIDENCE
BROOKS HILL ROAD
CATTLE SPRING SP-04
BALL RESIDENCE
HOOSIER RESIDENCE
EL. 800 Ft.
COX JR. RESIDENCE
SP-01
KLAPPER SPRING SP-03
SP-02
COX SR RESIDENCE
BRADING SPRINGS, 1 & 2
#1
#2
SP-05
BRADING RESIDENCE
KLAPPER RESIDENCE #1
KLAPPER RESIDENCE #2
EL. 800 Ft.
EL. 600 Ft.
BRUSHY FORK CREEK
EL. 600 Ft.
LEGEND
RESIDENCE
SPRING
X ELEVATION ABOVE MSL
SP-01 SAMPLE LOCATION NUMBER
0
SCALE IN FEET
EBASCO
EBASCO SERVICES INCORPORATED
SPRING SAMPLING LOCATION MAP
TRI-CITY INDUSTRIAL DISPOSAL SITE
BULLITT COUNTY, KENTUCKY
FIGURE 12

TABLE 5
RI SPRING SAMPLING, JULY 1989
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF ORGANIC ANALYSES (IN PPB)

CHEMICAL	COX	COX DUP.	KLAPPER	CATTLE	BRADING #2
Chloroform	5U	5U	5U	5U	5U
1,1-Dichloroethane	4J	4J	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U
1,2-Dichloroethene (total)	260	280	5U	5U	5U
Tetrachloroethene	88	89	5U	5U	5U
Toluene	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	11	11	5U	5U	5U
Trichloroethene	20	20	5U	5U	5U
Vinyl Chloride	31	32	10U	10U	10U

U indicates material analyzed for but not detected;
the number is the minimum quantitation limit.

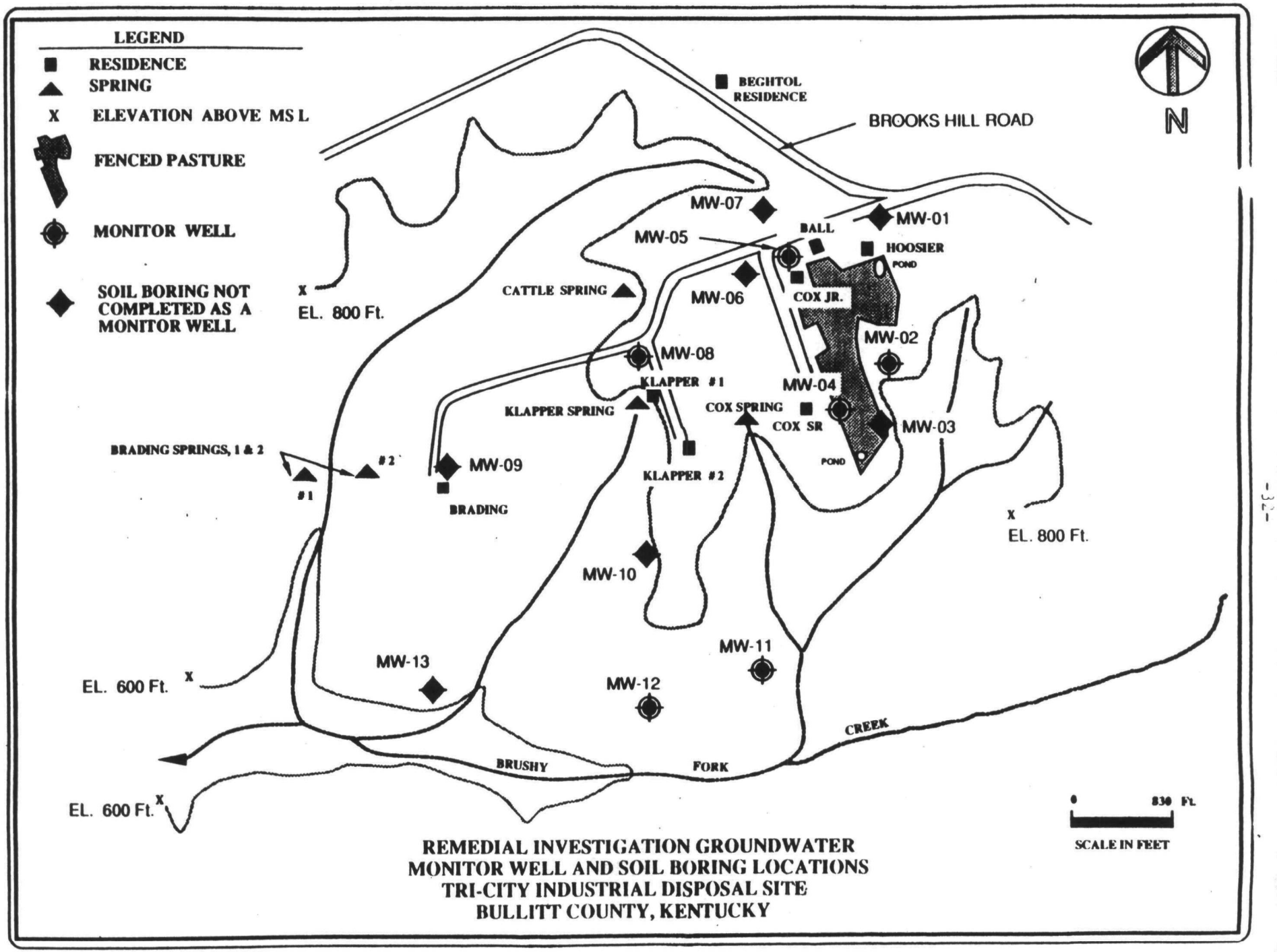
J indicates an estimated value

TABLE 6
RI SPRING SAMPLING, JULY 1989
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF INORGANIC ANALYSES (IN PPB)

CONTAMINANT	COX	COX DUP.	KLAPPER	CATTLE	BRADING #2
Aluminum	110U	100U	60U	1000	40U
Arsenic	2U	2U	2U	2U	2U
Beryllium	2U	2U	2U	2U	2U
Cadmium	3U	4U	4U	4U	4U
Calcium	87000	88000	82000	52000	75000
Chromium	4U	4U	4U	4U	4U
Iron	150U	110U	40U	1300	30U
Lead	1U	1U	1U	5U	1U
Magnesium	6900	6900	6400	8800	15000
Manganese	1800	1600	9U	190	2U
Mercury	0.20UJ	0.20UJ	0.20UJ	0.20UJ	0.20UJ
Nickel	20U	20U	9U	20U	9U
Potassium	810U	790U	310U	3000	550U
Sodium	6300	6200	5200	9200	11000
Thallium	3U	3U	3U	3U	3U
Vanadium	5U	6U	5U	7U	6U
Zinc	40U	60U	5U	60U	9U

U indicates material analyzed for but not detected; the number is the minimum quantitation limit.

J indicates an estimated value



REMEDIAL INVESTIGATION GROUNDWATER MONITOR WELL AND SOIL BORING LOCATIONS TRI-CITY INDUSTRIAL DISPOSAL SITE BULLITT COUNTY, KENTUCKY

URE 13

TABLE 7

RI GROUNDWATER SAMPLING, SEPT-NOV 1989

TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY

SUMMARY OF INORGANIC ANALYSES (IN PPB)

CONTAMINANT	MW-02	MW-04	MW-05	MW-08	MW-08-D	MW-11	MW-12
ALUMINUM	900	5800	1100	3300	2700	30000	44000
ARSENIC	3U	3U	3U	3U	3U	3U	3U
BARIUM	62	170	50	58	53	240	290
CADMIUM	3U	3U	3U	3U	3U	3U	6
CALCIUM	300000	740000	160000	450000	440000	49000	22000
CHROMIUM	18	32	38	64	47	46	74
COBALT	670	29	5U	10U	9U	28	40
COPPER	20U	30U	20U	40U	30U	40U	64
IRON	2900	26000	1100	5500	4400	50000	82000
LEAD	3U	21	20U	13	5	18	32
MAGNESIUM	80000	150000	23000	74000	69000	23000	13000
MANGANESE	160	890	130	460	470	1200	1700
MERCURY	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.29
NICKEL	110	170	49	120	100	67	110
POTASSIUM	31000	14000	30000U	5000U	4800U	5300U	6100U
SODIUM	150000	38000	100000	64000	61000	170000	10000
THALLIUM	3U	3U	3U	3U	3U	3U	3U
VANADIUM	6U	310	6	9U	8U	93	140
ZINC	280	0.01U	120U	170	160U	340	410

U indicates material analyzed for but not detected; the number is the minimum quantitation limit.

EPA's Environmental Services Division conducted additional sampling of the Cox, Klapper, and Cattle Springs, and the monitoring well MW-12 in December 1990. Two volatile organic compounds, PCE and TCE, were detected at estimated levels in the Cox Spring sample that were above the MCLs. An estimated level of PCE was detected in the Klapper Spring sample and an estimated level of toluene was found in the Cattle Spring sample, but both levels were below MCLs. No volatile organic contaminants were detected in the sample from MW-12. The results of the volatile organic analyses are summarized in Table 8.

The metals detected in the spring samples were common to a sedimentary environment. The levels of metals detected in the spring samples and the sample from MW-12 did not exceed MCLs. And though the minimum quantitation limits for lead and thallium were higher than the proposed MCLs, these metals were not detected during the RI when more sensitive analytical methods were used (see the analytical data in Tables 6 and 7). The results of the inorganic analyses of the samples collected in December 1990 are summarized in Table 9.

5.3.2 Soils

Site soils were also investigated during five separate events, one conducted by Kentucky and four by EPA. The Kentucky investigation in April 1987 included three soil samples, one background (TCD-02) and two samples (TCD-06 and TCD-07) obtained from the area around the waste sample locations. Figure 10 shows the soil sample locations. The background sample was collected from a depth of 4 inches, while TCD-06 was taken directly from the surface and TCD-07 was composited from the surface to a depth of 4 feet.

Few organic contaminants were detected in the soil samples. The greatest concentration observed was 2.8 ppm of methylphenol found in TCD-06. This compound was not detected in the background sample. In addition, TCD-06 contained two species of PCBs, Aroclor 1254 and Aroclor 1260, at concentrations less than 0.30 ppm. These compounds were below detectable limits in the other soil samples and also absent from the waste samples. For the majority of inorganic contaminants detected, onsite concentrations varied little from background conditions. The contaminants demonstrating significant concentrations above background were cadmium and mercury.

During the additional study conducted by EPA in May 1988 five composite surface soil samples were collected from sensitive areas, including two from gardens, two from yards, and one from the southeastern slope of the landfill. The sample locations were shown in Figure 11.

TABLE 8
EPA GROUNDWATER INVESTIGATION, DECEMBER 1990
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF VOLATILE ORGANIC ANALYSES (IN PPB)

PARAMETER	COX	KLAPPER	CATTLE	MW-12
CIS-1,2-DICHLOROETHENE	48J	5.0U	5.0U	5.0U
TETRACHLOROETHENE	250	0.77J	5.0U	5.0U
TOLUENE	21J	5.0U	0.58J	5.0U
1,1,1-TRICHLOROETHANE	100U	5.0U	5.0U	5.0U
TRICHLOROETHENE	12J	5.0U	5.0U	5.0U
VINYL CHLORIDE	100U	5.0U	5.0U	5.0U

U indicates that material was analyzed for but not detected. The number is the minimum quantitation limit.

J indicates an estimated value.

TABLE 9
EPA GROUNDWATER INVESTIGATION, DECEMBER 1990
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF INORGANIC ANALYSES

	COX	KLAPPER	CATTLE	MW-12
RESULTS IN PPB				
ALUMINUM	240	1100	580	43000
ARSENIC	30U	30U	30U	46
BARIUM	30	49	30	220
BERYLLIUM	5.0U	5.0U	5.0U	5.0U
CADMIUM	5.0U	5.0U	5.0U	5.0U
CHROMIUM	10U	10U	10U	67
COBALT	10U	10U	10U	22
COPPER	10U	10U	10U	36
LEAD	40U	40U	40U	40U
MANGANESE	150	51	25	650
MERCURY	0.2U	0.2U	0.2U	0.2U
NICKEL	20U	20U	20U	76
STRONTIUM	89	67	93	88
THALLIUM	100U	100U	100U	100U
TITANIUM	11	24	20	320
VANADIUM	10U	10U	10U	110
YTTRIUM	10U	10U	10U	34
ZINC	14	13	14	180
RESULTS IN PPM				
CALCIUM	82	29	91	20
IRON	0.22	1.1	0.58	92
MAGNESIUM	5.5	6.0U	5.2	13
POTASSIUM	2.0U	2.1	2.0U	7.2
SODIUM	3.6	1.5	9.1	8.0

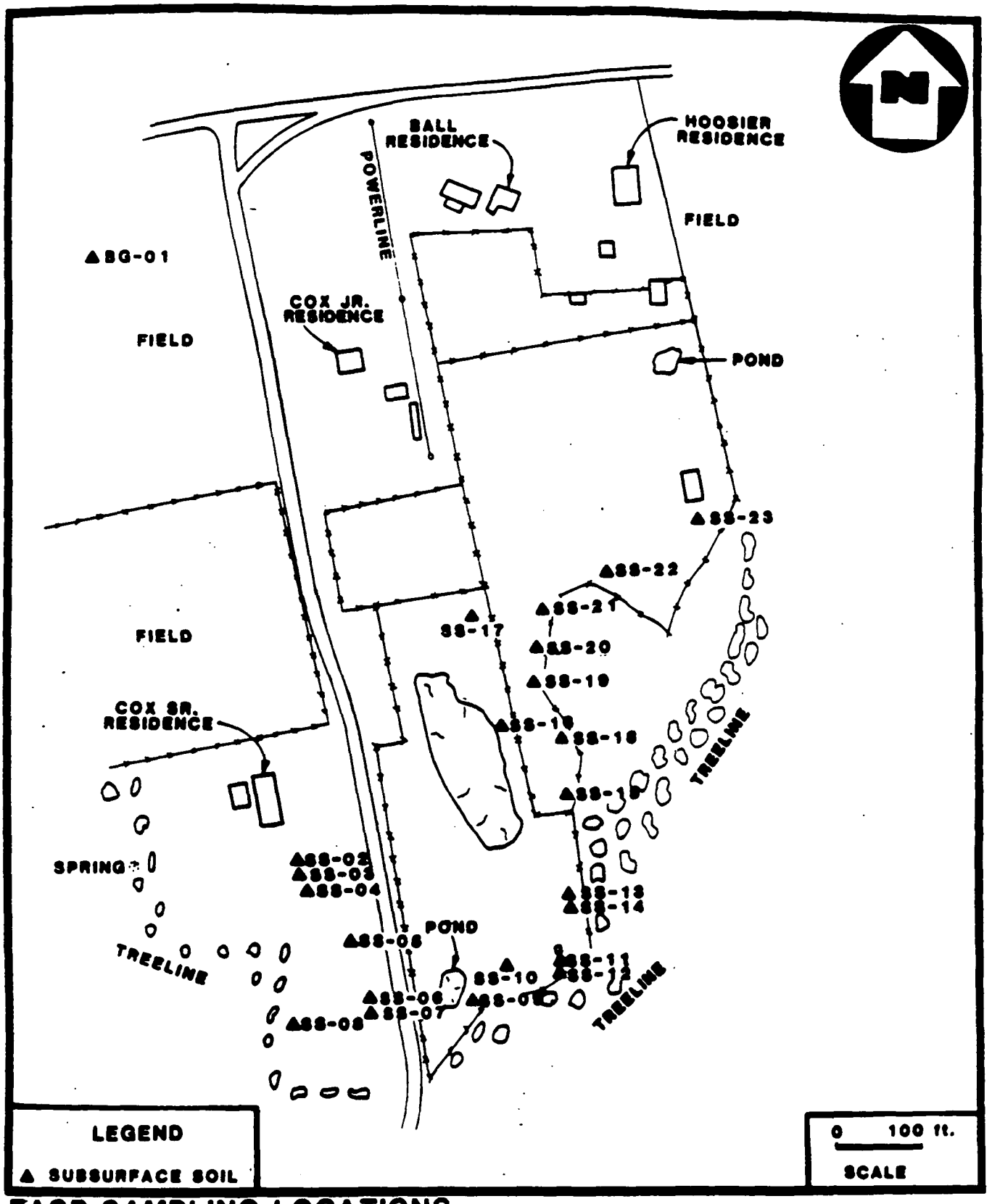
U indicates material was analyzed for but not detected;
the number is the minimum quantitation limit.

The results of the inorganic analyses showed that the surface soil sample TC-G-CS contained a number of metals. The metals present in highest concentrations were copper, lead, and zinc at 430 ppm, 210 ppm, and 870 ppm, respectively. These metals were also present in the samples collected from the yards (TC-F-CS and TC-D-CS) and the gardens (TC-B-CS and TC-E-CS), but in substantially lower concentrations. Cyanide was detected in all samples, but TC-G-CS and TC-D-CS contained the highest levels: 4.8 ppm and 5.4 ppm, respectively. Other inorganic contaminants of note that were present in TC-G-CS but absent from the yard and garden samples were cadmium and mercury at 2.4 ppm and 2.8 ppm, respectively.

Organic analyses of the soil samples revealed few positively identified compounds. Bis (2-ethylhexyl) phthalate and Aroclor-1254 were detected in the sample TC-G-CS at concentrations of 3700 ppb and 200 ppb, respectively. Both of these compounds were absent from the yard and garden samples. A number of polycyclic aromatic hydrocarbons (PAHs) were also detected in TC-G-CS in estimated concentrations that ranged from 89 to 440 ppb. These compounds were absent from the other soil samples collected. Toluene was detected at a level of 1000 ppb in the sample TC-B-CS, which was collected from a garden approximately 800 feet from the former disposal area. This compound was also observed in TC-G-CS and both yard samples at estimated concentrations ranging from 28 ppb to 2900 ppb. Sample TC-B-CS also contained a number of pesticides, with dieldrin and endosulfan appearing in the highest concentrations: 27 ppb and 14 ppb, respectively. These compounds were generally absent from the remaining soil samples, except TC-E-CS which contained 4,4'-DDT at a level of 7.6 ppb.

Subsurface soil samples were collected during the field analytical screening procedures (FASP) conducted by NUS Corporation in August 1988 to complement the geophysical survey. A total of 24 subsurface soil samples were collected, including one background sample. Sample locations are shown in Figure 14. The results of the field screening indicated the presence of VOCs in the subsurface soils in three sections of the landfill: the southwest corner, the southeast corner, and along the central section of the eastern boundary. Of these three areas, the highest concentrations of contaminants were found in the southwest corner of the landfill, which corresponds with the area in which the Emergency Removal Action was subsequently conducted. Elevated levels of 1,1-dichloroethane, trichloroethene, toluene, tetrachloroethene, ethyl benzene, and p-xylene were found in two samples from this area.

The southeast corner of the Site was represented by samples TC-SS-12, 13, and 14. Each of these samples contained elevated levels of PCE. In addition, samples TC-SS-12 and 14 contained 1,1-dichloroethane. VOCs were also detected in samples TC-SS-20, 21, and 23 along the eastern boundary of the landfill.



FASP SAMPLING LOCATIONS
TRI-CITY INDUSTRIAL DISPOSAL
BROOKS, BULLITT COUNTY, KENTUCKY

FIGURE 14

Surface soil samples (0-6") were collected from twenty locations during the Remedial Investigation, thirteen of the drilling locations and seven selected site locations. The sampling locations are shown in Figure 15.

Toluene was detected in the three samples TC-SS-07-1, 08-1, and 16-1 at levels between 30 ppb and 87 ppb. Toluene was also detected in the samples TC-SS-19-1 and 21-1 on the eastern edge of the former disposal area at estimated levels of 3 ppb and 5 ppb, respectively. Chloroform was detected in one sample, TC-SS-11-1, near Brushy Fork Creek at an estimated level of 3 ppb.

Four species of PAHs were detected at estimated levels ranging from 61 to 140 ppb in one surface soil sample, TC-SS-21-1, on the eastern edge of the landfill. This sample also contained 490 ppb of Aroclor 1260, which is below EPA's clean-up level of 0.5 to 1 ppm to achieve a E-6 cancer risk level. One phthalate was detected at an estimated level of 120 ppb in the duplicate of TC-SS-03-1 on the southeastern edge of the disposal area.

The majority of the metals levels in the surface soil samples were comparable to the levels in the background sample TC-SS-01 and were typical of a sedimentary environment characterized by limestones, shales, and siltstones. The analytical results are summarized in Table 10 as data ranges for each contaminant.

A total of 27 subsurface soil samples were collected from 25 locations corresponding with the monitoring wells that were attempted and completed during the Remedial Investigation. Sample locations are shown in Figure 13. Sample depths varied from two to seventeen feet.

Volatile organic compounds (VOCs) were found in three subsurface soil samples. An estimated level of 5 ppb PCE was found in the soil boring closest to the southernmost disposal trench, TC-SB-03, at a depth of 5 to 7 feet, and the duplicate contained an estimated 3 ppm each of PCE and toluene. Fifteen different PAH compounds and dibenzofuran were also found at this sample location in the interval from 11 to 13 feet. Four species of PAHs were found in the sample collected from 5 to 7 feet, and its duplicate contained three PAHs and two phthalates. One phthalate was found in TC-SB-01 at 10 to 12 feet and acetone was found in TC-SB-02 at 2 to 4 feet.

The metals levels in the subsurface soil samples were comparable to the levels found in the surface soil samples. The analytical results are summarized in Table 10 as ranges of data for each contaminant.

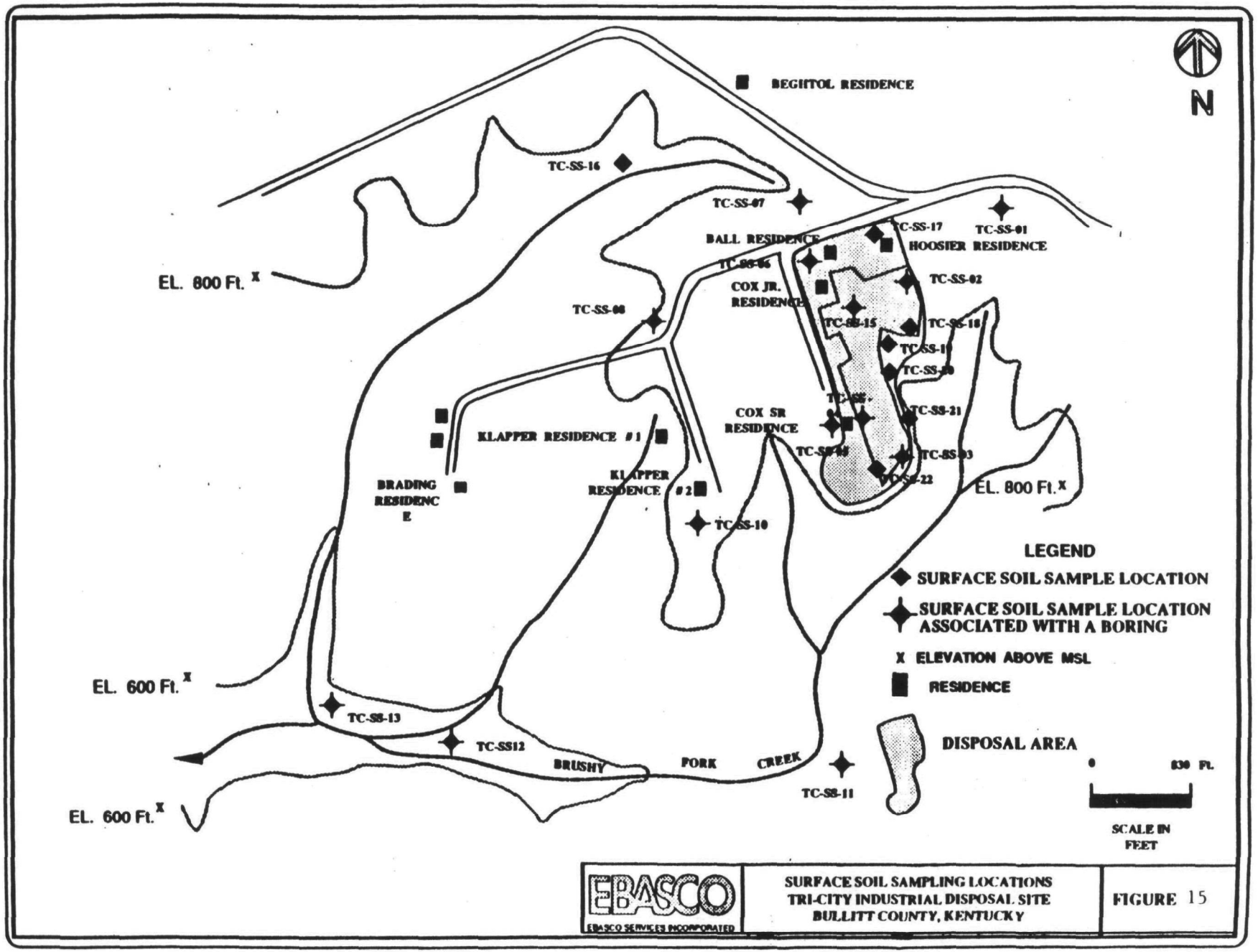

N
BEGHTOL RESIDENCE
TC-SS-16
TC-SS-07
BALL RESIDENCE
TC-SS-17
TC-SS-01
HOOSIER RESIDENCE
TC-SS-06
TC-SS-02
COX JR. RESIDENCE
EL. 800 Ft. X
TC-SS-08
TC-SS-15
TC-SS-18
TC-SS-19
TC-SS-20
TC-SS-21
COX SR RESIDENCE
KLAPPER RESIDENCE #1
TC-SS-03
BRADING RESIDENCE
KLAPPER RESIDENCE #2
TC-SS-22
EL. 800 Ft. X
TC-SS-10
LEGEND
SURFACE SOIL SAMPLE LOCATION
SURFACE SOIL SAMPLE LOCATION ASSOCIATED WITH A BORING
X ELEVATION ABOVE MSL
RESIDENCE
EL. 600 Ft. X
TC-SS-13
TC-SS12
BRUSHY
FORK
CREEK
TC-SS-11
DISPOSAL AREA
0
830 Ft.
EL. 600 Ft. X
SCALE IN FEET
EBASCO
EBASCO SERVICES INCORPORATED
SURFACE SOIL SAMPLING LOCATIONS
TRI-CITY INDUSTRIAL DISPOSAL SITE
BULLITT COUNTY, KENTUCKY
FIGURE 15

TABLE 10
RI SURFACE & SUBSURFACE SOILS SAMPLING, 1989
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF INORGANIC ANALYSES AS RANGES OF DATA (IN PPM)

CONTAMINANT	SURFACE SOILS	SUBSURFACE SOILS
ALUMINUM	4,400J - 190,000J	9,000 - 49,000
ARSENIC	4.5 - 19	4.1 - 31J
BARIUM	85 - 320	37 - 370
BERYLLIUM	1.2 - 2.3	1.1 - 3.7
CADMIUM	2 - 4	4 - 13JN
CALCIUM	580 - 4,000	440J - 14,000J
CHROMIUM	10 - 120	11 - 110
COBALT	11 - 38	1.8J - 36J
COPPER	6.1 - 84J	7.6 - 37J
IRON	11,000 - 55,000	13,000J - 62,000J
LEAD	16J - 66J	6J - 71
MAGNESIUM	310 - 2,600	700 - 22,000
MANGANESE	80J - 3,900J	62J - 2,500J
MERCURY	--	--
NICKEL	12 - 100	10 - 86J
POTASSIUM	420 - 1,500	500 - 3,300
SODIUM	260	250 - 330
VANADIUM	18 - 86	23 - 130
ZINC	37J - 130J	46J - 300J

J indicates an estimated value

N indicates presumptive evidence of material

-- indicates material not detected above minimum quantitation limit

Three surface soil samples (0-3") in the vicinity of the monitoring well MW-12 were collected by EPA during the December 1990 investigation. These sample locations are sufficiently removed from the disposal areas at the Tri-City Site to be indicative of background conditions. Analytical results indicated that the concentrations of metals in the soil samples were common to a sedimentary environment dominated by limestones, shales, and siltstones. Low concentrations of mercury were detected in each soil sample, but mercury is found in sedimentary environments and is often associated with carbonaceous materials such as limestones and shales. Mercury was not detected in any of the soil samples collected during the RI. The results of the metals analyses from the December 1990 sampling event are summarized in Table 11 as ranges of data for each contaminant. No purgeable organic compounds were found in the samples.

5.3.3 Surface Water

The surface water was investigated in July 1989 during the RI. A total of seven surface water samples, including a duplicate of SW-06, were collected at the locations shown in Figure 16. Four samples were collected from Brushy Fork Creek (one upstream, two directly south of the Site, and one downstream), and one sample each was collected from the two unnamed intermittent streams discharging to Brushy Fork Creek. Chloroform was detected in the duplicate of SW-06 at an estimated level of 2 ppb. TCE was detected in SW-02 at an estimated level of 1 ppb. And, toluene was detected in SW-04 at an estimated level of 4 ppb.

Barium and potassium were detected in all of the surface water samples, except the upgradient sample. Nickel and aluminum were found only in SW-05, which was collected from an intermittent creek entering Brushy Fork Creek on the side opposite from the Site. Manganese was detected in SW-05 and in the upgradient sample. The other metals levels were comparable across all samples. The analytical results from the metals analyses are summarized in Table 12.

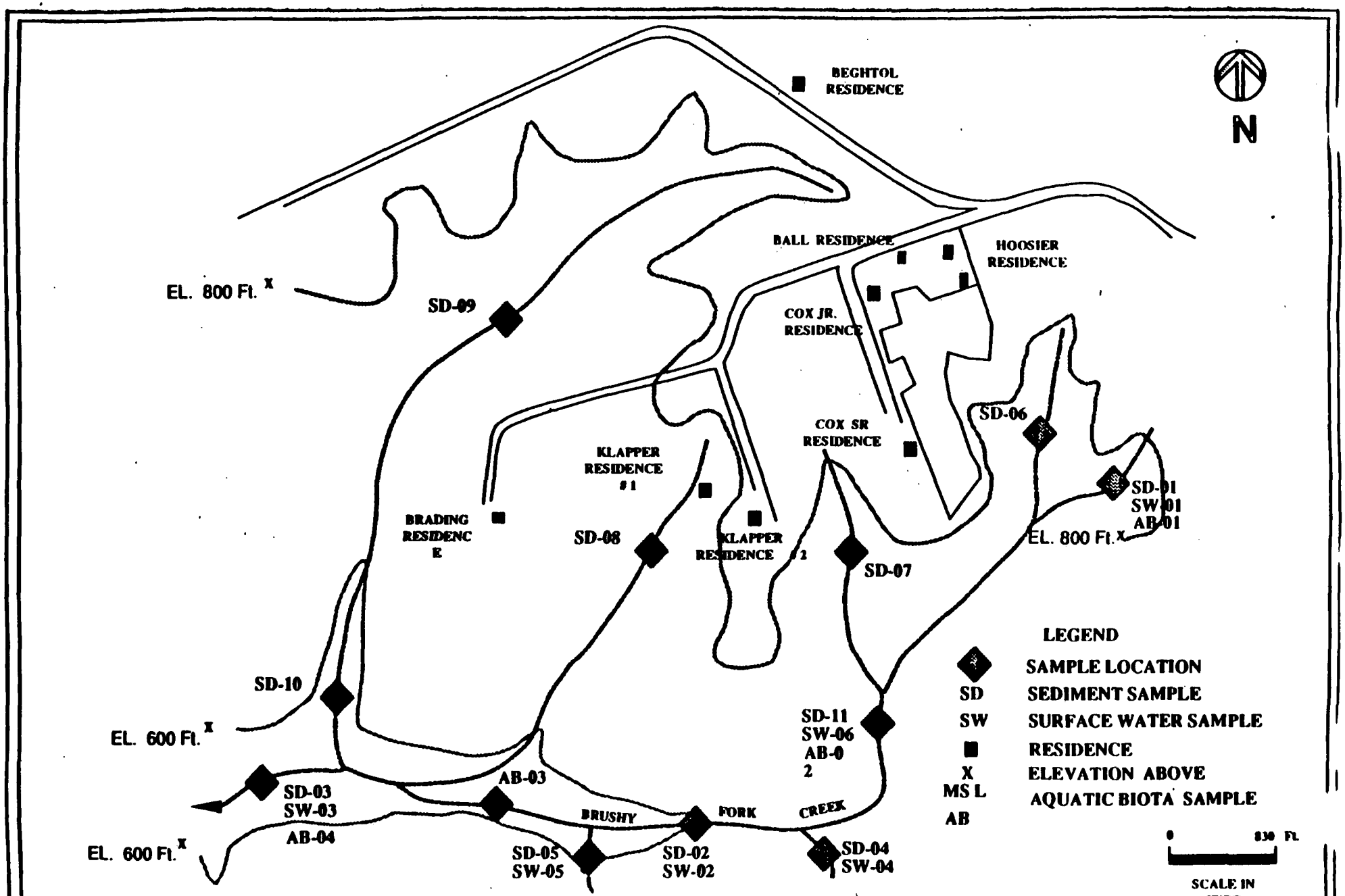
5.3.4 Sediments

Two sediment samples were collected by the Cabinet during the April 1987 investigation, one background sample corresponding to the water sample from Brading Spring No. 1 and one sample corresponding to the water sample from the unnamed spring on the southeastern slope of the former disposal area. The unnamed spring sediment sample had greater concentrations of the inorganic compounds detected (i.e., arsenic, barium,

TABLE 11
EPA SURFACE SOILS INVESTIGATION, DECEMBER 1990
SUMMARY OF INORGANIC ANALYSES AS RANGES OF DATA (IN PPM)

CONTAMINANT	CONCENTRATION
ALUMINUM	6,300 - 8,600
ARSENIC	10U - 15U
BARIUM	67 - 94
BERYLLIUM	0.50U - 1.0U
CADMIUM	0.50U - 1.0U
CALCIUM	2,300 - 2,500
CHROMIUM	8.4 - 13
COBALT	6.7 - 11
COPPER	6.5 - 9.6
IRON	11,000 - 21,000
LEAD	16 - 17
MAGNESIUM	980 - 2,400
MANGANESE	660 - 910
MERCURY	0.06 - 0.10
NICKEL	12 - 23
POTASSIUM	600 - 920
SODIUM	100U - 200U
VANADIUM	14 - 20
ZINC	40 - 60

U indicates material was analyzed for but not detected; the number is the minimum quantitation limit.



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SURFACE WATER, SEDIMENT AND AQUATIC BIOTA SAMPLE LOCATIONS
TRI-CITY INDUSTRIAL DISPOSAL
BULLITT COUNTY, KENTUCKY

FIGURE 16

TABLE 12

RI SURFACE WATER SAMPLING, JULY 1989

TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY

SUMMARY OF INORGANIC ANALYSES (IN PPB)

CONTAMINANT	SW-01	SW-02	SW-03	SW-04	SW-05	SW-06	SW-07
Aluminum	700U	60U	100U	40U	1,600	140U	40U
Barium	40U	33	37	35	55	35	33
Calcium	70,000	48,000	51,000	50,000	62,000	48,000	51,000
Iron	960	1U	170	1U	3,000	180	40U
Magnesium	9,700	12,000	13,000	13,000	13,000	12,000	12,000
Manganese	22	8U	8U	8U	230	8U	8U
Nickel	20U	6U	6U	6U	10	6U	6U
Potassium	1,500U	2,000	2,000	1,900	2,200	1,900	1,800
Sodium	4,600	6,500	6,000	6,300	7,700	6,200	6,200

U indicates that material was analyzed for but not detected; the number is the minimum quantitation limit.

cadmium, chromium, lead, mercury, and silver) than the background sample. The concentration of the organic contaminant, cis-1,3-dichloropropene, found in the unnamed spring sediment sample was just slightly elevated above the background level.

A total of eleven sediment samples were collected concurrently with the surface water samples in July 1989 during the Remedial Investigation. Four of the sediment samples were collected from Brushy Fork Creek at the surface water sampling locations, two were collected from the intermittent streams flowing into Brushy Fork Creek at the surface water sampling locations, and five were collected from the developed drainage paths of the springs originating from the Site. The sediment sampling locations are shown in Figure 16.

Several VOCs were found in the sediment sample SD-07 collected from the drainage pathway of the Cox Spring. Toluene, acetone, and methyl ethyl ketone were detected at 15 ppb, 110 ppb, and 170 ppb, respectively, in SD-07. One phenol was detected at estimated levels of 430 ppb and 250 ppb in the sediment sample SD-11, and its duplicate SD-12, collected from Brushy Fork Creek below the confluence with the Cox Spring drainage pathway.

The levels of the metals found in the sediment samples were comparable to the levels in the upgradient sample, except for the sample taken from the drainage pathway of the unnamed spring SD-06. That sample contained the highest levels of most of the metals, including lead and chromium. The results of the metals analyses are summarized in Table 13.

5.3.5 Air

Air monitoring at the Tri-City Site was conducted during the Remedial Investigation. Monitoring included the collection of ambient air samples and real-time air monitoring using direct reading instruments during the Phase II drilling activities. Three sampling locations were selected based on the locations of the residences relative to the landfill areas, the prevailing wind directions at the time of the air sample collection, and site operations. Ambient 8-hour air samples were taken at the sampling stations prior to disturbance of the soil so that pre-work site conditions could be documented. Subsequent samples were obtained at the stations once a week during drilling activities, resulting in a total of four samples at each location. Duplicate samples were taken at the location next to the Cox, Jr. residence. The sampling locations are shown in Figure 17.

TABLE 13
RI SEDIMENT SAMPLING, JULY 1989
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF INORGANIC ANALYSES (IN PPM)

CONTAMINANT	SD-01	SD-02	SD-03	SD-04	SD-05	SD-06
Aluminum	13,000	8,500	7,700	8,700	10,000	15,000J
Arsenic	12	7J	8.9J	5UJ	7.6J	19
Barium	110	68	67	73	96	220
Cadmium	1.3UJ	1.2U	0.97U	0.99U	1.4U	2UJ
Calcium	5,100	3,700	2,000	3,700	5,200	5,400
Chromium	33	19	83JN	11	35	160
Cobalt	26	12	16	13	17	32
Copper	20UJ	20U	9U	20U	20U	52J
Iron	31,000	23,000	42,000	22,000	29,000	44,000
Lead	28J	21	26	18	24J	610J
Magnesium	2,600	2,200	2,500	2,800	2,900	1,700
Manganese	2,000J	830	1,100	730	610	1,900J
Mercury	0.17UJ	0.2U	0.1U	0.1U	0.2U	0.24J
Nickel	35	22	27	23	30	40
Potassium	1,500	1,100	1,100	1,200	1,300	1,100
Sodium	100U	560U	460U	470U	680U	330U
Vanadium	40	26	44	20	32	58
Zinc	110J	76	93	67	120	140J

U indicates that material was analyzed for but not detected; the number is the minimum quantitation limit.

J indicates an estimated value

N indicates presumptive evidence of presence of material

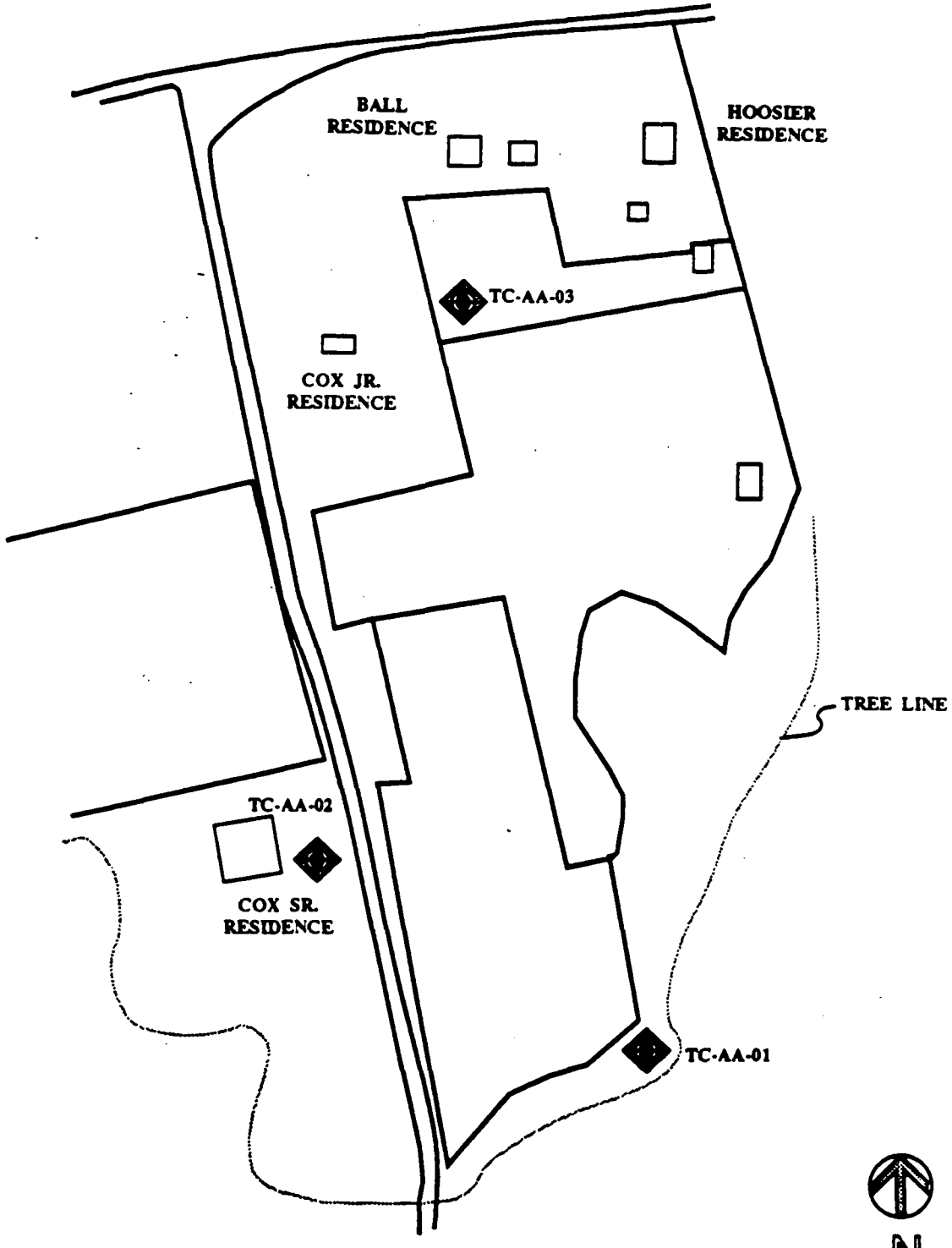
TABLE 13 (cont'd)
RI SEDIMENT SAMPLING, JULY 1989
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY
SUMMARY OF INORGANIC ANALYSES (IN PPM)

CONTAMINANT	SD-07	SD-08	SD-09	SD-10	SD-11	SD-12
Aluminum	10,000J	11,000	9,600J	8,300	7,400	8,300
Arsenic	8	7.5	11	6.9J	7.2J	4.9J
Barium	120	87	150	96	63	69
Cadmium	1.8UJ	1.1UJ	0.97UJ	0.99U	1.2U	1.3U
Calcium	14,000	8,800	3,800	3,400	4,800	4,600
Chromium	20U	20U	39	25	17	19
Cobalt	30U	20U	28	16	13	13
Copper	20UJ	20UJ	7UJ	20U	12	20U
Iron	19,000	26,000	28,000	24,000	22,000	23,000
Lead	39J	20J	36J	36	41	46
Magnesium	1,300	4,800	2,300	19	2,000	2,200
Manganese	2,500J	980J	3,100J	1,400	680	710
Mercury	0.25UJ	0.15UJ	0.13UJ	0.1U	0.2U	0.2U
Nickel	24	30	28	20	20	20
Potassium	820	1,500	1,100	900	820	1,000
Sodium	140U	150U	2.1U	470	580U	620U
Vanadium	26	23	37	27	24	26
Zinc	110J	120J	62J	71	67	74

U indicates that material was analyzed for but not detected; the number is the minimum quantitation limit.

J indicates an estimated value

N indicates presumptive evidence of presence of material



EBASCO SERVICES INCORPORATED

AMBIENT AIR SAMPLING LOCATIONS
TRI-CITY INDUSTRIAL DISPOSAL SITE
BULLITT COUNTY, KENTUCKY

FIGURE 17

Methylene chloride was found in three of the four samples collected at location AA-01, once at the location next to the Cox, Sr. residence, and once at the location next to the Cox, Jr. residence. PCE was found in two of the samples from location AA-01 at a level of 3.7 ppb and an estimated level of 4.5 ppb. Freon 113 was tentatively identified as being an air contaminant at all locations, but it was not identified during all sampling events. The highest Freon 113 concentrations were found at location AA-01. The only tentatively identified organic compounds were aliphatic aldehydes, which were found at all locations.

No consistent pattern of air contamination was found other than PCE, which was detected when the wind blew up the faces of the Cox Lobe. PCE was found during sampling events when the air speed was at its lowest, which potentially indicates that the contamination source was close to the sampling location.

The samples from location AA-01 contained the largest number of contaminants. Methylene chloride, Freon 113, and aliphatic aldehyes have not previously been identified with waste disposal activities nor were they found in any other media sampled during the RI.

6.0 SUMMARY OF SITE RISKS

CERCLA directs that EPA must protect human health and the environment from current and future exposure to hazardous substances at Superfund sites. In order to assess the current and future risks from the Tri-City Industrial Disposal site, a baseline risk assessment was conducted as part of the Remedial Investigation. This section of the Record of Decision summarizes the Agency's findings concerning the impact to human health and the environment if contaminated media (i.e., soils, ground water) at the Site were not remediated. The baseline risk assessment is included in the RI Report as Appendix F.

6.1 Human Health Risks

6.1.1 Contaminants of Concern

Table 14 provides a comprehensive list of the contaminants identified as chemicals of potential concern at the Site in their various media. The contaminants of concern are ten organic chemicals and nine inorganic chemicals. Table 14 also includes the reasonable maximum exposure limits which were used in calculating the carcinogenic and noncarcinogenic risks associated with each chemical.

TABLE 14

CONTAMINANTS DETECTED
TRI-CITIES INDUSTRIAL DISPOSAL SITE

COMPOUND	NO. OF DETECTIONS	MINIMUM	MAXIMUM	RME LIMIT
SURFACE SOIL				
Organics (ppb)				
Toluene	4/15	U	1600	310
PAHs	2/15	U	1309	49
Bis(2-ethylhexyl)phthalate	1/15	U	3700	330
PCBs	2/15	U	490	43
Inorganics (ppm)				
Barium	14/15	U	320	180
Beryllium	4/15	U	2.1	1.4
Chromium	14/15	U	430	1.14
Copper	8/15	U	430	47
Nickel	6/15	U	100	100
Lead	15/15	16	210	39
Vanadium	13/15	U	86	51
Zinc	15/15	40	870	220
SUBSURFACE SOIL				
Organics (ppb)				
Tetrachloroethylene	2/9	U	5	6.5
Toluene	1/9	U	3	6.5
PAHs	2/9	U	480	43
Inorganics (ppm)				
Beryllium	5/9	U	3.7	2.2
Cadmium	1/9	U	10	3.8
Chromium	9/9	24	74	5.85
Nickel	9/9	10	66	45
Lead	9/9	11	71	53.5
Zinc	9/9	52	170	160
SEDIMENT				
Organics (ppb)				
Toluene	1/4	U	15	310
Inorganics (ppm)				
Barium	4/4	87	200	220
Chromium	2/4	U	160	160
Copper	1/4	U	52	52
Lead	4/4	20	610	379
SPRING WATER				
Organics (ppb)				
Vinyl Chloride	3/9	U	32	20
1,1-Dichloroethane	4/9	U	4	65
1,1,1-Trichloroethane	6/9	U	11	10.5
Trichloroethane	5/9	U	47	35
Tetrachloroethylene	8/9	U	560	420
1,2-Dichloroethylene	5/9	U	280	42
AMBIENT AIR				
Tetrachloroethylene ($mg/10^3$)	2/12	U	28	2.8

6.1.2 Exposure Assessment

The objective of the exposure assessment is to estimate the type and magnitude of potential exposures to the chemicals of concern that are present at the site. The results of the exposure assessment are combined with chemical-specific toxicity information to characterize potential risks.

The primary human receptors at the Site are the inhabitants of the four residences in the former disposal area. These individuals may currently be exposed to site-related contaminants in surface soil, surface water, sediment, and air. Potential future exposures would include those pathways, as well as ground water/spring water and sub-surface soils. Although the ground water/spring water is not currently being used as a drinking water source, EPA and the Commonwealth of Kentucky have classified the aquifer as a Class II-B aquifer, a resource which should be maintained at drinking water quality.

The current exposure pathways considered were (1) dermal contact and incidental ingestion of surface soils, (2) ingestion of garden crops raised on-site, (3) ingestion of beef cattle raised on-site, and (4) inhalation of volatile organic compounds (VOCs) in ambient air. The future pathways considered include the current pathways and the following: (1) dermal contact and incidental ingestion of exposed sub-surface soils, (2) ingestion of spring water, and (3) inhalation of VOCs released from spring water while showering.

Table 15 provides the exposure and intake assumptions which were used in the baseline risk assessment.

6.1.3 Toxicity Assessment

The toxicity assessment was conducted to further determine the potential hazard posed by the chemicals of concern for which exposure pathways have been identified. Available evidence was weighed with regards to the potential of particular contaminants to cause adverse effects in exposed individuals and to provide, where possible, an estimate of the relationship between the extent of exposure to a contaminant and the increased likelihood and/or severity of adverse effects.

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg/day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with

TABLE 15

EXPOSURE AND INTAKE ASSUMPTIONS FOR
DERMAL CONTACT AND INGESTION OF SURFACE (PRESENT)
AND SUBSURFACE (FUTURE) SOIL PATHWAY MODELING

	LOCAL RESIDENTS - AGE GROUPS (YEARS)				
	0-1	2-6	7-11	12-17	18-70
Dermal Exposure to Soil (day/year)	38	155	103	103	78
Dermal Exposure to Sediment/Water (day/year)	0	22	44	44	22
Duration of Exposure (years)	2	5	5	6	30
Dermal Soil Deposition (mg/cm^2)	1.4	1.4	1.4	1.4	1.4
Skin Surface Area Exposed (cm^2)	1700	2200	3800	5900	2000
Dermal Absorption Factors: Soil					
Semivolatile Organics	1.2%	1.2%	1.2%	1.2%	1.2%
Volatile Organics	5%	5%	5%	5%	5%
Metals	1%	1%	1%	1%	1%
Dermal Absorption Factors: Sediment/ Water					
Semivolatile Organics	12%	12%	12%	12%	12%
Volatile Organics	100%	100%	100%	100%	100%
Metals	1%	1%	1%	1%	1%
Gut Absorption Factors:					
Metals, Semivolatiles	100%	100%	100%	100%	100%
Volatile Organics	100%	100%	100%	100%	100%
Soil Ingestion (mg/day)	100	200	100	100	100

Sources: Skin surface areas exposed are from Anderson, et al., (1984); other parameter values were derived as described in the text.

exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. CPFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic (systemic) effects. RfDs, which are expressed in units of mg/kg/day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, which will result in no adverse health effects. Estimated intakes of chemicals from environmental media (i.e., the amount of chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (i.e., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

The Agency has derived CPFs and RfDs for the contaminants of concern at the site for use in determining the upper-bound level of cancer risk and non-cancer hazard from exposure to a given level of contamination. These values are provided in Tables 16 and 17, respectively.

6.1.4 Risk Characterization

The risk characterization step of the baseline risk assessment process integrates the toxicity and exposure assessments into quantitative and qualitative expressions of risk. The output of this process is a characterization of the site-related potential noncarcinogenic and carcinogenic health effects.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (i.e., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of 1E-6 indicates that, as a plausible upper-bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

TABLE 16

TOXICOLOGIC CRITERIA VALUES FOR
CARCINOGENIC HEALTH EFFECTS
TRI-CITIES INDUSTRIAL DISPOSAL SITE

SUBSTANCE	WEIGHT OF EVIDENCE CLASSIFICATION	ORGAN(S) AFFECTED	CANCER POTENCY FACTOR (SLOPE FACTOR) (mg/kg/day)$^{-1}$		
			ORAL	INHALATION	SOURCE
Beryllium	B2	Lung	*[1]	8.4	IRIS
Cadmium	B1	Lung, Respiratory Tract	*	6.1	IRIS
Carcinogenic PAHs	B2	Lung, Reproductive System, Digestive Tract	11.5[4]	6.1[4]	HEAST
Chromium	A[2]	Lung	*	41[2]	IRIS
1,1-Dichloroethane	C	Hemangiosarcoma	0.091	NA	IRIS
Nickel	A[3]	Respiratory Tract	*	0.84[3]	HEAST
Polychlorinated Biphenyls	B2	Liver	7.7	NA	IRIS
Tetrachloroethene	B2	Leukemia, Liver	0.051	0.0033	HEAST
Trichloroethylene	B2	Lung, Liver	.011	.017	HEAST
Vinyl Chloride	A	Lung	2.3	0.29	HEAST

Notes: 1/ * = Not carcinogen by this route

2/ Values given are for hexavalent chromium

3/ Value given is for nickel refinery dust

4/ Values given are for benzo(a)pyrene; this value is currently under review by EPA

NA = Not Available

TABLE 17

TOXICOLOGICAL CRITERIA VALUES FOR NONCANCER HEALTH EFFECTS
TRI-CITIES INDUSTRIAL DISPOSAL SITE

	ORAL EXPOSURE			INHALATION EXPOSURE			
SUBSTANCE	RfD (mg/kg/day)$^{-1}$	UNCERTAINTY FACTOR	ORGAN(S) AFFECTED	RfD (mg/kg/day)$^{-1}$	UNCERTAINTY FACTOR	ORGAN(S) AFFECTED	SOURCE
Barium	$5x10^{-2}$	100	Blood	$1x10^{-4}$	1000	Fetotoxicity	IRIS
Beryllium	$5x10^{-3}$	100	NA	NA	NA	NA	IRIS
Cadmium	$5x10^{-4}$	10	Kidney	NA 1/	NA	NA	IRIS
Chromium	$5x10^{-3}$	500	Not Defined	NA 1/	NA	NA	IRIS
Copper	$3.7x10^{-2}$	None	Gastric Irrit.	NA 2/	NA	NA	HCL
Lead	NA 3/			NA 3/			
Nickel	$2x10^{-2}$	300	Reduced Org. Wt.	NA 1/	NA	NA	IRIS
Vanadium	$9x10^{-3}$						HEAST
Zinc	$2x10^{-1}$	10	Anemia	NA	NA	NA	HEAST
1,1-Dichloroethene	$1x10^{-1}$	1000	NA	$1x10^{-1}$	1000	Kidney	HEAST
1,2-Dichloroethene	0.02						HEAST
1,1,1-Trichloroethane	$3x10^{-1}$	1000	Hepatoxicity	$9x10^{-2}$	1000	Hepatoxicity	IRIS
Tetrachloroethene	$1x10^{-2}$	100	Liver	NA 1/	NA	NA	HEAST
Toluene	$3x10^{-1}$	100	Eye & Nose Irrit.	2	100	Cent. Nerv. Sys.	HEAST
Noncarcinogenic PAHs	$4x10^{-3}$	100	Ocular Lesions	NA 1/	NA	NA	HEAST

Notes: 1/ No RfD available for this route of administration, value for the other route was used in risk assessment.
2/ No RfD available for this route of administration, substance not included in quantitative assessment.
3/ No RfD values are available for lead; risk characterization will involve the use of EPA's biokinetic model, as explained in the text.
4/ Value given is for naphthalene.

EPA has set an acceptable carcinogenic risk range of 1E-4 to 1E-6, but prefers that remediation of Superfund sites achieve a residual cancer risk no greater than 1E-6. However, depending upon site factors, a risk of 1E-4 may be considered protective. The calculated upper-bound risks from the ingestion of beef from cattle raised on-site would fall just outside the lower limits of this risk range (2E-4). This risk level is based on the detection of PAHs and one species of PCB in one out of twenty surface soil samples collected during the Remedial Investigation. The reasonable maximum exposure (RME) was based on this detection and half the detection limit for the other samples. Because of this low frequency of detection, it is recommended that the presence of these carcinogenic compounds be verified through additional sampling. The risk assessment should then be revised to include the new data.

Two of the future exposure pathways, ingestion of spring water and inhalation of VOCs while showering, exceed EPA's acceptable carcinogenic risk range. The calculated risk levels are 2E-3 and 1E-4, respectively. The contaminated spring water should be remediated.

The carcinogenic upper-bound risk for each of the exposure pathways (current and future) identified at the site are summarized below:

	Lifetime Cancer Risk	
Exposure Pathways	Current	Future
Inhalation of Air	2.5E-5	2.5E-5
Ingestion of Spring Water	NA	1.8E-3
Inhalation of VOCs while Showering	NA	1.2E-4
Ingestion of Garden Crops	8.9E-5	8.9E-5
Ingestion of Beef	2.3E-4	2.3E-4
Contact with Surface Soils	7.3E-7	7.3E-7
Contact with Sub-Surface Soils	NA	2.6E-7
Total Risk	3.4E-4	2.3E-3

NA - Not Applicable

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may be reasonably exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The HQs and HIs for the exposure pathways (current and future) identified at the site are summarized below:

Exposure Pathways	Hazard Quotient Current	Future
Inhalation of Air	6.9	6.9
Ingestion of Spring Water	NA	1.9
Inhalation of VOCs while Showering	NA	3.9E-1
Ingestion of Garden Crops	4.8E-2	4.8E-2
Ingestion of Beef	1.1E-2	1.1E-2
Contact with Surface Soils	2.4E-1	2.4E-1
Contact with Sub-Surface Soils	NA	6.1E-1
Hazard Index	7.2	1.0E+1

NA - Not Applicable

The HQ for the air pathway and the drinking water pathway both exceed unity. The HQ for the drinking water pathway was based on the presence of various chemicals at concentrations exceeding EPA's Maximum Contaminant Levels (MCLs) for drinking water.

The HQ for the air pathway was based on one chemical, tetrachloroethene, which was detected in two out of twelve samples taken on-site. The RME was based on these two detections and half of the detection limit for the other ten samples. A source for the presence of this contaminant in the air has not been identified. Additional sampling is recommended to identify and define any sources. The risk characterization should then be revised to include the new data.

6.1.5 Risk Uncertainty

There is a generally recognized uncertainty in human risk values developed from experimental data. This is primarily due to the uncertainty of extrapolation in the areas of (1) high to low dose exposure and (2) animal data to values that are protective of human health. The site specific uncertainty is mainly in the degree of accuracy of the exposure assumptions. Most of the exposure assumptions used in this, and any, risk assessment have not been fully verified. For example, the degree of chemical absorption from the gut or through the skin or the amount of soil contact that may occur is not known with certainty. Generally accepted default values provided in Agency guidance were used when available.

In the presence of such uncertainty, the Agency and the risk assessor have the obligation to make conservative assumptions such that the likelihood is very small, approaching zero, for the actual health risk to be greater than that determined through the risk assessment process. On the other hand, the process is not intended to yield conservative risks values that have no basis in reality. That balance was kept in mind in the development of exposure assumptions and pathways and in the interpretation of data and guidance for this baseline risk assessment.

6.2 Environmental Risks

No ecological surveys or impact assessments were performed on the Site prior to the RI. As part of the scope of RI activities, an aquatic survey of Brushy Fork Creek was performed in July 1989 and reported in the RI Report. Surveys of terrestrial species (i.e, plants, animals, and birds) were not included in the scope of work.

Sampling stations for the aquatic survey were established along the creek and corresponded with surface water sampling locations when possible. The sampling stations are shown in Figure 16. Physical and chemical stream parameters were measured at all stations. Benthic macroinvertebrates were quantitatively sampled at each station, identified, and the diversity and tolerance levels of each population were determined in the laboratory. Benthic macroinvertebrates represent an ideal indicator community of water quality because they are fairly immobile, abundant, easily collected, and exhibit a varied degree of tolerance to pollutants. In addition to the benthic macroinvertebrate collections, the fish population was analyzed to determine the ability of the stream to support edible fish populations, and, if so, if this population posed a threat to human health by being utilized as a food source.

Diversity indices of the benthic macroinvertebrate populations were calculated at each station. High diversities indicate that the individuals comprising a population are distributed among a large number of species. High diversities are typically characteristic of high water quality streams where the benthic macroinvertebrate population consists of a large number of less tolerant species with each species represented by a few individuals. Low diversities are commonly associated with polluted or disturbed streams in which species tolerant of pollution or disturbance replace the less tolerant species in the population. The result is a small number of tolerant species with each species represented by a large number of individuals.

The stations had similar physiochemical parameters (i.e., temperature, pH, dissolved oxygen concentration, and specific conductivity) and the benthic populations sampled at each station could be compared directly. The diversity indices varied only slightly and did not indicate any drastic changes between the stations. The indices were moderately high indicating good to fair water quality and the individuals were evenly distributed among the species. Although there were species or groups which dominated the population at a given station, a large number of species with few representatives maintained the diversity at each station.

The biotic indices increased slightly at the downstream stations, TC-AB-03 and TC-AB-04, suggesting the possibility of some organic enrichment entering the creek from a non-human source. However, the high diversity at the sampling stations indicates that there are no serious point source pollutants entering the stream. The possibility exists that this enrichment is a result of residential and agricultural sources rather than the Tri-City Site.

An assessment of the fish population of Brushy Fork Creek was made at the downstream station (TC-AB-04) in order to determine species composition, relative abundance, and the presence of edible species. Five species of juvenile fish were collected from the creek, indicating that natural reproduction of these species was occurring within this particular stream reach. The fish that were collected or observed were too small to be a food supply and were not the typical species for sport fishing or human consumption.

Eleven sediment samples were collected in July 1989 during the RI. The sampling locations are shown in Figure 16. The data from the analyses of the sediment samples was discussed in Section 5.3.4.

Although sediment quality criteria have not been established for metals, effects levels have been estimated for aquatic biota by the National Oceanic and Atmospheric Administration (NOAA) based on the response of test organisms to single toxins, including metals. The effects range-lower (ER-L) value is an approximation of the concentration of a single analyte at which adverse effects were first detected. ER-L values are not to be construed as NOAA standards or criteria. And, since there is a low degree of confidence in the accuracy of some of the values due to inconsistent or insufficent data, these values may not be ecologically protective. Table 18 shows the ER-L values for the metals pertaining to the Site and the corresponding degrees of confidence.

TABLE 18

SUMMARY OF ER-L CONCENTRATIONS
FOR METALS IN SEDIMENT

CONTAMINANT	ER-L CONCENTRATION	DEGREE OF CONFIDENCE
Arsenic	33 ppm	Low
Chromium	80	Moderate
Lead	35	Moderate
Mercury	0.15	Moderate
Nickel	30	Moderate

NA = Not Available

Sediment samples 01, 04, and 05 were located on tributaries to Brushy Fork Creek which were not influenced by surface and groundwater originating from the Tri-City Site. With the exception of SD-05, the metals levels detected in these samples were below the ER-L. The nickel level in SD-05 was equivalent to the ER-L.

Sediment sample SD-06 was located in the drainage pathway from the unnamed spring to the southeast of the Cox Lobe. The ER-L values for chromium and lead were substantially exceeded in this sample. The level of chromium detected was twice the ER-L. The estimated detected level of 610 ppm lead was more than seventeen times the ER-L. The estimated detected level of mercury was more than one-and-a half times the ER-L. Mercury was not detected in the sediments at any other sampling locations.

Even though none of the metals observed in the sediment sample SD-06 were observed in the downstream surface water sample SW-06, metals were detected in the corresponding downstream sediment sample SD-11. The ER-L for lead was exceeded in sample SD-11 by 6 ppm. The location of sample SD-11 is downstream of both the unnamed spring and the Cox Spring.

Sediment sample SD-08 was located downstream of the Klapper Spring. The detected metals were below the ER-L. Sample SD-02 was located on Brushy Fork Creek downstream of the unnamed spring, the Cox Spring, and the Klapper Spring. Assuming that this location is an area of deposition, this sample represented the combined discharge from these three pathways. The levels of the detected metals were below the ER-L and no metals of concern were observed in the corresponding water column sample SW-02.

Sediment sample SD-09 was located at the confluence of Seep #1 and the Cattle Spring drainage. Arsenic, chromium, lead, and nickel were detected in this sample. The lead level was 1 ppm above the ER-L.

Sediment sample SD-10 was located downstream of SD-09 and before the confluence with Brushy Fork Creek. Arsenic, chromium, lead, and nickel were detected in concentrations similar to the levels in SD-09. The lead level in SD-10 was also 1 ppm above the ER-L.

Sediment sample SD-03 was located in Brushy Fork Creek downstream of all surface water drainage features originated from the Site. Lead and nickel were detected in this sample at levels below the ER-L. No metals of concern were detected in the corresponding water column sample SW-03.

Representatives from EPA and the Fish and Wildlife Service (FWS) conducted a cursory ecological reconnaissance of the Tri-City Site in August 1990. The objective of the reconnaissance was to determine if suitable feeding habitat for the endangered Indiana bat, gray bat, and bald eagle existed in the first and second order streams downgradient of the Site. Since the Indiana bat and gray bat are insectivores, a brief aquatic macroinvertebrate study was conducted on Brushy Fork Creek. In addition, a brief botanical survey and fish survey were conducted on the creek.

Conductivity, pH, and temperature were measured at the Cox Spring, Klapper Spring, and in Brushy Fork Creek during the reconnaissance. Conductivity was found to be slightly elevated in the Cox and Klapper Springs as compared to Brushy Fork Creek. The pH was circumneutral at all stations. All three parameters were observed within adequate ranges which would support the growth and maintenance of endemic aquatic biota.

Stream flow in Brushy Fork Creek during the reconnaissance was extremely low. Fish and aquatic macroinvertebrates were concentrated in pools which were isolated from each other. Similar species were collected during the reconnaissance as were collected during the RI.

EPA determined that Brushy Fork Creek was apparently a healthy stream supporting diverse communities of macroinvertebrates and fish. The hatching aquatic insects in the creek would have to be highly contaminated to constitute a serious threat to the bats since it appeared doubtful that foraging Indiana or gray bats would be able to find and consume enough emerging insects along this stream to constitute a significant portion of their diet. Obvious signs of biological contamination were not observed.

Since a toxicological examination of the Site has not been conducted, FWS recommended that an ecological contaminant monitoring program be included as part of the selected remedial alternative for the Tri-City Site. This program should consist of three monitoring episodes involving bioassays and tissue analyses. The initial monitoring episode should be conducted concurrently with the confirmatory sampling during the Remedial Design (RD) phase to establish the baseline conditions. The second monitoring episode should be conducted one year later to identify any short-term site-related impacts. The third monitoring episode should be conducted five years after implementation of the selected remedy to identify any long-term site-related impacts. The monitoring episodes should also be conducted during different seasons to be representative of site conditions.

If there has been no demonstrable indication of site-related ecological degradation after the three monitoring episodes, further ecological monitoring would not be necessary. However, if the monitoring episodes indicate that site-related ecological degration has occurred (or is occurring), histopathological studies may be necessary to further define the impact. The additional measures necessary to mitigate the threat to the environment would be implemented in Operable Unit #2.

Continued monitoring of Brushy Fork Creek for increases in water column and sediment contamination would also be included in the ecological contaminant monitoring program. In addition, FWS recommended remediation of the contaminated spring(s) since volatile organic compounds are entering Brushy Fork Creek via this pathway.

6.3 Summary

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

The health risk posed by this Site is primarily from the future use of the groundwater/spring water as a potable source. This risk is due to the presence of VOCs at concentrations above MCLs and non-zero MCLGs. These contaminants should be remediated.

The baseline risk assessment also shows a potential health risk associated with raising beef cattle and cultivating gardens on-site. However, this potential risk is based the detection of contaminants in one out of twenty on-site surface soil samples. Because of the low frequency of detection, the presence of surface soil contamination should be verified. The presence of any air contaminants should also be confirmed. Tetrachloroethene was detected in two of twelve air samples collected during the RI, but no source has been identified.

The ecological impacts to Brushy Fork Creek currently originating from the Site have been determined to be minimal. The creek is apparently a healthy stream supporting diverse communities of macroinvertebrates and fish, and no data has been collected to date to indicate that the creek has been adversely affected. Also, there is not adequate feeding habitat to support the endangered bats and the bald eagle within the stream reach of the creek and its tributaries.

The sediment sampling conducted during the RI revealed levels of chromium and lead in one sample that substantially exceeded effects levels estimated by NOAA for aquatic biota. In addition, mercury was detected in only that sample and at a level above the ER-L. Lead was also detected in a downstream sample at a level slightly above the ER-L. Consequently, the extent of inorganic contamination in the area of these sediment samples should be verified. Since the ER-L for lead was exceeded by only 1 ppm in two other samples, and the degree of confidence in the lead ER-L as an indicator of adverse effects in aquatic biota is moderate, additional action in the vicinity of these samples is not currently justified.

Since a toxicological examination has not been conducted at the Site, the Fish and Wildlife Service has recommended that the contaminated spring flowing into the creek be remediated and an ecological contaminant monitoring program be included in the selected remedy. The program would also include monitoring of Brushy Fork Creek for increases in water column and sediment contamination.

7.0 DESCRIPTION OF ALTERNATIVES

7.1 Background

A Feasibility Study (FS) was conducted to develop and evaluate remedial alternatives for Operable Unit #1 at the Tri-City Site. Remedial alternatives were assembled from applicable remedial technology process options and were initially evaluated for effectiveness, implementability, and cost. The alternatives meeting these criteria were then evaluated and compared to the nine criteria required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). In addition to the remedial alternatives, the NCP requires that a no-action alternative be considered at every Superfund site. The no-action alternative serves primarily as a point of comparison for other alternatives.

The remedial alternatives proposed for the Tri-City Site were developed to primarily address contaminated groundwater as it discharges to the springs. Treatment technologies that require the groundwater to be brought to the surface for treatment using an extraction system were considered. However, the effectiveness of a pumping well system would depend on the ability of the individual wells to intersect fractures within the bedrock. Only six of the thirteen groundwater monitoring wells attempted at the Site produced sufficient water for completion, and only one well (MW-08) had suffient yield to be considered for extraction purposes. Consequently, a high degree of uncertainty is associated with attempting to capture contaminated groundwater within the variably fractured rock mass. Moreover, the existence of a widespread, well-defined volatile organic contaminant plume was not substantiated by the analytical results from the RI.

At the Tri-City Site, groundwater discharges to the surface as springs. The levels of volatile organic contaminants have apparently decreased in the Klapper and Cattle Springs, and only the Cox Spring currently contains VOC levels in excess of MCLs and non-zero MCLGs. It is believed that the primary source of the groundwater contamination was removed during the Emergency Removal Action conducted by EPA in August and September 1988. Confirmatory sampling in the area of the removal action is necessary to determine if this source was completely removed.

7.2 Remedial Alternatives

A total of four alternatives were evaluated in detail to address Operable Unit #1 at the Tri-City Site. Except for the no-action alternative, each alternative includes the following common elements:

(1) Institutional Controls. Interim actions that include restrictions on the potable use of groundwater containing, or potentially containing, levels of contamination in excess of MCLs or non-zero MCLGs would be implemented. These springs include the Cox Spring, the Klapper Spring, the Cattle Spring, the Brading Spring #1, and the unnamed spring. The restrictions may include local ordinances, conservation or restrictive easements, record notice or some other appropriate measure. Potable water would continue being provided to residents who previously used the contaminated springs as sources of potable water. The restrictions and the provision of potable water to affected residents would continue until EPA, through monitoring, determines that the water is of sufficient and consistent quality for human consumption.

(2) Long-term Monitoring. Since the on-site springs have been historically used as sources of potable water, long-term monitoring is proposed to ensure that contaminant levels remain below MCLs and non-zero MCLGs. Five of the on-site springs (Cox, Klapper, Brading #2, Cattle, and the unnamed spring) would be monitored quarterly for the first year to identify seasonal variations in contaminant levels, semi-annually for the next two years, and yearly thereafter for up to 27 years. In addition to continuous reviews for any public health concerns, the data from the spring sampling would be reviewed to identify contaminant levels that warrant remedial action. If treatment of any of the other on-site springs, in addition to the Cox Spring, is determined to be necessary, it will be included in Operable Unit #1.

The groundwater would also be monitored for up to 30 years via annual sampling of the existing wells. The surface water and sediment of Brushy Fork Creek would be monitored via annual sampling for up to 30 years. The sampling results would be reviewed every five years for possible alterations in the monitoring program.

An ecological contaminant monitoring program involving bioassays and tissue analyses would be conducted at the Site. This program would consist of three monitoring episodes over the five-year period following

implementation of the remedy. The initial monitoring episode would be conducted concurrently with the confirmatory sampling during the RD phase to establish baseline conditions. The second monitoring episode would be conducted one year later to identify any short-term site-related impacts. The third monitoring episode would be conducted five years after implementation of the remedy to identify any long-term site-related impacts. The monitoring episodes would also be conducted during different seasons to be representative of site conditions. If the monitoring episodes indicate that site-related ecological degradation has occurred (or is occurring), histopathological studies may be necessary to further define the impact. The additional measures necessary to mitigate the threat to the environment would be implemented in Operable Unit #2.

(3) Confirmatory Sampling. Confirmatory sampling would be conducted to assess the effectiveness of the Emergency Removal Action conducted near the Cox, Sr. residence. The apparently disturbed areas in the northern portion of the Site (as shown in the EPIC aerial photograph taken in 1967) would be also sampled to investigate possible contamination from drum disposal.

The surface soils along the eastern edge of the former disposal area where the PAHs and one species of PCB were found during the RI would be sampled to establish the extent of any PAH and PCB contamination.

The sediment in the tributary to Brushy Fork Creek where the sample containing levels of chromium and lead substantially above the ER-L values was collected during the RI and extending to the location of the downstream sample containing the lead level in excess of the ER-L value would be sampled to determine the extent of the contamination. Additional air sampling along the slope of the Cox Lobe would be conducted to identify the source of the PCE detected during the RI.

The remedial alternatives are described in the following discussions.

Alternative 1 - No Action

Under this alternative, EPA would take no further action and the Site would be left "as is". This alternative relies on flushing of the groundwater via the springs to naturally remove the volatile organic contamination and restore the groundwater to a Class II-B aquifer suitable for drinking water purposes.

It is expected that the VOC levels in the Cox Spring will decrease to near or below MCLs and non-zero MCLGs within ten years. This conclusion is based on the following considerations: (1) the soil contamination that constituted the primary source of groundwater contamination has been removed; (2) the VOCs of concern in the aquifer are highly mobile and rapidly flushed from the aquifer; (3) the contaminants will flush from the solutionally enlarged fractures of the limestone aquifer more rapidly than if the aquifer were composed of a porous medium such as sand or clay; and (4) infiltrating precipitation will cause dilution of contaminants in the aquifer. Moreover, the VOC levels in several springs appear to be decreasing. This trend will be verified by long-term monitoring.

This alternative would not reduce the risk associated with the potential potable use of contaminated spring water and groundwater. Moreover, any risks from potentially contaminated site soils, sediment, and ambient air would not be investigated.

No funds would be spent for this alternative and it could be implemented immediately. However, since this alternative would result in contamination remaining on-site, CERCLA requires that the Site be reviewed every five years. If indicated by the review, remedial actions would be implemented at that time to mitigate any threat to human health or the environment.

Alternative 2 - Limited Action

This alternative includes the three major components previously discussed: institutional controls, long-term monitoring, and confirmatory sampling. Institutional controls would be necessary until natural processes restore the groundwater to a Class II-B aquifer suitable for drinking water purposes. As described in the no-action alternative, it is expected that the VOC levels in the Cox Spring will decrease to near or below MCLs and non-zero MCLGs within ten years.

Since this alternative does not include treatment of the contaminated spring water, it does not reduce the risk associated with potential potable usage.

The total present worth of this alternative for a 30-year period is approximately $1,714,000 and the capital cost is estimated to be $880,798. The annual operation and maintenance costs are shown in Table 19. This alternative could be implemented in approximately 12 months.

TABLE 19

SUMMARY OF COSTS FOR REMEDIAL ALTERNATIVES

Alternative 1 - No Action	
Capital	$0
Annual O&M	0
Ecological Cost	0
5-Year Cost	0
Total Present Worth	0
Alternative 2 - Limited Action	
Capital	$ 880,798
Annual O&M:	
1st Year	56,396
2nd Year	46,026
3rd Year	46,026
4th-30th Year	40,842
Potable Water Supply	2,420
Ecological Cost	22,704
5-Year Cost	10,000
Total Present Worth	$1,714,000
Alternative 3 - Carbon Adsorption	
Capital	$ 904,254
Annual O&M	
Process Monitoring	
1st Year	34,386
2nd-30th Year	23,896
Long-Term Monitoring	
1st Year	53,084
2nd Year	44,370
3rd Year	44,370
4th-30th Year	40,014
Potable Water Supply	2,420
Ecological Cost	22,704
5-Year Cost	10,000
Total Present Worth	$2,098,000

TABLE 19 (cont'd)

SUMMARY OF COSTS FOR REMEDIAL ALTERNATIVES

Alternative 4 - Aeration

Capital	$1,080,743
Annual O&M	
Process Monitoring	
1st-5th Year	20,980
6th-30th Year	10,490
Long-Term Monitoring	
1st Year	53,084
2nd Year	44,370
3rd Year	44,370
4th-30th Year	40,014
Potable Water Supply	2,420
Ecological Cost	22,704
5-Year Cost	10,000
Total Present Worth	$1,990,000

Since this alternative would result in contamination remaining on-site, CERCLA requires that the Site be reviewed every five years. If indicated by the review, remedial actions would be implemented at that time to mitigate any threat to human health or the environment.

Alternative 3 - Carbon Adsorption

This alternative includes the three major components previously described and treatment of contaminated spring water in a carbon adsorption system. A treatment system would be installed only at the Cox Spring, unless monitoring indicated that contamination in other springs exceeded MCLs or non-zero MCLGs. The treatment system would consist of modifications to the existing cistern and piping to a disposable activated carbon canister. The cistern will equalize the contaminant concentrations and a sand/geotextile filter will collect any large particulates in the spring water. The spring water would then flow to the carbon canister by gravity.

Remediation of contaminated groundwater for a Class II-B aquifer is required to meet MCLs as established under the Safe Drinking Water Act (40 CFR Part 141) and to attain non-zero MCLGs. The MCLs and non-zero MCLGs for the contaminants of concern in the Cox Spring are identified in Table 20. Reduction of the contaminants to these levels would reduce the carcinogenic risk associated with the ingestion of contaminated water to 1.4E-4 and the Hazard Index to less than one (1) for a 70 kilogram (kg) adult over a 70-year lifetime. These levels are within EPA's acceptable risk range of E-4 to E-6 and a Hazard Index of less than one (1).

The treated water would be discharged to the tributaries downstream of the springs. Any discharge to a nearby surface water body is required to meet National Pollutant Discharge Elimination System (NPDES) standards established by the Clean Water Act and regulated by the Commonwealth of Kentucky. The state surface water standards, 401 KAR 5:031, are included as Appendix A of this document. Final discharge levels will be determined by surface water flow information, contaminant levels, and water quality testing that will be established by the Commonwealth of Kentucky. The surface water discharge will be required to meet the NPDES limits that are established.

Treatment of contaminated spring water will continue until contaminant levels in the influent (i.e., the groundwater discharging to the surface as a spring) decrease to below MCLs

TABLE 20
SITE-SPECIFIC MCLs AND MCLGs (in PPB)
TRI-CITY INDUSTRIAL DISPOSAL SITE, BROOKS, KENTUCKY

CONTAMINANTS OF CONCERN	MCL (1)	MCLG (2)	RISK OR HQ (3)
PURGEABLE ORGANICS			
Chloroform	100	- -	1.7E-5
1,1-Dichloroethene	7	7	0.02
Cis-1,2-Dichloroethene	70	70	0.2
Trans-1,2-Dichloroethene	100	100	0.14
Tetrachloroethene (PCE)	5	0	7.5E-6
Toluene	1000	1000	0.14
1,1,1-Trichloroethane	200	200	0.07
Trichloroethene (TCE)	5	0	1.6E-6
Vinyl Chloride	2	0	1.1E-4
Xylenes	10,000	10,000	0.14
EXTRACTABLE ORGANICS			
Bis (2-ethylhexyl) Phthalate	4*	0*	1.6E-6

	TOTAL CARCINOGENIC RISK		1.4E-4 (4)
	TOTAL HAZARD INDEX		0.71

(1) Maximum Contaminant Levels (MCLs) are enforceable standards promulgated under the Safe Drinking Water Act. These standards apply to specific contaminants that EPA has determined to have an adverse effect on human health above certain levels. MCLs are used as remediation levels for contaminants having MCLs.

(2) Maximum Contaminant Level Goals (MCLGs) are non-enforceable health-based goals that are protective of adverse human health effects and that allow an adequate margin of safety.

(3) Risk levels and hazard quotients are based on the ingestion of 2 liters of water every day by a 70 kg person for a lifetime (70 years). Risk levels are for carcinogenic compounds. Hazard quotients are for non-carcinogenic compounds.

(4) The majority of the risk is based on the MCL for vinyl chloride. This MCL is set at the detection limit, therefore it is as low as possibly attainable.

* indicates a proposed MCL or MCLG

- - indicates that a MCL or MCLG has not been established

and non-zero MCLGs by natural processes. As described in the no-action alternative, the VOC levels in the Cox Spring are expected to decrease to near or below MCLs and non-zero MCLGs within ten years.

Monthly monitoring of the influent and effluent would be required for the first year to determine the frequency of carbon replacement. For up to the following 29 years, the influent and effluent would be sampled prior to carbon replacement.

The spent carbon would be regenerated or treated/disposed off-site, so analysis of the spent carbon would be conducted using the the Toxicity Characteristic Leaching Procedure (TCLP) to determine if it is a hazardous waste. This analysis is necessary to ensure that applicable Subtitle C or D requirements of the Resource Conservation and Recovery Act (RCRA) are met.

The total present worth of Alternative 3 over a 30-year period is approximately $2,098,000 with a capital cost of $904,254. The annual operation and maintenance costs are shown in Table 19. The time required to implement this alternative is expected to be 14 months, which includes 12 months for remedial design and procurements and two months for construction.

Since this alternative would result in contamination remaining on-site, CERCLA requires that the Site be reviewed every five years. If indicated by the review, remedial actions would be implemented at that time to mitigate any threat to human health or the environment.

Alternative 4 - Aeration

This alternative also includes the three major components previously described and treatment of the contaminated spring water by aeration. A treatment system would be installed only at the Cox Spring, unless monitoring indicated that contamination in other springs exceeded MCLs or non-zero MCLGs. The aeration treatment process would involve the construction of a series of approximately thirty concrete steps over which the spring water would pass. Spring water would flow into and through the aeration zone by gravity. The series of steps would increase the mixing of the spring water with air, thereby promoting the evaporation of the VOCs from the water.

As in Alternative 3, remediation of contaminated groundwater for a Class II-B aquifer is required to meet MCLs as established under the Safe Drinking Water Act (40 CFR Part 141) and to attain non-zero MCLGs. The MCLs and MCLGs for the contaminants of concern in the Cox Spring were identified in Table 20.

Treatment of contaminated spring water will continue until contaminant levels in the influent (i.e., the groundwater discharging to the surface as a spring) decreases to below MCLs and non-zero MCLGs by natural processes. As described in the no-action alternative, the VOC levels in the Cox Spring are expected to decrease to near or below MCLs and non-zero MCLGs within ten years.

The treated water would be discharged to the tributaries downstream of the springs. As described in Alternative 3, any discharge to a nearby surface water body is required to meet the NPDES standards established by the Clean Water Act and regulated by the Commonwealth of Kentucky. Final discharge levels will be determined by surface water flow information, contaminant levels, and water quality testing that will be established by the Commonwealth of Kentucky. The surface water discharge will be required to meet the NPDES limits that are established.

A treatability study would be required to determine the design parameters of the aeration system prior to construction. The influent and effluent would be monitored monthly for the first year and annually for up to the next 29 years if the system is effective. This treatment process does not generate any treatment residues other than air emissions. The treatability study would include an evaluation of the air emissions to determine if treatment would be necessary. Releases from the aeration zone will comply with the Clean Air Act as enforced through federal and state standards.

The total present worth of this alternative for a 30-year period is approximately $1,990,000 and the capital cost is estimated at $1,080,743. The annual operation and maintenance costs are shown in Table 19. The time required to implement this alternative is expected to be 13 months, which includes 12 months for remedial design and procurements and one month for construction.

Since this alternative would result in contamination remaining on-site, CERCLA requires that the Site be reviewed every five years. If indicated by the review, remedial actions would be implemented at that time to mitigate any threat to human health or the environment.

7.3 ARARs

The remedy implemented for Operable Unit #1 will meet the performance standards described below, which are the Applicable or Relevant and Appropriate Requirements (ARARs) identified for the proposed alternatives.

Remediation of contaminated groundwater for a Class II-B aquifer is required to meet MCLs as established under the Safe Drinking Water Act (40 CFR Part 141) and to attain non-zero MCLGs. The MCLs and MCLGs for the contaminants of concern at the Site were identified in Table 20. Reduction of the contaminants to these levels will reduce the risk associated with the ingestion of contaminated groundwater to 1.4E-4 for a 70 kg adult over a 70-year lifetime. This risk falls within EPA's acceptable risk range of E-4 to E-6.

Any discharge to a nearby surface water body is required to meet National Pollutant Discharge Elimination System (NPDES) standards established by the Clean Water Act and regulated by the Commonwealth of Kentucky. The state surface water standards, 401 KAR 5:031, are included as Appendix A of this document. Final discharge levels will be determined by surface water flow informtion, contaminant levels, and water quality testing that will be established by the Commonwealth of Kentucky. The surface water discharge will be required to meet the NPDES limits that are established.

The Clean Air Act is an ARAR for the releases to air from the treatment systems included in Alternatives 3 and 4. Releases from these systems would comply with federal and state standards promulgated under the Clean Air Act.

The spent carbon from the carbon adsorption treatment system in Alternative 3 would be regenerated or treated/disposed off-site, so analysis of the spent carbon would be conducted using the Toxicity Characteristic Leaching Procedure (TCLP)(40 CFR Part 262, Appendix II) to determine if it is a hazardous waste. This analysis is necessary to ensure that applicable Subtitle C or D requirements of the Resource Conservation and Recovery Act (RCRA) are met. If the spent carbon is determined to be a hazardous waste based on the results of the TCLP and if regeneration is not technically feasible, it would not be land disposed unless the treatment standards for all applicable TCLP constituents are met (40 CFR Part 268).

Pursuant to the Occupational Safety and Health Act of 1970 (OSHA), health and safety standards for employees engaged in hazardous waste operations were effective on March 6, 1990 (54 FR 9294). Consequently, a worker health and safety program that complies with OSHA standards is required for the remedial activities to be conducted on-site.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

During the Feasibility Study, a detailed analysis of each alternative was performed using the nine evaluation criteria identified in the NCP. The advantages and disadvantages of each alternative were then compared to identify the alternative providing the best balance of the nine criteria. The following discussions summarize the comparative analysis.

8.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses the degree to which the alternative eliminates, reduces, or controls threats to public health and the environment through treatment, engineering methods, or institutional controls.

The present and future risks to human health and the environment from exposure to contaminated groundwater (primarily as it discharges to the surface as springs) would be unchanged if Alternative 1 was implemented. Although it is anticipated that contaminant concentrations will eventually decrease as a result of natural degradation and flushing, the VOCs in the spring water are currently volatilizing into the atmosphere through natural mixing in the stream bed. The impact on downgradient surface water bodies has been determined to be minimal. In addition, any risks from potentially contaminated site soils, sediment, and ambient air would not be investigated.

Alternative 2 includes institutional controls to restrict residents from using groundwater and spring water for domestic purposes, and it provides for potable water to affected residents. Consequently, the potential risks to human health from the use of contaminated groundwater and spring water would be reduced. Any risks associated with potentially contaminated site soils, sediment, and ambient air would also be investigated in the alternative so it is more protective than Alternative 1. However, neither alternative includes treatment of groundwater to MCLs and non-zero MCLGs, and VOCs will continue to volatilize into the atmosphere.

Alternative 3 would provide protection of human health and the environment. Institutional controls, provision of potable water to affected residents, and groundwater treatment would reduce the potential risk to human health from ingestion and other household uses. Groundwater treatment would also reduce any environmental impacts by preventing the spread of contaminants to Brushy Fork Creek and the atmosphere. Contaminant levels in the groundwater would be reduced to

levels in conformance with ARARs. Moreover, any risks associated with potentially contaminated site soils, sediment, and ambient air would also be investigated in this alternative.

Alternative 4 would be protective of human health and the environment. However, the proposed aeration system is innovative and a treatability study would be necessary to determine if air emission controls are required. The potential risk to human health from ingestion of contaminated groundwater and other household uses would be reduced by institutional controls, provision of potable water to affected residents, and groundwater treatment to levels in conformance with ARARs. Groundwater treatment would also reduce any environmental impacts by preventing the spread of contaminants to Brushy Fork Creek. As in Alternatives 2 and 3, any risks associated with potentially contaminated site soils, sediment, and ambient air would be investigated in Alternative 4.

8.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental or facility siting law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations under federal or state environmental siting law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Compliance with ARARs addresses whether a remedy will meet all federal and state environmental laws and/or provide basis for a waiver from any of these laws.

EPA has divided ARARs into the following three categories to facilitate their identification: chemical-specific, location-specific, and action-specific.

Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment.

Location-specific ARARs restrict actions or contaminant concentrations in certain environmentally sensitive areas. Examples of areas regulated under various federal laws include floodplains, wetlands, and locations where endangered species or historically significant cultural resources are present. No location-specific ARARs apply to the Tri-City Site.

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions or conditions involving specific substances.

Alternatives 1 and 2 would not comply with chemical-specific ARARs since the Cox Spring would not be remediated. Groundwater contaminant levels would continue to exceed MCLs and non-zero MCLGs until natural degradation and flushing reduces the levels. There are no action-specific ARARs for Alternatives 1 and 2.

Both Alternatives 3 and 4 would be in compliance with chemical-specific ARARs. EPA has determined that the point of compliance for ARARs is where the groundwater discharges to the surface as springs. Remediation of the Cox Spring (the only spring currently containing contaminant levels in excess of MCLs and non-zero MCLGs) will be in conformance with the Safe Drinking Water Act and the treated discharge will meet NPDES standards established by the Clean Water Act and regulated by the Commonwealth of Kentucky.

Both Alternatives 3 and 4 would be in compliance with action-specific ARARs. The spent carbon generated in Alternative 3 would be evaluated for the toxicity charcteristic to ensure that applicable Subtitle C or D requirements of RCRA are met. A treatability study of the aeration system described in Alternative 4 would be conducted to determine the applicability of the Clean Air Act to emissions.

8.3 Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to the ability of an alternative to maintain reliable protection of human health and the environment. This criterion includes the consideration of residual risk and the adequacy and reliability of controls.

Alternative 1 would not be effective in mitigating potential risks associated with the domestic uses of groundwater and future land use scenarios, including excavation in areas of potential subsurface soil contamination. Moreover, any risks from potentially contaminated site soils, sediment, and ambient air would not be investigated. Since potential risks are not addressed, there is a likelihood that future remedial actions would be necessary.

Alternative 2 would mitigate the health risk through the implementation of institutional controls to restrict the potable use of contaminated groundwater. Groundwater use restrictions would be easy to implement and reliable in the long-term if enforced by federal, state, or local agencies and complied with by property owners. Moreover, the provision of potable water to affected residents and long-term monitoring of the groundwater are reliable methods to reduce the health risk associated with contaminated water supplies. However, the contaminated groundwater would not be treated.

Alternative 2 does not prevent the migration of contamination to Brushy Fork Creek nor does it provide protection to the biota. However, any adverse effects on downgradient surface water bodies have, to date, been determined to be minimal, and long-term monitoring is a reliable method for detecting the migration of contaminants.

Alternatives 3 and 4 provide the highest degrees of long-term effectiveness and permanence because both alternatives use irreversible treatment technologies to reduce the hazards associated with VOCs in spring water. Alternative 3 utilizes a proven and widely available technology. However, the spent carbon filters would require regeneration or treatment and disposal at an approved facility. The aeration system described in Alternative 4 is innovative, and a treatability study would be required to determine the design parameters. Moreover, the treatability study would be used to quantify the air emissions from the zone of aeration and to determine if control measures are necessary.

Both Alternatives 3 and 4 include long-term monitoring and confirmatory sampling, which are effective methods of identifying any additional human health or environmental risks associated with the Site.

8.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Reduction of toxicity, mobility, or volume refers to the preference for a remedy that uses treatment to reduce health hazards, contaminant migration, or the quantity of contaminants at the Site.

Alternatives 1 and 2 do not include treatment and would not reduce the toxicity, mobility, or volume of the contaminants in the groundwater. Alternative 3 would reduce the mobility of contaminants by transferring the VOCs to the activated carbon. The toxicity and volume of the contaminants would be reduced when the spent activated carbon is removed from the Site for

regeneration or treatment prior to disposal at an approved off-site facility. Alternative 4 would reduce the volume of contaminants in the groundwater, but air emission controls would be necessary to prevent transfer of the contaminants to the atmosphere. The nature and quantities of these contaminatnts would be identified during the treatability study to determine compliance with the appropriate air standards.

8.5 Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to achieve protection and assesses any risks to human health and the environment during the construction and implementation period until cleanup objectives are achieved.

There would be no short-term risk to the community and the environment if Alternative 1 was implemented because no work would be performed. And though the institutional controls included in Alternative 2 would not result in short-term risks to the community, workers would need protective clothing during field sampling activities to avoid contact with contaminants.

Alternatives 3 and 4 require installation of treatment systems on-site, in addition to implementing the long-term monitoring and confirmatory sampling programs. Both alternatives required very limited construction that would result in minimal impact on the on-site residents. Monitoring would be performed during construction to ensure protection of the on-site residents and workers. Protective equipment would also be used by workers who might come in contact with contaminated groundwater. Impact to the creek would also be minimal since the construction would be confined to a small area.

Construction time periods are anticipated to be short for the two treatment alternatives, with two months for Alternative 3 and one month for Alternative 4. The time required for remedial design and procurement would be approximately 12 months for both alternatives, but the treatability study necessary for Alternative 4 would take an additional 6 months.

8.6 Implementability

Implementability refers to the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the chosen solution. It also includes coordination of federal, state, and local governments to clean up the site.

Alternative 1 is the least difficult alternative to implement because no work is necessary. The institutional controls included in Alternative 2 would be relatively easy to implement by federal, state, and local officials, and/or the property owners. Transportation of potable water would continue using the established methods. Groundwater monitoring would be performed using the previously installed monitoring wells and the existing springs.

The carbon adsorption treatment system included in Alternative 3 is relatively easy to implement because carbon adsorbers are available as off-the-shelf items from many vendors. Construction of the system should not pose major problems unless the bedrock is shallow such that it impedes the installation of underground piping. If this is the case, insulation or soil covers could be used to protect the piping from freezing during the winter.

Carbon adsorption is a proven and reliable technology for treatment of VOCs. The operation of the system would require periodic sampling of the influent and effluent, replacing the carbon canisters, cleaning the cistern and sand/geotextile filter, and regeneration or treatment/disposal of the spent carbon filters. Consequently, operation and maintenance of the sytem would require a long-term commitment from state and local agencies. Future remedial actions, if necessary, would be relatively easy to implement since the carbon adsorbers are removable.

The aeration system included in Alternative 4 is also relatively easy to implement. The aeration zone could be constructed with small power equipment since heavy equipment cannot access the spring, and materials are readily available from multiple vendors. Operation and maintenance of this treatment system would be limited to long-term monitoring. However, this system is innovative and a treatability study is necessary to determine the design parameters and to quantify the air emissions. Delays in the implementation of this alternative could arise as a result of unacceptable risk associated with the VOC emissions. Moreover, future remedial actions may be difficult to implement with the aeration zone in place.

8.7 Cost

This criterion involves evaluation of the estimated capital (i.e., the cost of implementation) and operation and maintenance costs for each alternative. The costs for the four alternatives developed for the Tri-City Site were itemized in Table 19.

There are no capital or operation and maintenance costs associated with Alternative 1 since no remedial action would be implemented. The capital cost for Alternative 2 is $880,798 and the total present worth over a 30-year period is estimated to be $1,714,000.

The capital costs of Alternatives 3 and 4 are $904,254 and $1,080,743, respectively. The total present worth over a 30-year period for these alternatives is $2,098,000 and $1,990,000, respectively. While the "up front" cost is higher for Alternative 4, the total present worth is slightly less because operation and maintenance is minimal.

8.8 State Acceptance

State acceptance indicates whether or not, based on its review of the RI and FS Reports and the Proposed Plan, the Commonwealth of Kentucky concurs with, opposes, or has no comment on EPA's preferred alternative.

Based on review of the RI and FS Reports and the Proposed Plan, the Commonwealth generally concurs with EPA's selected remedy for Operable Unit #1. Although the Commonwealth believes that a complete characterization of a site is necessary before a successful strategy for remediation can be plotted, they will consider the successful remediation of Operable Unit #1 as a first step in the complete remediation of the Tri-City Site.

The Commonwealth also continues to maintain that the statute KRS 224.877 is a state ARAR that is more stringent than federal requirements. However, if EPA meets the criteria outlined in Section 10 of KRS 224.877, the Commonwealth believes that EPA will have complied with the requirements of the statute. Specifically, Section 10 of KRS 224.877 states that "the remedial action shall protect human health, safety, and the environment considering the following factors as appropriate:

(a) The characteristics of the substance, pollutant, or contaminant, including its toxicity, persistence, environmental fate and transport dynamics, bioaccumulation, biomagnification, and potential for synergistic interaction and with specific reference to the environment in which the substance, pollutant, or contaminant has been released;

(b) The hydrogeologic characteristics of the facility and the surrounding area;

(c) The proximity, quality, and current and future uses of surface water and groundwater;

(d) The potential effects of residual contamination of potentially impacted surface water and groundwater;

(e) The chronic and acute health effects and environmental consequences to terrestrial and aquatic life of exposure to the hazardous substance, pollutant or contaminant through direct and indirect pathways;

(f) An exposure assessment; and

(g) All other available information."

EPA does not agree that KRS 224.877 is a state ARAR because it does not contain any specific, enforceable requirements that are more stringent than provided by federal law. Nonetheless, EPA believes that the selected remedy complies with the requirements of KRS 224.877 because it is protective of human health, safety, and the environment taking the statutory factors into consideration through the performance of a Remedial Investigation, a Feasibility Study, and a Baseline Risk Assessment. And, as stated in this Record of Decision, the risk to human health and the environment associated with contamination identified during the confirmatory sampling will be re-evaluated based on the additional sampling data. Since the Commonwealth did not submit timely comments on the Baseline Risk Assessment, their concerns will be considered during the re-evaluation.

The letter containing the Commonwealth's comments on the Draft Record of Decision is included in Appendix B.

8.9 Community Acceptance

Community acceptance indicates the public support of a given alternative. Community acceptance of the various alternatives is evaluated in the Responsiveness Summary included in this document in Appendix C. The Responsiveness Summary provides a thorough review of the comments EPA received on the RI and FS Reports and the Proposed Plan during the public meeting and the public comment period.

9.0 THE SELECTED REMEDY

The investigations at the Tri-City Site have shown that the Cox and Klapper Springs have contained levels of volatile organic compounds in excess of MCLs. Both springs have been used as sources of potable water by on-site residents. At this time, however, only the Cox Spring contains contaminant levels in excess of MCLs and non-zero MCLGs.

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has selected Alternative 3, which includes treatment of the contaminated spring water in a carbon adsorption system, as the preferred method of addressing Operable Unit #1 at the Tri-City Site. Carbon adsorption is a well-proven, reliable technology that would be effective for removing the volatile organic compounds from the spring water. Removal efficiencies as high as 99 percent could potentially be achieved for these contaminants.

Alternative 3 will involve the following specific activities:

(1) Institutional controls to restrict the potable use of groundwater containing, or potentially containing, levels of contamination in excess of MCLs and non-zero MCLGs. Institutional controls may include local ordinances, conservation or restrictive easements, record notice, or some other appropriate measure. The restrictions will remain in effect until EPA, through monitoring, determines that the water is of sufficient and consistent quality for human consumption.

(2) Continued provision of potable water to residents who previously used contaminated groundwater as a source of potable water. Water will be supplied until EPA, through monitoring, determines that the water is of sufficient and consistent quality for human consumption.

(3) Long-term monitoring of the groundwater, surface water, sediment, and ecology. Since the on-site springs have been historically used for potable water, long-term monitoring is proposed to ensure that contaminant levels remain below MCLs and non-zero MCLGs. Five of the on-site springs (Cox, Klapper, Brading #2, Cattle, and the unnamed spring) will be monitored quarterly for the first year to identify seasonal variations in contaminant levels, semi-annually for the next two years, and yearly thereafter for up to 27 years. In addition to continuous reviews for any public health concerns, the data from the spring sampling will be reviewed to identify contaminant levels that warrant remedial action. If treatment of any of the other on-site springs, in addition to the Cox Spring, is determined to be necessary, it will be included in Operable Unit #1.

The groundwater will be monitored for up to 30 years via annual sampling of the existing wells. The surface water and sediment of Brushy Fork Creek will also be monitored via annual sampling for up to 30 years. The sampling results will be reviewed every five years for possible alterations in the monitoring program.

An ecological contaminant monitoring program involving bioassays and tissue analyses will be conducted at the Site. This program will consist of three monitoring episodes over the five-year period following implementation of the remedy. The initial monitoring episode will be conducted concurrently with the confirmatory sampling during the RD phase to establish baseline conditions. The second monitoring episode will be conducted one year later to identify any short-term site-related impacts. The third monitoring episode will be conducted five years after implementation of the remedy to identify any long-term site-related impacts. The monitoring episodes will also be conducted during different seasons to be representative of site conditions. If the monitoring episodes indicate that site-related ecological degradation has occurred (or is occurring), histopathological studies may be necessary to further define the impact. The additional measures necessary to mitigate the threat to the environment will be implemented in Operable Unit #2.

(4) Confirmatory sampling to assess the effectiveness of the Emergency Removal Action conducted near the Cox, Sr. residence. The apparently disturbed areas in the northern portion of the Site (as shown in the EPIC aerial photograph taken in 1967) will be also sampled to investigate possible contamination from drum disposal.

The surface soils along the eastern edge of the former disposal area where the PAHs and one species of PCB were found during the RI will also be sampled to establish the extent of any PAH and PCB contamination.

The sediment in the tributary to Brushy Fork Creek where the sample containing levels of chromium and lead substantially above the ER-L values was collected during the RI will be included in the confirmatory sampling program to determine the extent of the contamination. The sediment sampling will extend to the location of the downstream sediment sample that contained a level of lead in excess of the ER-L value. Additional air sampling along the slopes of the Cox Lobe will be conducted to identify the source of the PCE detected during the RI.

(5) Treatment of the contaminated water in the Cox Spring in a carbon adsorption system. The treatment system will consist of modifications to the existing cistern and piping to a disposable activated carbon canister. The cistern will equalize the contaminant concentrations and a sand/geotextile filter will collect any large particulates in the spring water. The spring water will then flow to the carbon canister by gravity. A preliminary diagram of the treatment system is shown in Figure 18.

The system will be designed to handle an estimated average year-round flow of 2.5 gallons per minute (gpm). The flow rate of the Cox Spring has been estimated to be one (1) gpm during the dry season and 5 gpm maximum during wet weather. Specific flowrate characteristics of the Cox Spring will be confirmed during the Remedial Design phase.

The point of compliance for ARARs has been determined to be where the groundwater discharges to the surface as springs. Remediation of a Class II aquifer is required to meet MCLs and non-zero MCLGs as established under the Safe Drinking Water Act. The treated water will be dicharged to the downstream tributary. This discharge will be required to meet the NPDES standards established by the Clean Water Act and regulated by the Commonwealth of Kentucky. The carbon canister will be sized to treat the contaminant levels to these standards. The specific performance standards for groundwater treatment have been discussed in Section 7.3 of this Record of Decision document.

Monthly monitoring of the influent and effluent will be required for the first year to determine the frequency of carbon replacement. Based on an estimated average year-round flow of 2.5 gpm, a replacement rate of one canister containing 150 pounds of carbon every two months is anticipated. This estimate will be verified during the first year of monitoring. For up to the following 29 years, the influent and effluent will be sampled prior to carbon replacement.

The spent carbon will be regenerated or treated/ disposed off-site. Evaluation for the toxicity characteristic will be necessary to ensure that the applicable Subtitle C or D requirements of RCRA are met. An estimated 900 pounds per year of contaminated carbon is expected to be generated by the treatment system.

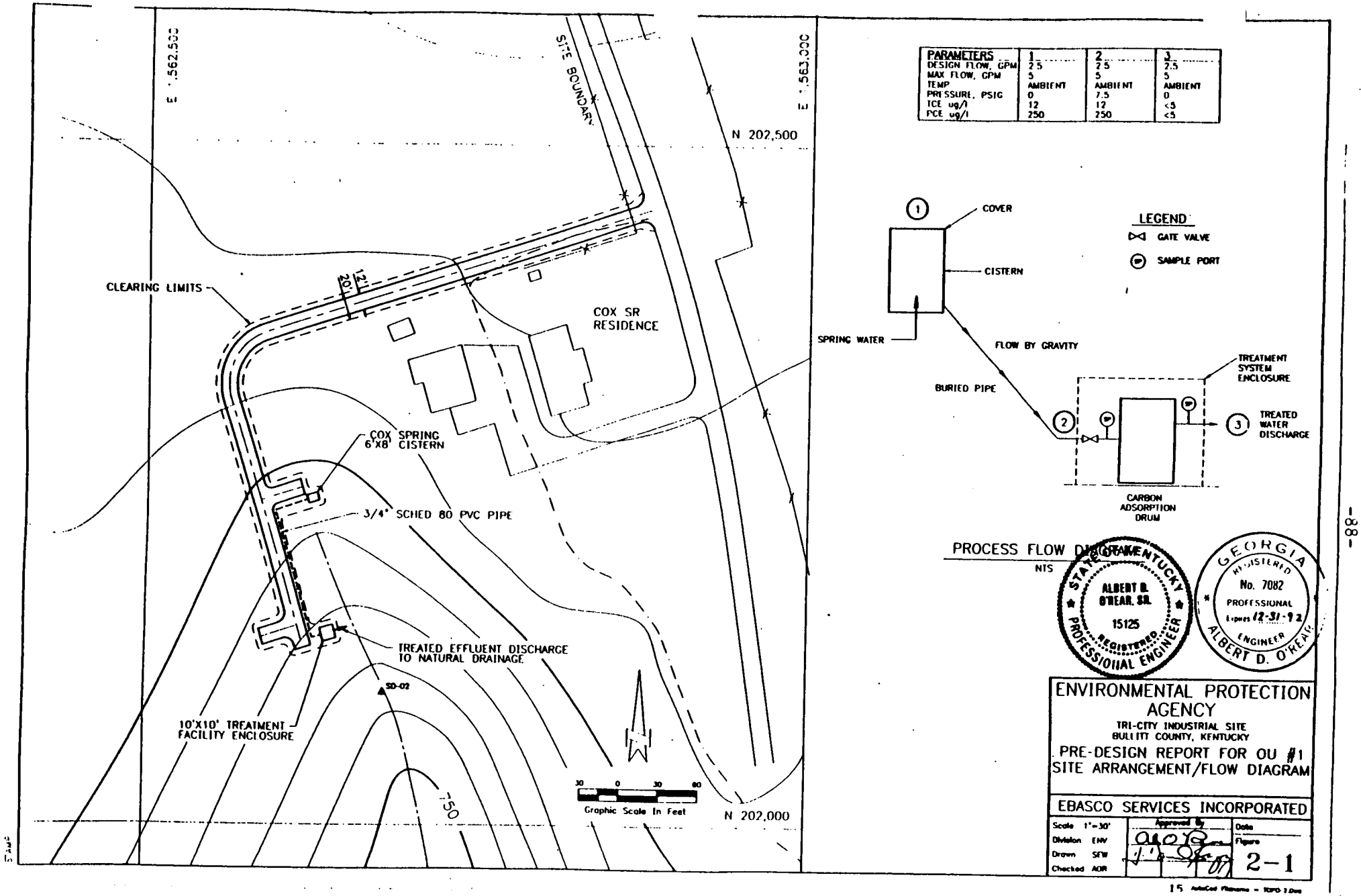


FIGURE 18. Diagram of Selected Remedy

In addition to the above activities, various support activities including the implementation of a worker health and safety program and environmental monitoring for indicator chemical emissions will be conducted.

The estimated cost of Alternative 3 was shown in Table 19. The total present worth is approximately $2,098,000 with an estimated capital cost of $904,254. The time required to implement this alternative is expected to be 14 months, which includes 12 months for remedial design and procurements and two months for construction.

10.0 THE STATUTORY DETERMINATIONS

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

10.1 Protection of Human Health and the Environment

Based on the baseline risk assessment, the primary health risk is from the potential use of the contaminated groundwater as a source of potable water. This risk is due to the presence of VOCs at levels in excess of the Maximum Contaminant Levels (MCLs) established by the Safe Drinking Water Act.

The selected remedy protects human health and the environment by treating the contaminated groundwater in a carbon adsorption system. It is not practicable to extract groundwater for treatment because of the hydrogeologic conditions at the Site, so the contaminated groundwater will be treated as it discharges to the surface as springs.

The contaminants will be permanently removed from the groundwater by the activated carbon filtration system. The spent carbon will then be transported off-site for regeneration or treatment and disposal.

Treatment of the contaminated groundwater will continue until contaminant levels in the influent decrease to below MCLs and non-zero MCLGs by natural processes. It is anticipated that the VOC levels will decrease to near or below MCLs and non-zero MCLGs within ten years.

Treatment of the contaminated groundwater to MCLs and non-zero MCLGs will reduce the carcinogenic risk to 1.4E-4 and the Hazard Index to less than one (1). These levels are within EPA's acceptable risk range of E-4 to E-6 and a Hazard Index of less than one (1).

The baseline risk assessment also revealed a potential risk associated with raising beef cattle and cultivating gardens on-site. However, this potential risk is based on the detection of polycyclic aromatic hydrocarbons (PAHs) and one species of PCB in one out of the twenty surface soil samples collected during the RI. The extent of PCB and PAH contamination in surface soils will be determined during the confirmatory sampling. The associated risks will be re-evaluated based on the new data.

Tetrachloroethene (also known as perchloroethylene, or PCE) was detected in only two of the twelve ambient air samples collected on-site during the RI. Although the risk associated with this exposure pathway was within EPA's acceptable risk range, the noncarcinogenic hazard quotient exceeded unity. Since a source of the PCE contamination in the air has not been identified, additional sampling will be conducted to determine if a source of the PCE exists. The risks associated with the air pathway will be re-evaluated based on the new data.

The sediment sampling conducted during the RI revealed levels of chromium and lead in one sample that substantially exceeded effects levels estimated by NOAA for aquatic biota. Consequently, the extent of inorganic contamination will be verified during the confirmatory sampling.

No unacceptable short-term risks or cross-media impacts are anticipated to be caused by implementation of the selected remedy.

10.2 Compliance with ARARs

The selected remedy involving treatment of contaminated groundwater using carbon adsorption, institutional controls, the provision of potable water, long-term monitoring, and confirmatory sampling will comply with all Applicable or Relevant and Appropriate Requirements (ARARs). The ARARs for the selected remedy are listed below.

Chemical-specific ARARs

Federal: Clean Water Act
- National Pollutant Discharge Elimination System (40 CFR Part 122)
- Water Quality Standards (40 CFR Part I31)
- Ambient Water Quality Criteria (Section 304(a)(1) of the Clean Water Act)

Safe Drinking Water Act
- Maximum Contaminant Levels (MCLs) (40 CFR Part 141)
- Maximum Contaminant Level Goals (MCLGs) (40 CFR Part 141, 50 FR 46936)

State: 401 KAR 5:031 - Surface Water Standards

Action-specific ARARs

Federal: Resource Conservation and Recovery Act
- 40 CFR Part 262 (Generators & Temporary Storage)
- 40 CFR Part 263 (Manifests & Transportation)
- 40 CFR Part 264 (Storage)

Clean Air Act (40 CFR Parts 50-62)

Occupational Safety and Health Act of 1970
- Health and safety standards for employees engaged in hazardous waste operations (54 FR 9294)

U.S. Department of Transportation's Hazardous Materials Transportation Act of 1990

State: 401 KAR 63:020 - Potentially Hazardous Matter or Toxic Substances
401 KAR 5:035 - Treatment Requirements
601 KAR 1:025 - Transporting Hazardous Materials
KRS 174-415 - Hazardous Material: Permits, Emergency Procedures, Enforcement

10.3 Cost Effectiveness

The selected alternative, Alternative 3, is cost-effective because it has been determined to provide overall effectiveness proportional to the cost. Carbon adsorption is a proven, reliable, and easily implementable technology for the treatment of VOCs in water. Minimal risk is associated with implementation and the operation and maintenance of the treatment system. The total present worth of Alternative 3 is $2,098,000.

10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for Operable Unit One at the Tri-City Site. Of the alternatives that are protective of human health and the environment and that comply with ARARs, EPA has determined that the selected remedy provides the best balance of tradeoffs with respect to long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, and cost while considering state and community acceptance.

The selected remedy utilizes a carbon adsorption treatment system, which is a proven and reliable technology for the removal of VOCs from water. Consequently, this alternative would be effective in mitigating the risk associated with the contaminated groundwater.

Treatment in the carbon adsorption system would reduce the mobility of contaminants by transferring the VOCs to the activated carbon. The toxicity and volume of the contaminants would be reduced when the spent carbon is removed from the Site for regeneration or treatment prior to disposal at an approved facility.

The carbon adsorption system is relatively easy to implement and the limited construction would result in minimal risk to workers and the community. The treatment system would also require minimal operator attention, such as periodic sampling and replacement of the carbon containers.

The selected remedy, in comparison with the other treatment alternative considered, is more reliable and easier to implement. It will significantly reduce the toxicity, mobility,

and volume of hazardous substances on-site. And, it is protective of human health and the environment. Therefore, it has been determined to be the most appropriate remedy for the contaminated groundwater at the Tri-City Site.

10.5 Preference for Treatment as a Principal Element

EPA has determined that Alternative 3, which includes treatment of contaminated groundwater in a carbon adsorption system, satisfies the statutory preference for remedies that employ treatment and meets the expectations in the NCP regarding restoration of groundwater to its beneficial uses within a reasonable timeframe.

Record of Decision
Tri-City Industrial Disposal Site
Brooks, Bullitt County, Kentucky

APPENDICES

Record of Decision/Operable Unit #1
Tri-City Industrial Disposal Site
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APPENDICES

Record of Decision/Operable Unit #1
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Brooks, Bullitt County, Kentucky

APPENDIX A

Kentucky Surface Water Standards

NATURAL RESOURCES AND ENVIRONMENTAL
PROTECTION CABINET
Department for Environmental Protection
Division of Water

401 KAR 5:031. Surface water standards.

RELATES TO: KRS Chapter 224

STATUTORY AUTHORITY: KRS 224.020, 224.033, 224.034, 224.037, 224.060 and 33 U.S.C. 1313

NECESSITY AND FUNCTION: This regulation sets forth water quality standards which consist of designated legitimate uses of the surface waters of the Commonwealth and the associated water quality criteria necessary to protect those uses. These standards are minimum criteria which apply to all surface waters in order to maintain and protect them for designated uses. Criteria for nutrients are recognized and included. These water quality standards are established to protect public health and welfare, protect and enhance the quality of water, and fulfill federal and state requirements for the establishment of water quality standards. These water quality standards are subject to periodic review and revision in accordance with federal and state laws. Definitions for terms used in this regulation are found in 401 KAR 5:029.

Section 1. Nutrient Limits. (1) In lakes, surface impoundments and their tributaries, and other surface waters where eutrophication problems may exist, nitrogen, phosphorus, carbon, and contributing trace element discharges will be limited as appropriate by the cabinet.

(2) The affected surface waters will be designated as nutrient limited.

Section 2. Minimum Criteria Applicable to all Surface Waters. (1)The following minimum water quality criteria are applicable to all surface waters including mixing zones, with the exception that toxicity to aquatic life in mixing zones shall be subject to the provisions of 401 KAR 5:029, Section 5. Surface waters shall not be aesthetically or otherwise degraded by substances that:

(a) Settle to form objectionable deposits;

(b) Float as debris, scum, oil, or other matter to form a nuisance;

(c) Produce objectionable color, odor, taste, or turbidity;

(d) Injure, are chronically or acutely toxic to or produce adverse physiological or behavioral responses in humans, animals, or fish and other aquatic life;

(e) Produce undesirable aquatic life or result in the dominance of nuisance species;

(f) Cause fish flesh tainting (the concentration of all phenolic compounds which cause fish flesh tainting shall not exceed 5 ug/l as an instream value);

(g) Cause the following changes in radionuclides:

1. The gross total alpha particle activity (including radium-226 but excluding radon and uranium) to exceed fifteen (15) pCi/l;

2. Combined radium-226 and radium-228 to exceed five (5) pCi/l (specific determinations of radium-226 and radium-228 are not necessary if dissolved gross alpha particle activity does not exceed five (5) pCi/l);

3. The concentration of total gross beta particle activity to exceed fifty (50) pCi/l;

4. The concentration of tritium to exceed 20,000 pCi/l;

5. The concentration of total Strontium-90 to exceed eight (8) pCi/l.

(2) The following criteria are applicable to all surface waters outside designated mixing zones except for those points where water is withdrawn for domestic water supply use. They are established for the protection of human health from the consumption of fish tissue, and shall not be exceeded.

For those substances associated with a cancer risk, an acceptable risk level of no more than one additional cancer case in a population of one million people (10^{-6}) will be utilized to establish the allowable concentration.

Table 1.
Water Quality Criteria for Protection of Human Health
from the Consumption of Fish Tissue

Substances Not Linked to Cancer	Concentration (ug/l)
Metals[1]	
Antimony	45,000
Chromium (III)	3,433,000
Mercury	0.146
Nickel	100
Thallium	48
Organics	
Acrolein	780
1,2,4,5-tetrachlorobenzene	48
Pentachlorobenzene	85
1,1,1-trichloroethane	1,030,000
bis(2-chloroisopropyl) ether	4,360
Dichlorobenzenes	2,600
Dichloropropenes	14,100
Endosulfan	159
Ethylbenzene	3,280
Fluoranthene	54
Isophorone	520,000
2,4-dinitro-o-cresol	765
Dinitrophenol	14,300

Dibutyl phthalate	154,000
Diethyl phthalate	1,800,000
Di-2-ethylhexyl phthalate	50,000
Dimethyl phthalate	2,900,000
Toluene	424,000

Substances Linked to Cancer

Metals[1]

Beryllium	0.117

Organics

Acrylonitrile	0.65
Aldrin	.000079
Benzene	40.0
Benzidine	.00053
Carbon tetrachloride	6.94
Chlordane	.00048
Hexachlorobenzene	.00074
1,2-dichloroethane	243
1,1,2-trichloroethane	41.8
1,1,2,2,-tetrachloroethane	10.7
Hexachloroethane	8.74
2,4,6-trichlorophenol	3.6
bis(2-chloroethyl) ether	1.36
Chloroform	15.7
DDT	0.000024
Dichlorobenzidine	0.02
1,1-dichloroethylene	1.85
Dieldrin	0.000076

2,4-dinitrotoluene	9.1
Dioxin (2,3,7,8-TCDD)	0.000000014
Diphenylhydrazine	0.56
Halomethanes	15.7
Heptachlor	0.00029
Hexachlorobutadiene	50.0
alpha Hexachlorocyclohexane (HCH)	0.031
beta HCH	0.0547
gamma HCH (lindane)	0.0625
Technical HCH	0.0414
N-nitrosodiethylamine	1.24
N-nitrosodimethylamine	16.0
N-nitrosodibutylamine	0.587
N-nitrosodiphenylamine	16.1
N-nitrosopyrrolidine	91.9
Polychlorinated Biphenyls (PCBs)	0.000079
Polynuclear Aromatic Hydrocarbons (PAHs)	0.0311
Tetrachloroethylene	8.85
Toxaphene	0.00073
Trichlorethylene	80.7
Vinyl Chloride	525

[1]Total recoverable form measured in an unfiltered sample

Section 3. Use Classifications and Associated Criteria. (1) Surface waters may be designated as having one (1) or more of the following legitimate uses and associated use criteria. The classifications in Sections 4, 5, 6, and 7 include the most common usage of surface waters within the Commonwealth. Nothing in this regulation shall be construed to prohibit or impair the legitimate beneficial uses of these waters. The criteria in Section 2

and the following use criteria represent minimum conditions necessary to protect surface waters for the indicated use and to provide for the protection of human health from fish consumption or a combination of fish and water consumption.

(2) On occasion surface water quality may be outside of the limits established to protect designated uses because of natural conditions. When this condition occurs during periods when stream flows are below the flow which is used by the cabinet to establish effluent limits for wastewater treatment facilities, a discharger shall not be considered a contributor to instream violations of water quality standards, provided that treatment in compliance with permit requirements is maintained.

(3) Governing flows for water quality-based permits. The following stream flows are to be utilized when deriving KPDES permit limitations for the protection of surface waters for the listed uses and purposes.

(a) Aquatic life protection - $7Q_{10}$

(b) Water-based recreation protection - $7Q_{10}$

(c) Domestic water supply protection - Harmonic mean for cancer-linked substances, $7Q_{10}$ for noncancer-linked substances, determined at points of withdrawal

(d) Human health protection from fish consumption only - Harmonic mean for cancer-linked substances, 7Q10 for noncancer-linked substances

(e) Protection of aesthetics and for changes in radionuclides - $7Q_{10}$.

Section 4. Aquatic Life. (1) Warmwater aquatic habitat. The following parameters and associated criteria shall apply for the protection of productive warmwater aquatic communities, fowl, animal wildlife, arborous growth, agricultural, and industrial uses:

(a) Natural alkalinity as $CaCO_3$ shall not be reduced by more than twenty-five (25) percent. Where natural alkalinity is below twenty (20) mg/l $CaCO_3$, no reduction below

the natural level is allowed. Alkalinity shall not be reduced or increased to a degree which may adversely affect the aquatic community.

(b) pH shall not be less than 6.0 nor more than 9.0 and shall not fluctuate more than one (1) unit over a period of twenty-four (24) hours.

(c) Flow shall not be altered to a degree which will adversely affect the aquatic community.

(d) Temperature shall not exceed 31.7 degrees Celsius (eighty-nine (89) degrees Fahrenheit):

1. The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

2. The cabinet will determine allowable surface water temperatures on a site-specific basis utilizing available data which shall be based on the effects of temperature on the aquatic biota which utilize specific surface waters of the Commonwealth and which may be affected by person-induced temperature changes. Effects on downstream uses will also be considered in determining site-specific temperatures. As a guideline, the water temperature for all surface waters shall comply with the limits shown in the following table:

Month/Date	Period Average (°F)	Instantaneous Maximum (°F)
January 1-31	45	50
February 1-29	45	50
March 1-15	51	56
March 16-31	54	59
April 1-15	58	64
April 16-30	64	69

May 1-15	68	73
May 16-31	75	80
June 1-15	80	85
June 16-30	83	87
July 1-31	84	89
August 1-31	84	89
September 1-15	84	87
September 16-30	82	86
October 1-15	77	82
October 16-31	72	77
November 1-30	67	72
December 1-31	52	57

3. A successful demonstration concerning thermal discharge limits carried out under Section 316(a) of the Clean Water Act shall constitute compliance with the temperature requirements of this subsection. A successful demonstration assures the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in or on the water into which the discharge is made.

(e) Dissolved oxygen:

1. Dissolved oxygen shall be maintained at a minimum concentration of five (5) mg/l daily average; at no time shall the instantaneous minimum be less than four (4) mg/l.

2. The dissolved oxygen concentration shall be measured at mid-depth in waters having a total depth of ten (10) feet or less and at representative depths in other waters.

(f) Solids:

1. Total dissolved solids: Total dissolved solids shall not be changed to the extent that the indigenous aquatic community is adversely affected.

2. Total suspended solids: Total suspended solids shall not be changed to the extent that the indigenous aquatic community is adversely affected.

3. Settleable solids: The addition of settleable solids that may adversely alter the stream bottom is prohibited.

(g) Ammonia: The concentration of the un-ionized form shall not be greater than 0.05 mg/l at any time instream after mixing. Un-ionized ammonia shall be determined from values for total ammonia-N, in mg/l, pH and temperature, by means of the following equation:

$$Y = 1.2\,(\text{Total ammona-N})/[1 + 10^{pK_a - pH}]$$

$$pK_a = 0.0902 + (2730/273.2 + T_c)$$

Where:

T_c = Temperature, degrees Celsius

Y = Un-ionized ammonia (mg/l)

(h) Toxics:

1. The allowable instream concentration of toxic substances or whole effluents containing toxic substances which are noncumulative or nonpersistent (half-life of less than ninety-six (96) hours) when not specified elsewhere in this section, shall not exceed the No Observed Effect Level (NOEL) or 0.1 of the ninety-six (96) hour median lethal concentration (LC50) of a representative indigenous or indicator aquatic organism(s) or exceed a chronic toxicity unit of one, whichever is more appropriate.

2. The allowable instream concentration of toxic substances or whole effluents containing toxic substances which are bioaccumulative or persistent, including pesticides, when not specified elsewhere in this section, shall not exceed the NOEL or 0.01 of the ninety-six (96) hour median lethal concentration (LC50) of a representative indigenous

or indicator aquatic organism(s) or exceed a chronic toxicity unit of one, whichever is more appropriate.

3. In the absence of acute criteria for substances listed in Table 2 or for other substances known to be toxic but not listed in this regulation, or for whole effluents which are acutely toxic, the allowable concentration shall not exceed the LC_1 or 1/3 LC_{50} concentration derived from bioassay tests on a representative indigenous or indicator aquatic organism(s) or exceed 0.3 acute toxicity units, whichever is more appropriate.

4. Where specific application factors have been determined for a toxic substance or whole effluent such as an acute/chronic ratio or water effect ratio, they may be used instead of the 0.1 and 0.01 factors listed in this subsection upon approval by the cabinet.

5. Allowable instream concentrations for specific substances (acute and chronic criteria) are listed in Table 2. These concentrations are based on protecting aquatic life from acute and chronic toxicity, and shall not be exceeded.

Table 2

Warmwater Aquatic Habitat Criteria[1]

Substance	Acute Criteria	Chronic Criteria
	Metals	
Arsenic		50 ug/l
Arsenic (III)	360 ug/l	190 ug/l
Beryllium		11 ug/l soft water[2]
		1100 ug/l hard water[2]
Cadmium (ug/l)	e(1.128 [In Hard*] - 3.828)	e(0.7852[In Hard] - 3.490)
Chromium (III) (ug/l)	e(0.8190 [In Hard] + 3.688)	e(0.8190[In Hard] + 1.561)
Chromium (VI)	16 ug/l	11 ug/l
Copper (ug/l)	e(.9422[In Hard] - 1.464)	e(.8545[In Hard] - 1.465)
Iron	4.0 mg/l	1.0 mg/l[3]

Lead (ug/l)	e(1.273 [ln Hard] - 1.460)	e(1.273 [ln Hard] - 4.705)
Mercury	2.4 ug/l	0.012 ug/l
Nickel (ug/l)	e(0.8460 [ln Hard] + 3.3612)	e(0.8460 [ln Hard] + 1.1645)
Selenium	20 ug/l	5 ug/l
Silver (ug/l)	e(1.72 [ln Hard] - 6.52)	
Zinc (ug/l)	e(0.8473 [ln Hard] + 0.8604)	e(0.8473 [ln Hard] + 0.7614)

Organics

Aldrin	3.0 ug/l	
Chlordane	2.4 ug/l	0.0043 ug/l
Chloropyrifos	0.083 ug/l	0.041 ug/l
DDT	1.1 ug/l	0.001 ug/l
Dieldrin	2.5 ug/l	0.0019 ug/l
Endosulfan	0.22 ug/l	0.056 ug/l

Endrin	0.18 ug/l	0.0023 ug/l
Heptachlor	0.52 ug/l	0.0038 ug/l
Lindane	2.0 ug/l	0.080 ug/l
Parathion	0.065 ug/l	0.013 ug/l
Pentachlorophenol (ug/l)	e(1.005 [pH] - 4.830)	e(1.005 [pH] - 5.290)
Phthalate esters		3 ug/l
Polychlorinated Biphenyls (PCBs)		0.0014 ug/l
Toxaphene	0.73 ug/l	0.0002 ug/l

Others

Chloride	1200 mg/l	600 mg/l
Chlorine, total residual	19 ug/l	10 ug/l
Cyanide, free	22 ug/l	5 ug/l
Hydrogen sulfide (undissociated)		2 ug/l

[1] Metal criteria, for purposes of this regulation, are total recoverable metals to be measured in an unfiltered sample.

[2] Soft water has an equivalent concentration of calcium carbonate ($CaCO_3$) of 0 to 75 mg/l, and hard water has an equivalent concentration of calcium carbonate ($CaCO_3$) of over 75 mg/l.

[3] The chronic criterion for total recoverable iron shall not exceed 3.5 mg/l when it is established that there will be no damage to aquatic life.

*Hard = Hardness as mg/l $CaCO_3$

(2) Coldwater aquatic habitat. The following parameters and their associated criteria are for the protection of productive coldwater aquatic communities and streams which support trout populations (whether self-sustaining or reproducing) on a year-round basis. All of the criteria adopted for the protection of warmwater aquatic life also apply to the protection of coldwater habitats with the following additions:

(a) Dissolved oxygen:

1. A minimum concentration of six (6) mg/l as a daily average and five (5) mg/l as an instantaneous minimum shall be maintained at all times.

2. In impoundments which support trout, the concentration of dissolved oxygen in waters below the epilimnion shall be kept consistent with natural water quality.

(b) Temperature. Water temperature shall not be increased through man's activities above the natural seasonal temperatures.

Section 5. Domestic Water Supply Use. Maximum allowable instream concentrations for specific substances, to be applicable at the point of withdrawal, for use for domestic water supply from surface water sources are specified in Table 3 and shall not be exceeded.

Table 3

Domestic Water Supply Source Criteria[1]

Substances Not Linked to Cancer	Concentration	
Metals		
Antimony	0.146	mg/l
Barium	1	mg/l
Cadmium	0.010	mg/l
Chromium	0.050	mg/l
Chromium (III)	170	mg/l
Copper	1	mg/l
Lead	0.05	mg/l
Manganese	0.05	mg/l
Mercury	0.144	ug/l
Nickel	13.4	ug/l
Selenium	0.01	mg/l
Silver	0.05	mg/l
Thallium	0.013	mg/l

Organics

Acrolein	0.320	mg/l
Monochlorobenzene	0.488	mg/l
1-2-4-5-tetrachlorobenzene	0.038	mg/l
Pentachlorobenzene	0.074	mg/l
1,1,1-trichloroethane	18.4	mg/l
2,4,5-trichlorophenol	2.6	mg/l
Bis (2-chloroisopropyl) ether	0.0347	mg/l
Dichlorobenzenes	0.400	mg/l
2,4-dichlorophenol	3.090	mg/l
Dichloropropenes	0.087	mg/l
Endosulfan	0.074	mg/l
Endrin	0.001	mg/l
Ethylbenzene	1.4	mg/l
Fluoranthene	0.042	mg/l
Hexachlorocyclopentadiene	0.206	mg/l
Isophorone	5.2	mg/l
Nitrobenzene	19.8	mg/l
2-4-dinitro-o-cresol	0.0134	mg/l
Dinitrophenol	0.070	mg/l
Pentachlorophenol	1.0	mg/l
Phenol	3.5	mg/l
Dibutyl phthalate	34	mg/l
Diethyl phthalate	350	mg/l
Di-2-ethylhexyl phthalate	15	mg/l
Dimethyl phthalate	313	mg/l

Asbestos (fibers/liter)	30,000
Benzene	0.66
Benzidine	0.00012
Carbon tetrachloride	0.40
Chlordane	0.00046
Hexachlorobenzene	0.00072
1,2-dichloroethane	0.94
1,1,2-trichloroethane	0.60
1,1,2,2,-tetrachloroethane	0.17
Hexachloroethane	1.9
2,4,6-trichlorophenol	1.2
bis(2-chloroethyl) ether	0.03
Chloroform	0.19
DDT	0.000024
Dichlorobenzidine	0.01
1,1-dichloroethylene	0.033
Dieldrin	0.000071
2,4-dinitrotoluene	0.11
Dioxin (2,3,7,8-TCDD)	0.000000013
Diphenylhydrazine	0.042
Halomethanes	0.19
Heptachlor	0.00028
Hexachlorobutadiene	0.45
alpha Hexachlorocyclohexane (HCH)	0.009
beta HCH	0.016
gamma HCH (Lindane)	0.019
Technical HCH	0.012

N-nitrosodiethylamine	0.0008
N-nitrosodimethylamine	0.0014
N-nitrosodibutylamine	0.0064
N-nitrosodiphenylamine	4.9
N-nitrosopyrrolidine	0.016
Polychlorinated Biphenyls (PCBs)	0.000079
Polynuclear Aromatic Hydrocarbons (PAHs)	0.0028
Tetrachloroethylene	0.8
Toxaphene	0.00071
Trichloroethylene	2.7
Vinyl Chloride	2.0

[1]See note 1 in Table 2.

Section 6. Recreational Waters. (1) Primary contact recreation water. Primary contact recreation waters are waters suitable for full body contact recreation during the recreation season of May 1 through October 31. Criteria for primary contact recreation waters are listed below:

(a) Fecal coliform content shall not exceed 200 colonies per 100 ml as a monthly geometric mean based on not less than five (5) samples per month; nor exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during the month; these limits are applicable during the recreation season. Fecal coliform criteria listed in subsection 2(a) of this section apply during the remainder of the year.

(b) pH shall be between 6.0 to 9.0 and shall not change more than one (1) pH unit within this range over a period of twenty-four (24) hours.

(2) Secondary contact recreation water. Secondary contact recreation waters are waters suitable for partial body contact recreation, with minimal threat to public health

due to water quality. The following criteria apply to waters classified for secondary contact recreation use during the entire year:

(a) Fecal coliform content shall not exceed 1000 colonies per 100 ml as a monthly geometric mean based on not less than five (5) samples per month; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during the month.

(b) pH shall be between 6.0 to 9.0 and shall not change more than one (1) pH unit within this range over a period of twenty-four (24) hours.

Section 7. Outstanding Resource Waters. This classification category includes certain unique waters of the Commonwealth.

(1) Water for inclusion:

(a) Automatic inclusion. The following surface waters shall automatically be included in this category:

1. Waters designated under the Kentucky Wild Rivers Act, KRS 146.200 - 146.360.

2. Waters designated under the Federal Wild and Scenic River Act, 16 U.S.C. 1271 et seq. and high quality waters constituting an outstanding national resource water.

3. Waters identified under the Kentucky Nature Preserves Act, KRS 146.410-146.530, which are contained within a formally dedicated nature preserve or are published in the registry of natural areas and concurred upon by the cabinet.

4. Waters that support federally recognized endangered or threatened species under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

(b) Permissible consideration. Other surface waters may be included in this category as determined by the cabinet if:

1. The surface waters flow through or are bounded by state or federal forest land, or are of exceptional aesthetic or ecological value or are within the boundaries of

national, state, or local government parks, or are a part of a unique geological or historical area recognized by state or federal designation; or

2. They are a component part of an undisturbed or relatively undisturbed watershed that can provide basic scientific data and possess outstanding water quality characteristics; or two (2) of the following criteria:

a. Support a diverse or unique native aquatic flora or fauna.

b. Possess physical or chemical characteristics that provide an unusual and uncommon aquatic habitat.

c. Provide a unique aquatic environment within a physiographic region.

(2) Outstanding resource waters protection: The classification of certain waters as outstanding resource waters shall fairly and fully reflect those aspects of the waters for which the classification is proposed. The cabinet will determine water quality criteria for these waters as follows:

(a) At a minimum, the criteria of Section 2 and the appropriate criteria associated with the stream use classification assignments in 401 KAR 5:026, are applicable to these waters.

(b) Where the values identified for an outstanding resource water are dependent upon or related to instream water quality, the cabinet will review existing water quality criteria and determine whether additional criteria or more stringent criteria are necessary for protection, and evaluate the need for the development of additional data upon which to base the determination. Existing water quality and habitat shall be maintained and protected in those waters designated as outstanding resource waters which support federally threatened and endangered species of aquatic organisms, unless it can be demonstrated to the satisfaction of the cabinet, that lowering of water quality or a habitat modification will not have a harmful effect on the threatened or endangered species which the water supports.

(c) "Water quality shall be maintained and protected in waters which constitute an outstanding national resource. The cabinet may approve temporary or short-term changes in water quality if the changes to the waters in question have no demonstrable impact on the ability of the waters to support this use."

(d) Adoption of more protective criteria in accordance with this section will be listed with the respective stream segment in 401 KAR 5:026, and will be promulgated as an administrative regulation pursuant to KRS Chapter 13A.

(3) Determination of classification:

(a) Any person may present a proposal to classify certain waters under this section. Documentation requirements in support of an outstanding resource water proposal shall contain those elements outlined in 401 KAR 5:026, Section 5 (1) through (8).

(b) The cabinet will review the proposal and supporting documentation to determine whether the proposed waters qualify as outstanding resource waters within the criteria established by this regulation. The cabinet will document the determination to deny or to propose reclassification, and a copy of the decision will be served upon the petitioner and other interested parties.

(c) After considering all of the pertinent data, a reclassification, if appropriate, will be made pursuant to 401 KAR 5:026.

Section 8. Water Quality Criteria for the Main Stem of the Ohio River. The following criteria apply to the main stem of the Ohio River from its juncture with the Big Sandy River at river mile 317.1 to its confluence with the Mississippi River, and shall not be exceeded: These waters are subject to all applicable provisions of 401 KAR 5:026, 401 KAR 5:029 and 401 KAR 5:031.

(1) Dissolved oxygen: concentrations shall average at least 5.0 mg/l per calendar day and shall not be less than 4.0 mg/l at any time provided that a minimum of 5.0 mg/l at any time is maintained during the April 15-June 15 spawning season.

(2) Temperature. (a) Allowable stream temperatures are:

Month/Date	Period Average (°F)	Instantaneous Maximum (°F)
January 1-31	45	50
February 1-29	45	50
March 1-15	51	56
March 16-31	54	59
April 1-15	58	64
April 16-30	64	69
May 1-15	68	73
May 16-31	75	80
June 1-15	80	85
June 16-30	83	87
July 1-31	84	89
August 1-31	84	89
September 1-15	84	87
September 16-30	82	86
October 1-15	77	82
October 16-31	72	77
November 1-30	67	72
December 1-31	52	57

(b) A successful demonstration conducted for thermal discharge limits under Section 316(a) of the Clean Water Act will constitute compliance with these temperature criteria.

(3) Total dissolved solids: Not to exceed 500 mg/l as a monthly average, nor exceed 750 mg/l at any time. Equivalent 25°C specific conductance values are 800 and 1,200 micromhos/cm respectively.

(4) Maximum allowable instream concentrations for specific parameters are given below. Metal concentrations are total recoverable values except hexavalent chromium which is dissolved.

Parameter	Concentration (mg/l)
Arsenic	.05
Barium	1.0
Chloride	250
Fluoride	1.0
Nitrite + Nitrate Nitrogen	10.0
Nitrite-Nitrogen	1.0
Phenolics	.005
Sulfate	250

Parameter	Chronic Criteria Concentration ug/l	Acute Criteria Concentration ug/l
Cadmium	e(.7852 [ln Hard] - 3.490)	e(1.128 [ln Hard] - 3.828
Chromium (hexavalent)	11	16

Copper	e(.8545 [In Hard] - 1.465)	e(.9422 [In Hard] - 1.464)
Cyanide (free)	5	22
Lead	e(1.273 [In Hard] - 4.705)	e(1.273 [In Hard] - 1.460)
Mercury	.012	2.4
Zinc	e(.8473 [In Hard] + .7614)	e(8473 [In Hard] + .8604)

(5) The net discharge of aldrin, dieldrin, DDT, including DDD and DDE, endrin, toxaphene, benzidine and PCBs is prohibited.

Section 9. Exceptions to Criteria.

(1) The cabinet may grant exceptions to the criteria contained in Sections 2, 4, 5, 6, 7, and 8 upon demonstration by an applicant that maintenance of applicable water quality criteria are not attainable or scientifically valid but the use classification is still appropriate. This determination will be made on a case-by-case basis with respect to a specific surface water following an analysis for each area.

(2) The analysis shall show that the water quality criteria cannot be reasonably achieved either on a seasonal or year-round basis due to natural conditions, or site-specific factors differing from the conditions used to derive Section 2, 4, 5, 6, 7, and 8 criteria, or a demonstration that meeting the criteria would cause substantial and widespread economic and social impact. Site-specific criteria shall be developed by the applicant utilizing toxicity tests, indicator organisms, and application factors that are consistent with those outlined in "Water Quality Standards Handbook" (EPA, 1983). In addition, an applicant shall supply the documentation listed in Section 5 of 401 KAR 5:026.

(3) An exception to criteria listed in Section 2(2) for the protection of human health from the consumption of fish tissue may be granted if it can be demonstrated that natural, ephemeral, intermittent or low flow conditions or water levels preclude the year-round support of a fishery, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges.

(4) Before granting an exception to water quality criteria, the cabinet shall ensure that the water quality standards of downstream waters are attained and maintained.

(5) All exceptions to water quality criteria will be subject to review at least every three years.

(6) Upon completing a review and the procedures for promulgation of administrative regulations pursuant to KRS Chapter 13A, exceptions to water quality criteria will be listed with the respective surface water in 401 KAR 5:026.

Adopted May 31, 1990

APPENDIX B

Comments from the Commonwealth of Kentucky Regarding the Draft Record of Decision

CARL H. BRADLEY
SECRETARY

WALLACE G. WILKINSON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

August 28, 1991

Harold W. Taylor, Jr., Chief
Kentucky/Tennessee Remedial Section
North Superfund Remedial Branch
United States Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RE: Draft Record of Decision and Comments on the Proposed Plan
Tri-City Industrial Disposal Superfund Site, Operable Unit #1
Brooks, Bullitt County, Kentucky

Dear Mr. Taylor:

Thank you for the additional time to allow the Commonwealth of Kentucky to adequately review the Draft Record of Decision (ROD) for the Tri-City Site, Operable Unit #1. As stated previously, we believe that complete characterization of a site is necessary before a successful strategy for remediation can be plotted. Such a characterization has not been done at Tri-City. However, we recognize the inherent difficulties of the process and the programmatic constraints within which EPA must operate. Kentucky will consider the successful remediation of operable Unit #1 as a first step in complete remediation of the entire site.

We generally concur with the remedial alternative selected in the Feasibility Study; i.e., treatment of water discharged from the Cox Spring by activated carbon adsorption. It is understood that other springs as well as groundwater, surface water, sediment and ecology will continue to be monitored and confirmatory sampling will be conducted to assess the effectiveness of the emergency removal action near the Cox, Sr. residence. EPA will provide potable water to residents who previously used the contaminated springs and will effect institutional controls over the use of contaminated water sources.

To the extent that the Baseline Risk Assessment may need to be modified as a result of confirmatory sampling, please consider relevant comments directed to you in our April 4, 1991 letter. As

you know, the Risk Assessment Section of the Kentucky Division of Environmental Services concluded that, due to deficiencies in the report which they reviewed, the cumulative lifetime risk could not be established. They also concluded that the ecological assessment was not complete enough to draw any conclusions. Since the Baseline Risk Assessment is a key component in setting remediation goals, it is imperative that Kentucky and EPA agree on the Assessment's validity.

Kentucky continues to maintain that KRS 224.877 is an Applicable or Relevant and Appropriate Requirement (ARAR) which is more stringent that federal requirements, a position with which EPA does not agree. We do agree, however, that if EPA meets the criteria outlined in Section 10 of KRS 224.877, it will have complied with the requirements of the statute. Again, the Baseline Risk Assessment is important in determining compliance with Section 10 and therefore must be reliable.

We have asked the Kentucky Division of Water Quality to identify the specific criteria in 401 KAR 5:031 which are applicable to the site. This information will be forwarded to you as quickly as we receive it.

Please contact Rick Hogan or me at (502) 564-6716 if you have any questions.

Sincerely,

Robert C. Logan for CM

Carl Millanti, Manager
Uncontrolled Sites Branch
Division of Waste Management

CM/RH/kb

cc: Kim Gates, U.S. EPA-Region IV
File

Record of Decision/Operable Unit #1
Tri-City Industrial Disposal Site
Brooks, Bullitt County, Kentucky

APPENDIX C

Responsiveness Summary

I. OVERVIEW

The Responsiveness Summary, as described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), is a summary of significant comments, criticisms, and new relevant information submitted during the public comment period for the Proposed Plan and the responses by the U.S. Environmental Protection Agency (EPA) to each issue. This Responsiveness Summary for the Tri-City Industrial Disposal Site in Brooks, Kentucky includes the information described in the NCP and a summary of the community involvement with the Site.

The Proposed Plan Fact Sheet for Operable Unit #1, which described EPA's preferred alternative for addressing the contaminants found at the Tri-City Site, was distributed to interested parties on April 19, 1991. The Proposed Plan Fact Sheet summarized the Site's background information, the results of the Remedial Investigation/Feasibility Study (RI/FS), and EPA's preferred remedial alternative. The Proposed Plan Fact Sheet is included as Attachment 1 to this document.

EPA held a public comment period from May 2 through June 1, 1991 for interested parties to comment on the RI and FS Reports and the Proposed Plan for Operable Unit #1 of the Site. All comments received by EPA during the public comment period were considered in the final selection of the remedial alternative for Operable Unit #1.

EPA held a public meeting on May 9, 1991 at 7 PM in the library of the Bullitt Lick Middle School in Shepherdsville, Kentucky to describe the Superfund process, to discuss the results of the RI and the FS, and to present the proposed remedial alternatives for addressing Operable Unit #1. The proceedings of this meeting are documented in the official transcript that is included as Attachment 2 of this Responsiveness Summary.

This Responsiveness Summary is organized into the following sections and attachments:

I. **OVERVIEW.** This section describes the purpose of the Responsiveness Summary and the events that preceded its development.

II. **SUMMARY OF COMMUNITY INVOLVEMENT.** This section summarizes community interest in the Site, EPA's community relations activities, and key public concerns.

III. SUMMARY OF MAJOR VERBAL QUESTIONS AND COMMENTS RECEIVED AND AGENCY RESPONSES. This section summarizes the verbal comments received by EPA during the meeting with local government officials on May 2, 1991 and the public meeting on May 2, 1991, and EPA's responses to those comments.

IV. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES. This section references the written comments received during the public comment period and EPA's written responses to these comments. The letters containing these comments are included in this document as Attachment 6.

ATTACHMENT 1: The Proposed Plan Fact Sheet for Operable Unit #1.

ATTACHMENT 2: Transcript from the Public Meeting held on May 9, 1991

ATTACHMENT 3: Sign-In Sheets from meeting with local officials and the Public Meeting, both held on May 9, 1991

ATTACHMENT 4: EPA Memorandum dated May 16, 1991 regarding the provision of public water to site residents

ATTACHMENT 5: Hand-Out from the Public Meeting held on May 9, 1991

ATTACHMENT 6: Letter from EPA to Ms. Sue Hayes dated August 26, 1991 in response to request for sampling information

ATTACHMENT 7: Written comments received during the public comment period and EPA's responses

II. SUMMARY OF COMMUNITY INVOLVEMENT

A. Background

The Tri-City Industrial Disposal Site was an industrial waste landfill known to have been operated by Tri-City Industrial Services, Inc. from late 1964 to late 1967. The Site is located in northern Bullitt County, Kentucky approximately 15 miles south of Louisville, Kentucky in the community of Brooks. Several families currently live on or adjacent to disposal areas that were active during the landfill operations.

The Site was a source of local citizen complaints and concerns to state and county government officials on numerous occasions during the disposal operations. In 1965, residents near the Site first complained to local officials about the unkempt condition of the landfill, explosions, fires, and smoke which was said to irritate eyes, make breathing difficult, and have an offensive odor. Additionally, deposition of ash and charred debris on neighboring properties led to a civil lawsuit for creating a public nuisance. In September 1966, the Bullitt County Circuit Court judge issued a permanent injunction prohibiting the burning of refuse at the Site. However, the judge ruled that use of the property for refuse disposal did not constitute a nuisance and was not unlawful.

In December 1966, the citizens of Brooks submitted a petition to the Kentucky Division of Environmental Health (DEH) to close the landfill. The Bullitt County Health Department, County Attorney, and the Commonwealth of Kentucky Department of Fish and Wildlife Resources along with DEH (now the Department of Health) investigated these complaints. The Kentucky DEH responded that no health laws were being violated. However, since the court prohibited burning of refuse at the landfill, a contempt of court charge was filed against Tri-City Service's president, Mr. Harry Kletter, in May 1967. In addition, two Grand Jury indictments were also served to Tri-City Services and to Mr. Kletter in March and November 1967. The first indictment charged the owners and operators of the landfill with creating a public nuisance. This indictment was later dismissed because of insufficient evidence. The citizens of Brooks obtained the second indictment against Tri-City Services, which resulted in the issuance of a warrant for the arrest of Mr. Kletter.

Following Mr. Kletter's arrest on the nuisance charge, a settlement was arranged whereby the charges would be dropped if Tri-City Services agreed to stop disposing of and burning waste at the Site. The arrest coincided with the eruption of a fire at the Site that burned for two years. Tri-City Services reportedly ceased all waste disposal activity shortly after the fire began.

Several individuals living in the vicinity of the Site have filed a private civil suit against Waste Management of Kentucky, Inc., Ford Motor Company, and General Electric Company, Inc. alleging damages resulting from contamination originating on-site. This action is apparently on-going.

B. EPA's Community Relations Activities

EPA involvement with the Site commenced in September 1985 following notification by the Kentucky Natural Resources and Environmental Protection Cabinet. To date, the EPA has conducted the following community relations activities at the Site:

- Issued a press release on May 24, 1988, in conjunction with the state agency, to announce a residential water sampling program;

- Established an information repository at the Ridgway Memorial Library in Shepherdsville, Kentucky in May 1988 to make site-related information available to the public;

- Established communications with the residents of the affected area to keep them informed of emergency removal activities taking place at the Site in August and September 1988;

- Conducted telephone interviews with citizens in the community during the period from April 7 to April 19, 1989 to gain an understanding of the community's perceptions of the Site;

- Conducted community interviews during a Site visit held April 11 through April 13, 1989;

- Published a Community Relations Plan in May 1989 to present an overview of community concerns and provide the basis for determining the appropriate community relations activities to support the RI/FS activities to be conducted at the Site;

- Issued a press release on May 25, 1989 to announce an availability session and an informal presentation to discuss activities at the Site and describe the sampling to be conducted during the Remedial Investigation;

- Issued a fact sheet in May 1989 to briefly describe the Site, the nature of the RI/FS, the community relations activities during the RI/FS, and future activities to be conducted by EPA at the Site;

- Conducted an availability session and informational meeting on June 1, 1989 at the Bullitt Lick Middle School in Shepherdsville, Kentucky to discuss the RI/FS activities with concerned citizens and local officials ;

- Updated the mailing list in March 1991;

- Conducted telephone interviews of several on-site residents to identify any new community concerns;

- Issued a fact sheet in April 1991 to describe the results of the RI/FS and present EPA's preferred alternative for addressing Operable Unit #1;

- Issued a public notice on April 29, 1991 to announce the Proposed Plan public meeting;

- Conducted a 30-day public comment period from May 2 through June 1, 1991 for the community to express concerns regarding the EPA's Proposed Plan for Operable Unit #1;

- Released the Administrative Record on May 2, 1991 for public review at the Ridgway Memorial Library and the EPA-Region IV Library;

- Met with locally elected government officials on May 9, 1991 at 10 AM to discuss site-related concerns; and

- Conducted a public meeting on May 9, 1991 at 7 PM at the Bullitt Lick Middle School in Shepherdsville, Kentucky to present the results of the RI/FS and EPA's preferred alternative for addressing Operable Unit #1 at the Site.

C. Community Concerns

The following concerns pertaining to the Tri-City Site were identified by local citizens during the telephone interviews and the interviews during the site visit in April 1989.

- Water Contamination

  The majority of residents in the area appeared to be using cistern systems, although several residents used wells and springs for potable water. Residents living along Brushy Fork Creek were concerned that the water might contain contaminants from the Site. Some residents were concerned about children playing in the creek or how their livestock may be affected by potentially contaminated water.

- Health Concerns

  In general, the residents living near the Site were concerned about their health and the safety of their livestock and the environment in which they live. Residents were interested in receiving information, as it became available, on the actual hazards associated with the Site and how these hazards will affect their health and well-being. The health problems at the time were perceived as being caused by previous exposures to contaminants from the Site.

- Enforcement Efforts

  Awareness of the costs estimated to cleanup the Smith's Farm Site prompted the desire to identify the parties responsible for the contamination at the Tri-City Site. Concerned citizens with information about other dump sites or active dumping activities which may not be under appropriate controls were not sure to whom their concerns should be addressed.

The north central Bullitt County community has participated in three federal Superfund sites: The A.L. Taylor Site (which is better known as the Valley of the Drums), the Smith's Farm Site, and the Tri-City Site. Residents have indicated an overall concern regarding dumping practices in their county. Many residents complained about random and varied dumping locations along steep ravines in the area and expressed concerns about well water contamination. The rough geography and sparse population has apparently made the area attractive to "midnight dumping."

The Tri-City Site, from the perspective of local, county, and state officials, did not seem to be as significant a source of concerns as the Smith's Farm Site. In interviews conducted for the development of the Community Relations Plan, the overwhelming majority of the state and local officials stated that they had not received complaints related to the Tri-City Site.

EPA conducted telephone interviews with several on-site residents in April 1991 to identify any new community concerns and to inform them of the upcoming public meeting. The primary concerns voiced by the residents involved the contaminated springs that had been used as sources of potable water, the lack of a public water supply, and the disruption caused by the Emergency Removal Action conducted by EPA in August and September 1988.

III. SUMMARY OF MAJOR VERBAL QUESTIONS AND COMMENTS RECEIVED AND AGENCY RESPONSES

Representatives from EPA met with locally elected government officials at the Bullitt County Health Department in Shepherdsville, Kentucky on May 9, 1991 before the public meeting. The sign-in sheet for this meeting is included in Attachment 3. The purpose of the meeting was to discuss site-related concerns. The following comments and concerns were raised during the meeting.

1. When were samples last collected at the Site? When will the confirmatory sampling included in the proposed remedial alternative be conducted?

   EPA Response: EPA's contractor, Ebasco Services, Inc., collected surface water, sediment, and surface soil samples during Phase I of the Remedial Investigation in July 1989. Phase II of the Remedial Investigation was conducted from September to November 1989 and the sampling activities included the collection of subsurface soil, groundwater, and air samples. EPA's Environmental Services Division conducted additional sampling of the Cox, Klapper, and Cattle Springs, and monitoring well MW-12, in December 1990 to verify the sampling conducted during the Remedial Investigation. The confirmatory sampling of site soils, sediment, and air that is included in the proposed remedy is anticipated to be conducted during the Remedial Design phase. EPA expects to implement the Remedial Design in six months to one year after the Record of Decision is signed by the Regional Administrator.

2. If additional contamination is found during the confirmatory sampling, will the remedy be changed?

   EPA Response: The purpose of the confirmatory sampling is to identify any additional contamination. The confirmatory sampling and the evaluation of the risk to human health or the environment from any identified contamination have been included in Operable Unit #1 for the Tri-City Site. The measures necessary to mitigate any threat to human health or the environment will be implemented in Operable Unit #2. Consequently, the remedy for Operable Unit #1 will remain the same, but the results of the confirmatory sampling will determine the actions included in Operable Unit #2.

3. How many homes are being provided with potable water? Will the provision of potable water continue for 30 years?

   EPA Response: Three residences, the two Klapper homes and the Cox, Sr. residence, have been provided with potable water by EPA since May 1988 due to the volatile organic contamination in the Cox and Klapper Springs. The remedy for Operable Unit #1 includes the continued provision of potable water to these residences until EPA determines, through long-term monitoring, that the groundwater is of sufficient and consistent quality for human consumption.

4. Are the families affected by the contaminated springs currently in any danger?

   EPA Response: No. EPA is providing the affected residents with potable water so that domestic usage of the contaminated springs is not necessary. In addition, the proposed remedy will include institutional controls to restrict the potable usage of any groundwater (including the locations where the groundwater discharges to the surface as springs) containing, or potentially containing, levels of contamination in excess of the Maximum Contaminant Levels established by the Safe Drinking Water Act. The restrictions may include local ordinances, conservation or restrictive easements, record notice, or some other appropriate measure. Restrictions will be placed on the Cox Spring, the Klapper Spring, the Cattle Spring, the Brading Spring #1, and the unnamed spring, and on the installation and use of groundwater wells.

5. Are Superfund monies, or other federal funds, available for the installation of public water lines to the residents on and in the area of the Tri-City Site?

   EPA Response: This concern was also raised by one of the site residents during the telephone interviews conducted in April 1991. Based on EPA's research following the telephone interview, it was determined that the installation of water lines to the site residents would cost approximately $1.5 million. The provision of potable water to the three residents affected by the contaminated springs costs approximately $2,420 annually. It is anticipated that the continued provision of potable water to these residents will be necessary for at least ten more years, resulting in an estimated total expenditure for the provision of

potable water of $31,460. Consequently, it is not cost-effective for EPA to fund the installation of the public water line. Moreover, it is apparently appropriate to only use Superfund monies for the residents affected by the contaminated sources of drinking water. No other federal funds were identified as being available for the installation of public water lines. The results of EPA's research are documented in the memorandum dated May 15, 1991 from Ms. Kimberly Gates, Remedial Project Manager, to Mr. Harold Taylor, Kentucky/Tennessee Remedial Section Chief, included as Attachment 4.

6. How close is the Tri-City Site to the Smith's Farm Site, which is also located in Bullitt County? Is it possible for contamination from the Smith's Farm Site to affect the Tri-City Site or vice versa?

   EPA Response: The two sites are approximately two miles apart and they are topographically separated by hills and valleys. Based on available information about the two sites, it is not believed to be possible for either site to affect the other.

7. Have all the drums on the Tri-City Site been excavated?

   EPA Response: Geophysical surveys of the Site were conducted prior to the initiation of the Emergency Removal Action in August 1988. In addition to identifying the area of drum disposal in the side yard of the Cox, Sr. residence, the results of the geophysical surveys were used to aid in determining additional trenching locations in the former landfill area. The trenching revealed that many of the geophysical anomalies were isulation and wire. A limited number of empty drums and drums containing solids were excavated and staged, but no additional liquids were located. The primary drum disposal location is believed to have been the side yard of the Cox, Sr. residence where 165 drums containing liquid wastes were excavated. It is believed that all drums containing hazardous materials have been removed from the Tri-City Site.

8. Have any wildlife studies been conducted at the Tri-City Site?

   EPA Response: EPA's Remedial Investigation included an aquatic survey of Brushy Fork Creek. In addition, an ecological reconnaissance of the Site was conducted by EPA and the U.S. Fish & Wildlife Service in August 1990. As a result of these studies, it has been

determined that Brushy Fork Creek is apparently a healthy stream supporting diverse communities of fish and insects. An ecological contaminant monitoring program has been included in the proposed remedy to determine if the Site is causing any short-term or long-term impacts to the environment. If any site-related ecological degradation is occurring, the measures necessary to mitigate the threat to the environment will be implemented in Operable Unit #2.

9. Explain the "State Acceptance" criterion for the assessment of the preferred remedial alternative. If the Commonwealth of Kentucky does not agree with EPA's proposed remedy and provide the 10% cost share, will anything get accomplished at the Site?

   EPA Response: State acceptance indicates whether or not, based on its review of the Remedial Investigation and Feasibility Study Reports, and the Proposed Plan, the Commonwealth of Kentucky concurs with, opposes, or has no comment on EPA's preferred alternative. Following signature of the Record of Decision, EPA will send Special Notice Letters to the Potentially Responsible Parties (PRPs) giving them the opportunity to perform the work involved in the selected remedy. If the PRPs decline to perform the work, EPA has the option of issuing a Unilateral Adminstrative Order to order the PRPs to perform the work described in the Record of Decision or EPA can perform the work using the monies provided by the Superfund trust fund. The 10% cost share from the Commonwealth of Kentucky would be necessary for EPA to perform the work. If the Commonwealth does not concur with the selected remedy, we can only assume that they would not agree to the 10% cost share. If that were to happen and we were not successful negotiating with the PRPs to perform the work, it is possible that no remedy would be implemented at the Site. However, EPA is optimistic that use of the Agency's various enforcement tools will encourage the PRPs to perform the needed Remedial Design and Remedial Action.

The comments voiced during the Proposed Plan public meeting held on May 9, 1991 for the Tri-City Site and EPA's responses are summarized below by subject. The proceedings of this meeting are documented in the official transcript that is included as Attachment 2 of this Responsiveness Summary. The sign-in sheets for the meeting are included in Attachment 3. A copy of the hand-out that was prepared for the meeting is included in Attachment 5.

A. The Impact and Hazards from the Site

1. What are the health hazards from the Site to future generations?

EPA Response: Based on the Baseline Risk Assessment that was conducted as part of the Remedial Investigation, EPA has identified potential health hazards associated with the ingestion of contaminated groundwater. Since potable water is being provided to affected residents, contaminated groundwater does not present a current health hazard. EPA also identified the site soils as a potential human health hazard if cattle are grazed and gardens are grown in soils containing a widespread level of contamination as was found in the one surface soil sample collected from the edge of the former landfill area. Confirmatory sampling is included in the proposed remedy to determine if the contamination is widespread.

2. What are the hazards associated with waste materials remaining on-site?

EPA Response: As part of the Emergency Removal Action that was conducted by EPA in 1988, areas of the Site that showed anomalies during the geophysical investigations were trenched. The operators of the backhoes primarily found fiberglass insulation, ash, wood, empty drums, and nonhazardous garbage. Consequently, based on the trenching and the sampling that has been conducted, additional excavations do not appear to be necessary because the hazardous materials have been removed.

3. What is the downstream impact of the contamination in the springs?

EPA Response: Based on the sampling conducted during the Remedial Investigation, Brushy Fork Creek has apparently not been adversely impacted by the Site.

4. Is it possible for site-related contamination to migrate to a drinking water well located at the foot of Brooks Hill (i.e., four miles away)?

EPA Response: Based on the available information about the hydrogeology and topography of the Site and the surrounding area, there is apparently no regional movement of groundwater away from the Site. The geologic formations immediately underneath the Site

appear to be the only ones affected, and the contaminated groundwater has been discharging to the surface as springs instead of migrating into deeper formations. The deeper wells installed during the Remedial Investigation were not impacted by the Site. Moreover, based on the topography of the area, the only wells that could be impacted would be wells screened in the formations immediately under the Site.

5. Could PCB contamination from the Site have migrated to Brushy Fork Creek and then downstream to Knob Creek?

   EPA Response: One species of PCB, Aroclor 1260, was detected at a level of 490 parts per billion in one surface soil sample collected from the eastern edge of the landfill during the Remedial Investigation. This detected level is less than half of one part per million. EPA's clean-up level for PCBs in a residential area is one-half to one part per million. PCBs were not detected in any other samples collected during the RI, including the surface water and sediment samples collected from Brushy Fork Creek. If the PCB contamination had been widespread, we would have found PCBs in the other samples and there probably would have been a noticeable impact to the environment. Moreover, PCBs do not tend to migrate so we would not expect to see downstream PCB contamination.

6. If sampling at the Site had been conducted fifteen years ago, would the detected levels of contaminants have been higher?

   EPA Response: It is not possible to answer this question without data from sampling. However, if volatile organic compounds (e.g., from solvents) had contaminated surface soils fifteen years ago, these compounds would probably have volatilized into the air or have migrated to the subsurface. In the case of the groundwater, there are too many variables (i.e., the rate of water movement, the rate of contaminant migration into and within the water, the rates of natural contaminant degradation and flushing, etc.) to speculate on whether contaminant levels have been higher in the past.

The Waste at the Site

1. What was in the drums that were excavated during the emergency removal in 1988 and how deep was the excavation? Did EPA dig down to uncontaminated soil?

EPA Response: The drummed materials included silicon and paint wastes, and the analyses revealed heavy metals and semi-volatile organic compounds. Additional information is included in the Emergency Response Action Final Report which is available for review in the Administrative Record at the Ridgway Memorial Library in Shepherdsville, Kentucky. According to this report, a variety of hazardous substances were detected in the analyses and the following waste streams were classified: organic liquids, aqueous liquids, PCB liquids, PCB solids, organic solids, and nonhazardous soil and debris. The hazardous compounds that were identified included tetrachloroethene, toluene, ethyl benzene, xylene, PCBs, and lead. The trench that was excavated to remove the drums from the side yard at the Cox, Sr. residence was approximately thirty feet long by twelve to fifteen feet wide by ten feet deep. Samples were collected from the soil following removal to determine if the soil was hazardous. Confirmatory sampling in the area of the removal trench has been included in the proposed remedy to determine if all of the contaminated soil was removed.

C. The Contaminated Springs and the Provision of Potable Water

1. How long will it take until the water in the Cox Spring is safe to drink?

EPA Response: If the primary source of contamination was removed by the Emergency Removal Action, it is anticipated that any residual contamination in the limestone and rock underlying the Site would be flushed out through the springs within ten years. Groundwater treatment will continue until the contaminant levels in the groundwater (as it discharges to the surface) decrease to within drinking water standards (i.e., Maximum Contaminant Levels and non-zero Maximum Contaminant Level Goals).

2. Since EPA's primary concern at the Site is the contaminated groundwater, why hasn't the installation of public water lines been considered as a possible alternative? For the cost of the proposed remedy (i.e., $2 million), thirty-five to forty miles of water line could be run throughout the area.

EPA Response: A significant portion of the cost of the remedy is for the additional sampling, the long-term monitoring, and the treatment of the Cox Spring. The total cost of providing potable water to the residences affected by the groundwater contamination is

approximately $2,420 annually, or an estimated $24,200 over the anticipated ten-year period. And, as previously discussed in this Responsiveness Summary, no other federal funds were identified as being available for the installation of public water lines. EPA would have considered using Superfund monies for public water to the affected residents if this alternative had been cost-effective.

D. Additional Sampling to be Conducted

1. How long will the additional sampling take?

EPA Response: EPA expects that the confirmatory sampling could take up to one year to complete after initiation. The long-term monitoring could be performed for up to thirty years. The time period for monitoring the springs will depend on how quickly the contaminant levels decrease. The monitoring will continue until EPA determines that the water is of sufficient and consistent quality for human consumption.

2. Will another public hearing be conducted after the additional sampling is completed to inform the community about the results?

EPA Response: If the confirmatory sampling reveals unacceptable levels of hazardous contaminants, the additional measures necessary to mitigate any threat to human health or the environment will be implemented as Operable Unit #2. Consequently, we would conduct another public comment period and public meeting to inform the community and solicit comments on the proposed remedial alternatives.

E. EPA's Involvement with the Site

1. How long has EPA known about the contaminated springs at the Site?

EPA Response: EPA was notified about one of the contaminated springs, the Klapper Spring, by the Commonwealth of Kentucky in 1988. EPA conducted additional sampling in May 1988 to confirm the contamination. EPA also identified another contaminated spring that was being used for drinking water. EPA then began providing potable water to the people that had been using the two springs as sources of drinking water. EPA also conducted an Emergency Removal Action in 1988 to remove drums of liquid waste from the Cox, Sr. property.

2. What brought the Site to EPA's or the state's attention?

   EPA Response: EPA was initially notified about the Site in 1985 by the Commonwealth of Kentucky. The actual site discovery probably resulted from several different lists of disposal sites. One list, the "Eckhart List", was created in 1979 as a result of a requirement that the fifty major chemical companies in the United States report all of their disposal sites in the country to EPA. At the same time, EPA was maintaining a list of potential hazardous waste sites based on information from the states. The Tri-City Site could have been on one of these lists, or the attention could have resulted from a past complaint.

3. Will EPA, as a government agency, remain in existence for the time period it will take to implement the remedy?

   EPA Response: Whether or not EPA will be in existence to enforce the long-term monitoring for up to thirty years will depend on Congress. Since we generally rely on the states after the first year of the remedy, the question is really whether or not the Commonwealth of Kentucky will be there.

F. State Involvement with the Site

1. How long were on-site residents still drinking contaminated water after the sampling was conducted by the Commonwealth of Kentucky in 1987?

   Response from the Commonwealth of Kentucky: We have no excuses to justify not acting on the sampling results that indicated that the Klapper Spring was contaminated and being used for potable water. The lapse from 1987 to 1988 was an oversight and there were serious repercussions as a result.

2. What would be necessary for the Commonwealth to concur with EPA's proposed remedy?

   Response from the Commonwealth of Kentucky: The Commonwealth generally requires cleanup to a more stringent level than EPA and there is a difference of opinion regarding how that is handled. This disagreement is state-wide, and not specific to the Tri-City Site. Moreover, the Commonwealth believes that the Site has not been adequately characterized and that it is inappropriate to select a remedy at this time.

3. Is state funding available for the installation of public water lines in the area of the Site?

   Response from the Commonwealth of Kentucky: Our primary concern is removal of the people from the effects of contamination. We feel that they have been removed since they are no longer drinking contaminated water. It would not benefit the Commonwealth in general to run the water line.

During the public meeting, a resident who lives adjacent to the former disposal area asked about the analytical results from the sampling conducted on her property during the Remedial Investigation. EPA responded in writing to this request for information, and a copy of the letter is included in Attachment 6.

IV. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

The comments received by EPA during the public comment period held from May 2, 1991 through June 1, 1991 and the Agency's responses are contained in Attachment 7. Comments were received from two of the Potentially Responsible Parties, Waste Management of Kentucky, Inc. and Ford Motor Company, and from the Kentucky Resources Council.

ATTACHMENT 1

Proposed Plan Fact Sheet for Operable Unit #1

Proposed Plan
Fact Sheet

Tri-City Industrial Disposal Site
Operable Unit One

Brooks, Kentucky

EPA

Region IV — ***April 1991***

INTRODUCTION

The U.S. Environmental Protection Agency (EPA), in cooperation with the Commonwealth of Kentucky, recently completed a Remedial Investigation (RI) to identify and characterize the nature and extent of contamination at the Tri-City Industrial Disposal Site (the "Site") in Brooks, Bullitt County, Kentucky. At the conclusion of the RI, a Feasibility Study (FS) was conducted to evaluate cleanup alternatives that address contamination problems identified at the Site during the RI and other investigations. The results of the investigation at the Site are discussed in the RI Report. Details of the alternatives evaluation are presented in the FS Report. Both reports are available for public review locally at the information repository located at the Ridgway Memorial Library on Walnut Street in Shepherdsville, Kentucky (see "Additional Public Information" on the back page).

This fact sheet presents EPA's preferred cleanup alternative, known as a Proposed Plan, for addressing groundwater contamination problems at the Tri-City Site. It also includes information on how interested members of the community can participate in EPA's selection process by submitting comments on the alternatives presented in the Proposed Plan. Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, requires that EPA publish Proposed Plans for addressing contamination problems at Superfund sites and provide the public with an opportunity to comment on the proposed course of action. EPA's Regional Administrator and the Commonwealth of Kentucky will consider public comments as part of the final decision-making process for selecting the cleanup remedy for the Site.

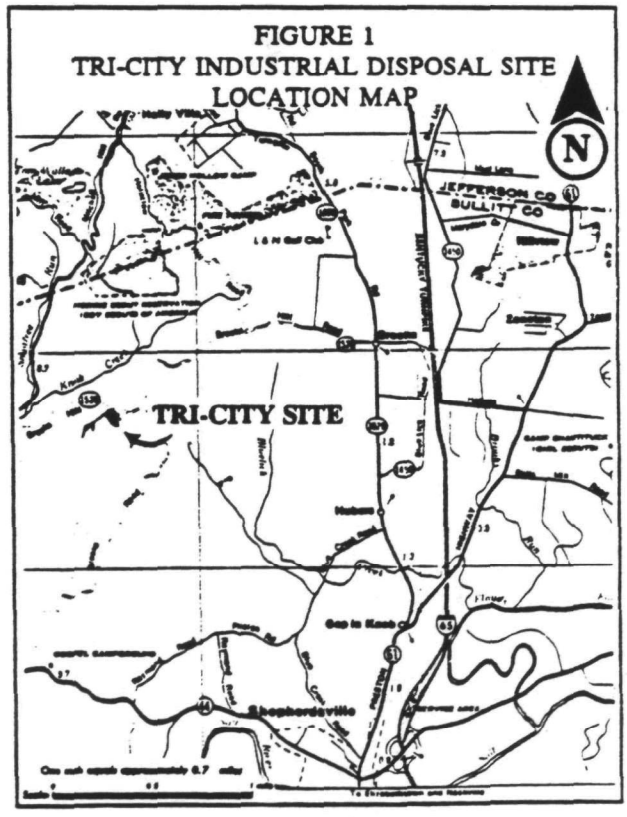
This Proposed Plan:

1. Includes a brief history of the Site and the principal findings of site investigations;
2. Presents the alternatives for the Site considered by EPA;
3. Outlines the criteria used by EPA to recommend an alternative for use at the Site;
4. Provides a summary of the analysis of alternatives;
5. Presents EPA's rationale for its preliminary selection of the preferred alternative; and
6. Explains the opportunities for the public to comment on the remedial alternatives.

BACKGROUND INFORMATION

The Tri-City Industrial Disposal Site was an industrial waste landfill known to have been operated by Tri-City Industrial Services, Inc. (the "Company") from late 1964 to late 1967. The Site, as shown in Figure 1, is

FIGURE 1
TRI-CITY INDUSTRIAL DISPOSAL SITE
LOCATION MAP



located in northern Bullitt County, Kentucky, approximately 15 miles south of Louisville, Kentucky, in the community of Brooks. The Site consists of an estimated 57 acres together with any real property to which hazardous constituents have migrated including, but not limited to, the Cox and Klapper Springs. The Site is located on the south side of State Highway 1526 (Brooks Hill Road) on Klapper Road, approximately four miles west of U.S. Interstate 65 and five miles northwest of Shepherdsville, Kentucky.

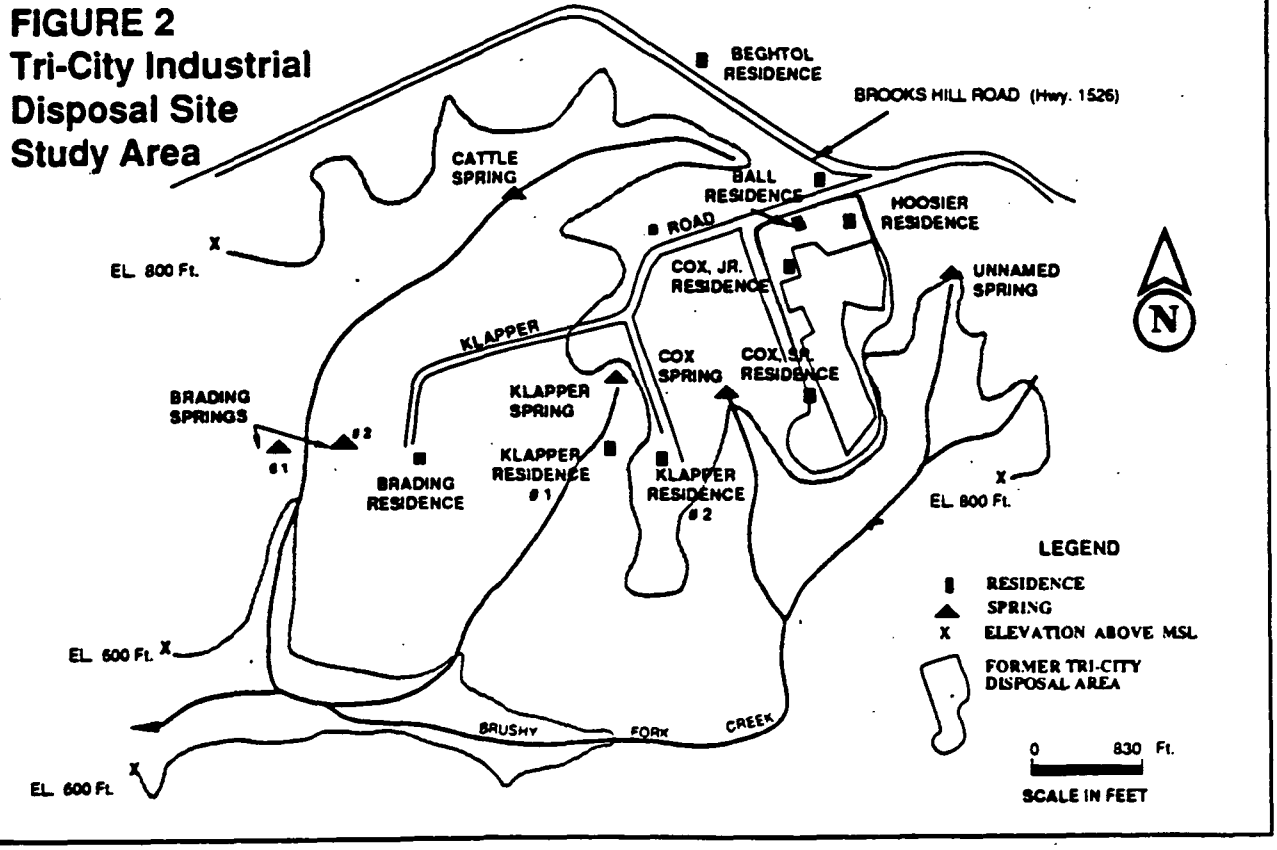
Situated on a broad ridge known as the Beghtol Ridge, the Site slopes moderately to the south. The southern boundary and portions of the western and eastern boundaries drop into steep, vegetated ravines. All surface drainage ultimately flows south where it enters Brushy Fork Creek, an intermittent stream that forms a confluence with Knob Creek approximately one and a half miles west of the Site. The majority of the Site is covered with grass and a few trees. A site map is provided in Figure 2.

Site ownership is currently divided between Mr. and Mrs. William Dawson Cox, Sr., Mr. William Dawson Cox, Jr., and Mr. and Mrs. Wenfrey C. Hoosier. These families, Mr. O. E. Ball, Mr. and Mrs. Roger Klapper, and Mrs. Loretta Klapper currently live on or adjacent to former disposal areas on the Site.

The Site was a source of local citizen complaints and concerns to State and County officials on numerous occasions during the disposal operations. In 1965, residents near the Site first complained to local officials regarding the unkempt condition of the landfill, explosions and fires, and smoke which was said to irritate eyes, make breathing difficult, and have an offensive odor. Additionally, deposition of ash and charred debris on neighboring properties led to a civil lawsuit for creating a public nuisance. The Bullitt County Health Department, County Attorney, and the Commonwealth of Kentucky Department of Fish and Wildlife Resources (Division of Fisheries) along with the Department of Health (then the Division of Environmental Health) investigated these complaints. An indictment, served to Tri-City Industrial Services, Inc. and others in November 1967, resulted in the arrest of the Company's president, Mr. Harry Kletter, on the nuisance charge. After Mr. Kletter's arrest, a settlement was negotiated whereby the charges would be dropped if the Company agreed to stop disposing of and burning waste at the Site. At about the same time as the arrest, a fire erupted on the Site that burned for two years. The Company reportedly ceased all waste disposal activity shortly after the fire began.

EPA involvement with the Site commenced in September 1985 following notification by the Kentucky

FIGURE 2
Tri-City Industrial Disposal Site Study Area



Natural Resources and Environmental Protection Cabinet (the "Cabinet"). The Cabinet conducted a Site Investigation (SI) at the Site in April 1987 to determine its eligibility for inclusion on EPA's National Priorities List (NPL), which is a federal roster of the nation's hazardous waste sites eligible for investigation and cleanup under the Superfund program.

The Cabinet's SI report revealed a number of heavy metals and organic contaminants in on-site soil samples and the presence of tetrachloroethene (also known as perchloroethylene, or PCE) in nearby springs, including two used for potable water by nearby residents. This finding prompted EPA to provide an alternate water supply to several residences in the area, an action which is ongoing. In addition, the springs used for potable water, along with a number of additional springs in the area, were then sampled by EPA. This resampling of springs confirmed the presence of PCE in the previously sampled potable water sources.

The Site received further attention when waste material was observed to be seeping out onto Mr. Cox's lawn, which prompted EPA to conduct an Emergency Removal Action in this area during the Summer of 1988. This activity resulted in the excavation and removal of approximately 165 drums (full or partially full), 400 gallons of free liquids, and 1000 cubic yards of soil and debris. Hazardous materials identified during the removal included PCE, toluene, ethyl benzene, xylene, polychlorinated biphenyls (PCBs), and lead. The cost of this action was approximately $736,000 and it was totally funded by the federal trust fund known as "Superfund".

The majority of the materials reportedly disposed of at the Site were industrial in origin from several Louisville, Kentucky-based industries. The bulk of the waste consisted of wood and fiberglass insulation material. The remaining wastes consisted of drummed residues and the liquid contents of drums that were poured onto the ground at the Site.

Based on the data from the Cabinet's SI report, EPA evaluated the hazards at the Site using the Mitre Hazard Ranking System (HRS). This system uses scores from 0 to 100 to indicate the probability and magnitude of harm to public health and the environment. Any site with a score of 28.50 or higher is eligible for inclusion on the NPL, which makes federal Superfund monies available for investigating and cleaning up the site, as necessary. As a result of this evaluation, the Tri-City Site received a HRS score of 33.82, based primarily on the potential hazard from contaminated groundwater (namely the springs), and it was included on the NPL on March 31, 1989.

EPA began the first phase of a long-term two-part comprehensive study of contamination at the Site, called a Remedial Investigation, in July 1989. The investigation was completed in August 1990. EPA conducted additional sampling of several springs, including the Cox and Klapper Springs, and one monitoring well in December 1990 to verify sampling conducted during the RI. The second phase of the study at the Site, the Feasibility Study, has been conducted to develop remedial alternatives for addressing the Site's known contamination problems. As with the earlier removal action, the RI and the FS were entirely funded by the federal Superfund trust fund.

RESULTS OF THE REMEDIAL INVESTIGATION

EPA's Remedial Investigation of the Tri-City Industrial Disposal Site focused on identifying the nature and extent of contamination in disposal areas outside the area where the Emergency Removal Action was conducted. The RI included the sampling of groundwater, surface water, sediments, soils, and ambient air. During the RI, six groundwater monitoring wells were installed and sampled. The installation of seven other wells was attempted, but not completed because of insufficient groundwater. Four springs were sampled, and six surface water samples were taken from Brushy Fork Creek and the two tributaries that discharge to the creek. Twelve sediment samples were collected in the areas of the springs and Brushy Fork Creek. Twenty surface soils samples and 25 subsurface soil samples were collected. And, 16 air samples were collected at three locations that were selected based on prevailing wind directions and the locations of residents. A detailed discussion of the RI results can be found in the RI Report available at the site information repository.

Of particular concern to EPA was contamination found in the Cox Spring. One sample and its duplicate collected from the Cox Spring were found to contain volatile organic compounds (VOCs), including PCE, at levels which exceeded federally established Maximum Contaminant Levels (MCLs). Several of the same contaminants were found at similar levels in a sample from the Cox Spring collected by EPA in December 1990. PCE was also found in the monitoring well next to the Cox, Sr. residence during the RI.

Volatile organic compounds were not found in the other springs sampled during the RI. However, small quantities of VOCs were found in samples collected by EPA from the Klapper Spring and the Cattle Spring in December 1990. Although the contaminant levels did not exceed MCLs, additional monitoring is warranted to determine if future levels will require action.

Low levels of polycyclic aromatic hydrocarbons (PAHs) and PCBs were found in surface soil samples on-site during the RI. However, additional sampling is necessary to determine the extent, if any, of contamination. Moreover, PCE was detected in low concentrations in two air samples when the wind was blowing up the slopes of the Cox Lobe.

Lead was detected in one sediment sample in a tributary of Brushy Fork Creek. However, additional sampling is necessary to determine the extent of any lead contamination in the sediment.

EPA conducted a joint ecological assessment of the Site with the U.S. Fish & Wildlife Service in August 1990. The current ecological impacts were determined to be minimal, but continued monitoring was recommended to identify any future impacts.

SUMMARY OF SITE RISKS

During the Remedial Investigation, an analysis was conducted to estimate the human health or environmental problems that could result if the contamination identified at the site was not cleaned up. This analysis, known as a Baseline Risk Assessment, focused on the potential health effects from long-term direct exposure to the contaminants found at the Site.

EPA has concluded that the major risk to human health and the environment at the Site would result from the ingestion of groundwater contaminated with volatile organic compounds, including PCE. This is not a current risk because potentially affected residences are being supplied with an alternate drinking water source. However, if residents were to use contaminated groundwater or spring water as a source of drinking water in the future, there would be long-term risks to human health.

A current exposure pathway that remains of concern is the air pathway. Although the calculated risk, based on the levels of PCE detected in the two air samples, does not represent a health concern, EPA recommends additional sampling to determine if there is still a source of PCE on-site.

Actual or threatened releases of hazardous substances from this Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare, or the environment.

For more information about the risks posed by the contamination at the Tri-City Industrial Disposal Site, please refer to the Baseline Risk Assessment contained in the RI Report. This document is available for review at the information repository at the Ridgway Memorial Library in Shepherdsville, Kentucky.

SCOPE AND OBJECTIVES OF THIS REMEDIAL ACTION

Using the information gathered during the Remedial Investigation and the Baseline Risk Assessment, EPA identified the following remedial action objectives for the cleanup at the Tri-City Industrial Disposal Site:

* Groundwater - (1) To clean up spring water having contaminant concentrations in excess of MCLs, and (2) to restrict potable usage and monitor springs in the area of the Site until the water is of sufficient and consistent quality for human consumption.

* Soil - To perform Confirmatory Sampling of site soil to confirm that (1) all contaminants of concern were removed by the Emergency Removal Action, (2) PCB and PAH contamination is localized, (3) apparently disturbed areas in the northeast quadrant of the Site (as shown in the aerial photograph taken in 1967) are clean, and (4) the soil on the sloped areas of the fill is clean.

* Sediment - To perform Confirmatory Sampling to determine the extent of any lead contamination in the tributary of Brushy Fork Creek.

* Air - To perform Confirmatory Sampling of ambient air to determine if there is a pattern of contamination and identify a source.

* Surface Water - To monitor surface water to provide assurance that surface water quality is not affected by site contaminants.

* Ecological - To monitor Brushy Fork Creek to identify future impacts from the Site.

The remedial action objectives proposed in this plan address the cleanup of contaminated groundwater (which is the principal threat known to exist at the Site), institutional controls, monitoring and Confirmatory Sampling. These actions will be implemented as Operable Unit #1.

If the Confirmatory Sampling reveals unacceptable levels of hazardous contaminants in areas of the Site that are not addressed by these remedial action objectives, the additional measures necessary to mitigate any threat to human health or the environment will be implemented as Operable Unit #2.

SUMMARY OF REMEDIAL ALTERNATIVES

EPA developed four remedial action alternatives to address the remedial action objectives established for the Site. Since the sampling conducted during the RI and in December 1990 indicated that only the Cox Spring is contaminated, the contaminated groundwater will be addressed by cleaning up the spring. Only one groundwater monitoring well out of the fifteen borings drilled during the Remedial Investigation had sufficient yield to be considered for extraction purposes. Therefore, a high degree of uncertainty exists in attempting to capture the contaminated groundwater within the variably fractured bedrock beneath the Site. It is believed that the contaminated groundwater is gradually being flushed through the springs.

The following descriptions of clean-up alternatives are summarizations. The FS Report contains a more detailed evaluation of each alternative.

ALTERNATIVE 1 - NO ACTION

By law, EPA is required to evaluate a "No Action" alternative to serve as a basis against which other alternatives can be compared. Under the no action alternative, the site would be left "as is" and no funds would be spent for this remedial alternative.

ALTERNATIVE 2 - LIMITED ACTION

Major components include:

* Institutional controls

* Monitoring

* Confirmatory sampling

Under this alternative, institutional controls such as local ordinances, conservation or restrictive easements, deed restrictions, record notice or some other appropriate measure would be imposed to prevent residents from using groundwater or spring water for domestic purposes. Potable water would be supplied to the on-site residents until EPA determines, through monitoring, that the springs are suitable for potable water usage.

The springs would be monitored by quarterly sampling for the first year to identify seasonal variations in contaminant levels, semi-annually for the next two years, and yearly thereafter for up to 27 years. In addition to continuous reviews for any public health concerns, the sampling results from the springs would be reviewed to identify contaminant levels that warrant remedial action. The groundwater and surface water would be monitored via annual sampling for up to 30 years and the sampling results would be reviewed every five years for possible alterations in the monitoring program. Ecological monitoring would be conducted every other year for the first ten years and every five years thereafter for up to 20 years.

Confirmatory sampling would be conducted to assess the effectiveness of the Emergency Removal Action near the Cox, Sr. residence. The apparently disturbed areas in the northeast quadrant of the Site (as shown in the aerial photograph taken in 1967) would be sampled to investigate possible contamination from drum disposal. The surface soils of the landfill would be sampled to establish the extent of PCB and PAH contamination. The sediment in the tributary of Brushy Fork Creek would be sampled to determine the extent of any lead contamination. Additional air sampling would be conducted. The slopes of the fill area and the on-site ponds would also be sampled.

The total present worth of this alternative for a 30-year period is approximately $1,714,000.

ALTERNATIVE 3 - CARBON ADSORPTION

Major components include:

* Carbon adsorption

* Institutional controls

* Monitoring

* Confirmatory sampling

This alternative involves treating the contaminated spring water in a carbon adsorption system containing an activated carbon adsorber. Monthly monitoring of the influent and effluent would be required for the first year to determine the frequency of carbon filter replacement. During the following 29 years, the influent and effluent would be sampled prior to carbon filter replacement. The spent carbon would be disposed of in a RCRA TSD facility in accordance with the appropriate RCRA regulations. If the carbon can be regenerated and reused, that option will be considered if it is cost-effective.

Combined with this alternative are the following actions previously described in Alternative 2: prevention of potable use of the groundwater and spring water and provision of an alternate water supply, until otherwise determined by EPA; long-term monitoring of groundwater, spring water, and surface water; ecological monitoring; and confirmatory sampling.

The total present worth of this alternative over a 30-year period is approximately $2,098,000.

ALTERNATIVE 4 - AERATION

Major components include:

* Aeration

* Institutional controls

* Monitoring

* Confirmatory sampling

This alternative consists of aerating the contaminated spring water prior to its release. This process would involve the construction of a series of concrete steps over which the spring water would pass. The water would aerate and thereby volatilize the major contaminants of concern (VOCs). A treatability study would be required to determine the design parameters for the aeration system prior to the construction of the steps. The influent and effluent would be monitored monthly for the first five years and annually for up to the next 25 years if the system is effective.

Combined with this alternative are the following actions previously described in Alternative 2: prevention of the potable use of groundwater and spring water and provision of an alternate water supply, until otherwise determined by EPA; long-term monitoring of groundwater, spring water, and surface water; ecological monitoring; and confirmatory sampling.

The total present worth of this alternative for a 30-year period is approximately $1,990,000.

CRITERIA FOR EVALUATING REMEDIAL ALTERNATIVES

EPA's selection of the preferred cleanup alternative for the Tri-City Industrial Disposal Site, as described in this Proposed Plan, is the result of a comprehensive evaluation and screening process. The Feasibility Study (FS) for the Site was conducted to identify and analyze the alternatives considered for addressing contamination at the Site. The FS Report for the Tri-City Site describes, in detail, the alternatives considered, as well as the process and criteria EPA used to narrow the list to four potential remedial alternatives to address spring water contamination.

EPA used the following nine criteria to evaluate alternatives identified in the FS. While overall protection of human health and the environment is the primary objective of the remedial action, the remedial alternative(s) selected for the Site must achieve the best balance among the evaluation criteria considering the scope and relative degree of the contamination at the Site.

1. Overall protection of human health and the environment: EPA assesses the degree to which each alternative eliminates, reduces, or controls threats to public health and the environment through treatment, engineering methods or institutional controls.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs): The alternatives are evaluated for compliance with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the site conditions.

3. Cost: The benefits of implementing a particular remedial alternative are weighed against the cost of implementation. Costs include the capital (up-front) cost of implementing an alternative as well as the cost of operating and maintaining the alternative over the long term, and the net present worth of both capital and operation and maintenance costs.

4. Implementability: EPA considers the technical feasibility (e.g., how difficult the alternative is to construct and operate) and administrative ease (e.g., the amount of coordination with other government agencies that is needed) of a remedy, including the availability of necessary materials and services.

5. Short-term effectiveness: The length of time needed to implement each alternative is considered, and EPA assesses the risks that may be posed to workers and nearby residents during construction and implementation.

6. Long-term effectiveness: The alternatives are evaluated based on their ability to maintain reliable protection of public health and the environment over time once the cleanup goals have been met.

7. Reduction of contaminant toxicity, mobility, and volume: EPA evaluates each alternative based on how it reduces (1) the harmful nature of the contaminants, (2) their ability to move through the environment, and (3) the volume or amount of contamination at the site.

8. State acceptance: EPA requests state comments on the Remedial Investigation and Feasibility Study reports, as well as the Proposed Plan, and must take into consideration whether the state concurs with, opposes, or has no comment on EPA's preferred alternative.

9. Community acceptance: To ensure that the public has an adequate opportunity to provide input, EPA holds a public comment period and considers and responds to all comments received from the community prior to the final selection of a remedial action.

EVALUATION OF ALTERNATIVES

Table 1 summarizes how the alternatives were evaluated using seven of the nine criteria.

State Acceptance

The Kentucky Natural Resources and Environmental Protection Cabinet (the "Cabinet") has reviewed and provided EPA with comments regarding the reports and data from the RI and the FS. Based upon their review of the selected alternatives, the Cabinet does not believe that State ARARs, as outlined in KRS 224.877, are being addressed. Nor do they feel that enough technical information about the Site is available to justify remedial action at this time.

However, EPA has carefully considered the requirements of KRS 224.87 and believes that Alternatives 3 and 4 are in compliance. Additionally, EPA feels that sampling data warrants the cleanup of the Cox Spring, provision of potable water, and monitoring of groundwater, springs, and surface water. EPA agrees that further sampling of sediments, site soils, and ambient air is necessary before making any decisions regarding cleanup.

Community Acceptance

Community acceptance of the various alternatives will be evaluated during the public comment period and it will be described in the Record of Decision (ROD) for the Site.

EPA'S PREFERRED ALTERNATIVE

Based on the analysis of alternatives in the Feasibility Study Report, EPA has identified Alternative 3 as the preferred method of addressing the established remedial action objectives for the Tri-City Industrial Disposal Site.

EPA preferred Alternative 3 to address the contaminated spring water in Cox Spring. This alternative involves treating the spring water in a carbon adsorption system to remove the volatile organic compounds (VOCs).

All of the alternatives, except Alternative 1 (No Action) provide adequate protection of human health and the environment. The risk associated with the contaminated spring water and the potential risks from the contaminated soils and air are investigated further to determine future remedial action.

Alternative 3 provides the most protection for human health and environment because the VOCs will be destroyed when the exhausted carbon filter is treated. Alternative 4 is less protective because the VOCs are merely transferred from the spring water to the atmosphere. However, both alternatives are effective in preventing contamination of surface water downgradient of the spring. Although Alternative 2 restricts potable use of the spring water, it will not prevent downgradient contamination.

Both Alternative 3 and 4 provide long-term effectiveness and permanence because treatment technologies are used to reduce the hazards associated with the VOCs. However, the aeration described in Alternative 4 is innovative and it requires a treatability study to determine the design parameters. Alternative 3 is a proven and widely available technology and it is easier to implement than Alternative 4. Alternative 2 costs the least, except for the No Action alternative, but it will not provide long-term effectiveness and permanence. The costs to implement Alternatives 3 and 4 are not substantially different.

Alternative 3 would reduce the toxicity, mobility, and volume of contaminated spring water through treatment. Alternative 4 would reduce the toxicity and volume of contaminated spring water, but the mobility is not reduced because the contaminants are transferred to the atmosphere. Alternative 2 will not reduce the toxicity, mobility, or volume of the contaminated spring water.

Alternatives 3 and 4 require installation of treatment units on-site. Therefore, the associated short-term risks to workers on-site and residents are similar. The time for implementation, approximately fourteen months, is also similar for both alternatives. Alternative 2 could be implemented expediently. And, Alternatives 3 and 4 comply with all ARARs.

TABLE 1

SUMMARY OF ALTERNATIVES EVALUATION
TRI-CITY INDUSTRIAL DISPOSAL SITE
OPERABLE UNIT #1 FEASIBILITY STUDY

ALTERNATIVE 1 NO ACTION	ALTERNATIVE 2 LIMITED ACTION	ALTERNATIVE 3 CARBON ADSORPTION	ALTERNATIVE 4 AERATION
Description:			
No remedial action will be performed and the site would be left as is.	Restrict groundwater and spring water use through institutional controls. Provide potable water supply to site residents. Perform long-term monitoring and confirmatory sampling.	Collect and treat spring water with carbon adsorption. Sample influent and effluent monthly for one year to determine carbon replacement schedule. Sample prior to carbon replacement for the next 29 years. Dispose of spent carbon in RCRA landfill. Restrict groundwater and spring water use through institutional controls. Provide potable water supply to site residents. Perform long-term monitoring and confirmatory sampling.	Collect and treat spring water with aeration. Sample influent and effluent monthly for first 5 years and annually for the next 25 years. Restrict groundwater and spring water use through institutional controls. Provide potable water supply to site residents. Perform long-term monitoring and confirmatory sampling.
Overall Protection:			
Risks to human health and environment not changed.	Risks to human health reduced by restricting groundwater use. Risk to environment not changed. Surface water not degraded. VOCs discharge to atmosphere. Risks from contaminated soil, sediment, and air would be addressed by confirmatory sampling.	Risks reduced by removing spring water contaminants and by restricting groundwater use. Treatment of spring water will prevent the spread of contaminants to protect the environment from further degradation. Risks from contaminated soil, sediment, and air would be addressed by confirmatory sampling.	Risks reduced by removing spring water contaminants and by restricting groundwater use. Treatment of spring water will prevent the spread of contaminants to downgradient surface water. Will discharge VOCs to atmosphere. Risks from contaminated soil, sediment, and air would be addressed by confirmatory sampling.
Compliance With ARARs:			
Would not comply with chemical-specific ARARs for groundwater. Would comply with location-specific ARARs. There are no action-specific ARARs.	Would not comply with chemical-specific ARARs for groundwater. Would comply with location-specific and action-specific ARARs. There are no chemical-specific ARARs for cleanup of soil, sediment, and air.	Treated spring water would comply with chemical-specific ARARs for surface water and groundwater. Would also comply with location-specific and action- specific ARARs. There are no chemical-specific ARARs for cleanup of soil, sediment, and air.	Treated spring water would comply with chemical-specific ARARs for surface water. Would also comply with location-specific and action-specific ARARs. There are no chemical-specific ARARs for cleanup of soil, sediment, and air.
Long-Term Effectiveness:			
Not effective in reducing risk from groundwater contaminants. Aquifer restoration depends on natural flushing and degradation of contaminants.	Institutional controls would ensure that groundwater is not used as a potable water supply. Not effective in reducing groundwater contaminant concentrations. Aquifer restoration depends on natural flushing and degradation of contaminants. Long-term monitoring required.	Spring water treatment would reduce the future potential risk from ingestion and other household uses and surface water contamination. Aquifer restoration depends on natural flushing and degradation of contaminants. Process monitoring required. Requires regeneration or disposal of spent carbon. VOCs are destroyed. Institutional controls would ensure that groundwater is not used as a potable water source.	Spring water treatment would reduce the future potential risk from ingestion and other household uses and surface water contamination. Aquifer restoration depends on natural flushing and degradation of contaminants. Process monitoring required. VOCs are discharged to the atmosphere. Institutional controls would ensure that groundwater is not used as a potable water source.

TABLE 1 (Cont'd)

ALTERNATIVE 1 NO ACTION	ALTERNATIVE 2 LIMITED ACTION	ALTERNATIVE 3 CARBON ADSORPTION	ALTERNATIVE 4 AERATION
Reduction of Toxicity, Mobility and Volume:			
No reduction of toxicity, mobility or volume.	No reduction of toxicity, mobility or volume of contaminated spring water. Mobility of contaminants would increase when discharged to the atmosphere.	Spring water treatment would reduce the toxicity, volume and mobility of spring water contaminants.	Spring water treatment would reduce the toxicity and volume of contaminants. Mobility of contaminants would increase when discharged to the atmosphere.
Short-Term Effectiveness:			
No risks to public.	No risk to public from sampling activities. Protective equipment required for personnel conducting long-term monitoring and confirmatory sampling.	Little risk to public or workers during implementation. Workers would be required to wear protective equipment. Spring water treatment would be operational within one to two months after site work is initiated. Confirmatory sampling would take twelve to eighteen months.	Little risk to public or workers during implementation. Workers would be required to wear protective equipment. Spring water treatment would be operational within one to two months after site work is initiated. Confirmatory sampling would take twelve to eighteen months.
Implementability:			
No work to be implemented.	Institutional controls can be implemented by federal, state, local officials, and/or owners. Groundwater monitoring could be performed using previously installed wells. Alternate water supply would continue using current method.	Technology demonstrated and commercially available. SPDES compliance monitoring required. Institutional controls can be implemented by federal, state, local officials and/or owners. Groundwater monitoring could be performed using previously installed wells. Alternate water supply would continue using current method.	Technology demonstrated and commercially available. SPDES compliance monitoring required. Institutional controls can be implemented by federal, state, local officials and/or owners. Groundwater monitoring could be performed using previously installed wells. Alternate water supply would continue using current method.
Cost:			
Capital: $0 Annual O&M: $0 Ecological Cost: $0 5-Year Cost: $0 Present Worth: $0	Capital: $ 880,798 Annual O&M: 1st Year $ 56,396 2nd Year $ 46,026 3rd Year $ 46,026 4th-30th Year $ 40,842 Pot. Water Supply $ 2,420 Ecological Cost: $ 22,704 5-Year Cost: $ 10,000 Present Worth: $1,714,000	Capital: $ 904,254 Annual O&M: Process Monitoring: 1st Year $ 34,386 2nd-30th Year: $ 23,896 Long-Term Monitoring: 1st Year $ 53,084 2nd Year $ 44,370 3rd Year $ 44,370 4th-30th Year $ 40,014 Pot. Water Supply $ 2,420 Ecological Cost $ 22,704 5-Year Cost: $ 10,000 Present Worth: $2,098,000	Capital: $1,080,743 Annual O&M: Process Monitoring: 1st-5th Year $ 20,980 6th-30th Year: $ 10,490 Long-Term Monitoring: 1st Year $ 53,084 2nd Year $ 44,370 3rd Year $ 44,370 4th-30th Year $ 40,014 Pot. Water Supply $ 2,420 Ecological Cost $ 22,704 5-Year Cost: $ 10,000 Present Worth: $1,990,000

Consequently, Alternative 3 represents the best balance among the criteria used in the evaluation. It is protective of human health and the environment, utilizes a permanent solution, poses little risk to the public or workers on-site, is readily implementable, and is cost-effective. It also satisfies EPA's preference for treatment as a principal element.

EPA's selection of Alternative 3 as the preferred remedial action at the Tri-City Industrial Disposal Site is preliminary. Based on new information or public comments, EPA, in consultation with the Commonwealth of Kentucky, may later modify the preferred alternative or select another remedial action presented in this Proposed Plan and the FS Report.

THE NEXT STEP

After the public comment period ends on June 1, 1991 (see below), EPA will review and consider all comments received from the community as part of the process of reaching a final decision on the most appropriate remedial alternative, or combination of alternatives, to address the contamination at the Tri-City Industrial Disposal Site. EPA's final choice of a remedy will be issued in a Record of Decision (ROD) for the Site this summer. A document, called the Responsiveness Summary, that summarizes EPA's responses to comments received during the public comment period will be issued with the ROD.

Once the ROD is signed by the EPA Regional Administrator, it will become part of the Administrative Record. EPA will then offer the Potentially Responsible Parties (PRPs) the opportunity to conduct the Remedial Design and Remedial Action under the terms of a Consent Decree. When the negotiation period ends, either the PRPs or EPA will begin developing the engineering design plans for implementing the remedial alternative(s).

If the Confirmatory Sampling conducted during the Remedial Design phase reveals unacceptable levels of hazardous contaminants in areas of the Site that are not addressed by the remedial actions identified in this Proposed Plan, the additional measures necessary to mitigate any threat to human health or the environment will be implemented as Operable Unit #2.

GLOSSARY

Activated Carbon: A powdered or granular form of carbon that has been treated to increase its surface area and adsorptive properties. It is widely used in pollution control systems because contaminants are adsorbed, or adhered, to the surface of the carbon.

Administrative Record: A file which contains all information used by the lead agency to make its decision on the selection of a response action under CERCLA. This file is required to be available for public review and a copy is to be established at or near the site, usually in an information repository. A duplicate file is maintained at a central location, such as a regional EPA and/or state office.

Aeration: A purification process that increases exposure of contaminated water to air circulation to remove volatile contaminants.

Applicable or Relevant and Appropriate Requirements (ARARs): Federal and State requirements that a remedy selected by EPA must attain. These requirements are site-specific and are generally categorized as chemical-specific, location-specific, and action-specific.

Bedrock: The layer of rock located below the glacially deposited soil and rock under the earth's surface. Bedrock can be either solid or fractured (cracked); fractured bedrock can support aquifers.

Bench-scale Study: A type of treatability study that is performed in the laboratory using small amounts of waste. These tests are generally used to determine if the "chemistry" of the cleanup process works.

Carbon Adsorption: A process for removing a variety of organic compounds. It involves passing the water through a chamber that is packed with activated carbon particles, where contaminants attach to the carbon particles, effectively removing contaminants from the water.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). These acts created a special tax that goes into a trust fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, EPA can either: (1) pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work, or (2) take legal action to force parties responsible for site contamination to clean up the site or pay back the Federal government for the cost of the cleanup.

Consent Decree: A legal document, approved by a judge, that formalizes an agreement reached between EPA and PRPs through which PRPs will conduct all or part of a cleanup action at a Superfund site. The consent decree describes the actions the PRPs will take.

Ecological Monitoring: Monitoring of an ecosystem to determine if it is being adversely impacted by contaminants originating from a hazardous waste site. The monitoring includes the analyses of tissues from organisms in the ecosystem and using living organisms to measure the effects of a contaminant.

Effluent: The stream of water that flows out of a treatment process.

Emergency Removal Action: An immediate action taken over the short-term to address a release or threatened release of hazardous substances.

Feasibility Study (FS): The second part of a two-part study called a Remedial Investigation/Feasibility Study (RI/FS). The FS identifies and evaluates remedial alternatives that are designed to address contamination problems found during the RI at a Superfund site. (See the definition for RI.)

Groundwater: Water found beneath the earth's surface that fills spaces between materials such as sand, soil, gravel, and cracks in bedrock to the point of saturation. Groundwater is often used as a source of drinking water via municipal or domestic wells. Groundwater typically flows very slowly compared to surface water, along routes that often lead to rivers or lakes.

Hazardous Substance: Any material that poses a threat to human health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.

Influent: The stream of contaminated water entering a treatment process.

Information Repository: The location of a file containing current information, technical reports, and reference documents regarding a Superfund site. The information repository is usually located in a public building that is convenient for local residents, such as a public school, city hall, or library.

Institutional Controls: Legal, non-engineering measures to prevent human exposure to contaminants at hazardous waste sites.

Maximum Contaminant Levels (MCLs): Enforceable drinking water standards developed under the Safe Drinking Water Act for public water supplies. MCLs are the maximum permissible levels of contaminants.

Monitoring: The continued collection of information about the environment that helps determine the effectiveness of a cleanup action.

National Priorities List (NPL): EPA's list of the top priority hazardous waste sites that are eligible for federal money under Superfund.

Net Present Worth: The amount of money necessary to secure the promise of future payment, or series of payments, at an assumed interest rate.

Operable Unit: A discrete action that comprises an incremental step toward comprehensively addressing problems at a Superfund site. Operable units may address geographical portions of a site, specific site problems (such as contaminated groundwater), or interim actions that will be followed by subsequent actions which fully address the scope of the problem.

Organic Compounds: One of two large classes of chemical compounds: organic and inorganic. The term "organic" is used to describe substances that are primarily composed of carbon, hydrogen, and oxygen. Examples of organic compounds include petroleum products such as solvents, oils, and pesticides.

Parts per Million (ppm): A way of expressing tiny concentrations of pollutants in air, water, soil, human tissue, food, or other products. One ppm of a compound in water corresponds to one gallon of the chemical in one million gallons of water.

Polychlorinated Biphenyls (PCBs): A group of toxic, persistent organic chemicals used in transformers and capacitors for insulating purposes and in gas pipeline systems as a lubricant. Further sale for new use was banned by law in 1979.

Polycyclic Aromatic Hydrocarbons (PAHs): A group of organic compounds characterized by a fused ring-like molecular structure. PAHs are common environmental pollutants that are produced by the incomplete combustion of organic materials. These compounds occur in the exhaust from motor vehicles and other gasoline and diesel engines, the emissions from coal-, oil-, and wood-burning stoves and furnaces, cigarette smoke, and charcoal-broiled foods.

Persistence: Refers to the length of time a compound, once introduced into the environment, stays there.

Potable water: Water that is safe for drinking and cooking.

Potentially Responsible Parties (PRPs): An individual, business, or government organization identified by EPA as potentially liable for the actual or threatened release of hazardous substances from an uncontrolled hazardous waste site.

Record of Decision (ROD): A public document that explains which cleanup alternative will be used at a National Priorities List site and the reasons for choosing that cleanup alternative over other possibilities.

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup that follows the remedial design.

Remedial Alternatives: A combination of technical and administrative methods developed and evaluated in a Feasibility Study that can be used to address contamination at a Superfund site.

Remedial Design (RD): The phase of a Superfund site cleanup that follows the Remedial Investigation/ Feasibility Study and includes development of engineering drawings and specifications.

Remedial Investigation (RI): The first part of a two-part study called a Remedial Investigation/ Feasibility Study (RI/FS). The RI is a study during which information is collected and analyzed to determine the nature and extent of contamination at a Superfund site.

Resource Conservation and Recovery Act (RCRA): This act regulates the transportation, storage, treatment, and disposal of hazardous wastes.

Sediment: Materials such as sand, soil, mud, and decomposing animals and plants that settle to the bottom of a pond, stream, river, or lake.

Source: Area(s) at a hazardous waste site from which groundwater and surface water contamination originate.

Superfund: The name commonly used in reference to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. Superfund also refers to the trust fund that is used for to pay for the investigations and cleaning up of abandoned or uncontrolled hazardous waste sites.

Surface Water: Streams, lakes, ponds, rivers, or any other body of water naturally open to the atmosphere.

Toxicity: The degree of danger posed by a substance to animal or plant life.

Treatability Study: A study that is conducted to collect data on cleanup technologies to determine if they will be effective.

Treatment, Storage, and Disposal (TSD) Facility: Any building, structure, or installation where a hazardous substance has been treated, stored, or disposed. TSD facilities are regulated by EPA and state governments under the Resource Conservation and Recovery Act (RCRA).

Volatile Organic Compound (VOC): A group of organic compounds that are characterized by the tendency to evaporate (or volatilize) into the air from water or soil. Common VOCs include commercial and industrial solvents such as toluene, xylene, tetrachloroethene (perchloroethylene, or PCE), and ethyl benzene.

TECHNICAL ASSISTANCE GRANT (TAG) PROGRAM

Community groups interested in interpreting the technical information presented in the RI and FS reports and other studies may be eligible for one grant of up to $50,000 in Federal funds. The purpose of the grant is to provide technical assistance for community residents seeking to understand site documents. For further information or an application, contact the TAG Coordinator identified at the end of this fact sheet.

OPPORTUNITIES FOR PUBLIC INVOLVEMENT

Public Comment Period

EPA is conducting a 30-day public comment period from May 2 to June 1, 1991 to provide an opportunity for public involvement in the final cleanup decision. During the comment period, the public is invited to review this Proposed Plan and the Remedial Investigation and Feasibility Study reports. These documents are available at the information repositories indicated below. During the comment period, interested members of the community may submit written comments to Ms. Suzanne Durham, the EPA Community Relations Coordinator for the Tri-City Industrial Disposal Superfund Site, at the address listed below. Comments must be postmarked no later than June 1, 1991. Oral comments may be presented during the Public Meeting.

Public Meeting

EPA will hold a public meeting on May 9, 1991 at 7:00 PM in the library of the Bullitt Lick Middle School, located at 1080 West Blue Lick Road in Shepherdsville, Kentucky. This meeting will include a presentation that describes the activities and findings of the Remedial Investigation conducted at the Site and the evaluation of cleanup alternatives conducted during the Feasibility Study. The public is encouraged to

attend the meeting to hear the presentation, to ask questions, and to comment on alternatives identified in the Proposed Plan. Comments made during the meeting will be transcribed, and a copy of the transcript will be added to the Site's Administrative Record available at the information repository.

Additional Public Information

Because the Proposed Plan provides only a summary description of the Tri-City Industrial Disposal Site and the cleanup alternatives considered, the public is encouraged to consult the Administrative Record, which contains the Remedial Investigation Report, the Feasibility Study Report, and other site documents, for a detailed explanation of the Site and all of the remedial alternatives under consideration.

The Administrative Record will be available for review at the following locations no later than May 2, 1991:

Records Center (404) 347-0506
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365
Contact: Mr. Tom Love
Hours: Monday - Friday, 8 AM - 5 PM

Ridgway Memorial Library (502) 543-7675
Walnut Street
P. O. Box 146
Shepherdsville, Kentucky 40165
Contact: Mr. Randy Matlow, Director
Hours: Monday - Saturday, 9 AM - 5 PM
Tuesday 9 AM - 7 PM

The following EPA and State personnel may be contacted if you have further questions:

Suzanne Durham (404) 347-7791
Community Relations Coordinator
Waste Management Division (4WD-NSRB)
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Kimberly Gates (404) 347-7791
Remedial Project Manager
Waste Management Division (4WD-NSRB)
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Denise Bland (404) 347-2234
Technical Assistance Grant Coordinator
Waste Management Division (4WD-WPB)
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Bob Padgett (502) 564-6716
Uncontrolled Sites Branch
Division of Waste Management
Kentucky Department for Environmental Protection
18 Reilly Road
Frankfort, Kentucky 40601

Mailing List Additions

If you would like your name and address placed on EPA's mailing list to receive information on the Tri-City Industrial Disposal Superfund Site, please fill out this form and mail it to:

Suzanne Durham
Community Relations Coordinator
Waste Management Division (4WD-NSRB)
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Name: _____

Address: _____

_____

_____

Telephone: _____ Affiliation: _____

ATTACHMENT 2

Transcript from the Public Meeting
May 9, 1991

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION IV

PUBLIC INFORMATION MEETING

TRI-CITY INDUSTRIAL DISPOSAL

SUPERFUND SITE

MAY 9, 1991

7:00 P.M.

BULLITT LICK MIDDLE SCHOOL

1080 WEST BLUE LICK ROAD

SHEPHERDSVILLE, KENTUCKY 40165

REPORTED BY:

SHARON L. KLOSTERMAN
Court Reporter
1806 South Third Street
Louisville, Kentucky 40208
(502) 637-1602

ORIGINAL

APPEARANCES:

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Environmental Protection Agency
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KIM GATES
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APPEARANCES (continued)

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TONY ABLE
Groundwater Technology Support Unit
Environmental Protectional Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

The following was heard on Thursday, May 9th, 1991, at 7:00 O'clock p.m., at Blue Lick-Middle School in Shepherdsville, Bullitt County Kentucky.

MR. TAYLOR: Welcome, everybody. My name is Harold Taylor. I am the Chief of the Tennessee-Kentucky Remedial Section in the Superfund Program at Region IV, EPA, in Atlanta Georgia.

We are here tonight for the Tri-Cities public meeting. We'll get into the agenda and everything in a minute. We are going to have a presentation, a short presentation, after we get through with the Tri-Cities presentation on the Smith's Farm Site. So, dual purpose tonight but the primary purpose is to go over the Tri-City Site and Proposed Plan for the remediation of that site. So, for those of you that are here primarily for Smith's Farm, we'll try and get through the Tri-Cities as fast as we can and not keep you here all night.

First of all, I'd like to, number one, thank the school for letting use their facilities here. This is about the third time I know that I have been here and they are more than accomodating. In fact

it's one of the better facilities that we get to use in Tennessee or Kentucky.

First of all, what I'd like to do is introduce a few of the people that are here tonight. We have some - - can you all hear me alright? Good. I'll try to speak up. Let me just introduce a few of the local people that we have here.

Glenn Armstrong. There we go. Glenn is the Bullitt County Judge-Executive. Appreciate it, Glenn.

Dennis Mitchell, Bullitt County Magistrate. Is that right? Thanks, Dennis.

Ned Fitzgibbons with the Bullitt County Health Department. Appreciate it, Ned, your coming tonight.

Carl Millanti is here with the Kentucky Superfund Program. And next to Carl is Rick Cogan. And right behind Rick is Bob Padgett, all with the Superfund Program.

Let me see. Okay. Let me introduce the - - Glenn Armstrong. I got Glenn. There we go. Okay.

Let me introduce a few of the EPA people that are here tonight. On my immediate left, your right, is Kim Gates. Kim is the Remedial Project

Manager in the Tennessee-Kentucky Remedial Section at EPA, Region IV, in Atlanta, who is in charge of the Tri-City Site. It is her responsibility to oversee the project and basically move EPA through the Superfund process on the Site. So, she'll be making presentations tonight on what we have done to date with the the Tri-City Site. Over on her left is Tony DeAngelo.

Tony DeAngelo is the Remedial Project Manager for the Smith's Farm Site. He is also in the Tennessee-Kentucky Remedial Section at the U.S. EPA, Region IV, in Atlanta, Georgia. Now, over on my right is Brook Dickerson.

Brook Dickerson is the Assistant Regional Counsel in our Office of Regional Counsel and she is the attorney who is representing the U.S. EPA, Region IV, for the Tri-City Site. Over on her right is Suzanne Durham.

Suzanne Durham is the Community Relations Coordinator for the Tri-City Site and for the Smith's Farm Site and for all the other sites in Tennessee and Kentucky. And over, again, on her right is Glenn Adams.

Glenn is a toxicologist in the Water Division and he is here tonight mainly to answer

any questions that people may have about the health effects, or whatever, regarding the chemicals that we found at the Site. And over on his right is Tony Able.

Tony is a groundwater hydrologist that's in our Groundwater Technology Support Unit at EPA, Region IV. So, I think I've introduced pretty much everyone here.

What we're going to try to do tonight, if you look over the agenda, and if you don't have, there are copies of most of the slides there in the back, along with the fact sheet on the Tri-City Site and the fact sheet on the Smith's Farm Site. What we are going to do tonight is run through this agenda in about an hour and then open it up for questions and answers on the Tri-City Site.

We do have a court reporter here who is completing a record for the agency. So what we will ask you to do is let us get through our hour of presentation and hold your questions until the end and then we'll answer your questions. The other thing that I would ask you to do is when you, if you do have a question at the end, I'd like to ask you to please stand up and state your name so that we have a record of who is asking the question. And if you have a really difficult name to spell it might not hurt to

spell your name for the reporter and I'm sure she will appreciate that.

We will take about a ten minute break after we get through with the questions and answers on Tri-Cities. The Court Reporter will stop and then we'll answer any questions you have on the Smith's Farm Site at that time. I think that's pretty much it for the agenda.

Just go over and we'll go over this a couple of times tonight. But the Administrative Record for the Tri-City Site, and that is a record for all documents that EPA has used to come to the proposed plan that we are here to discuss tonight. They are located at the Ridgeway Memorial Library in Shepherdsville. It's - - the documents are probably about - - fit on a bookshelf about yea long. But we'll try and summarize it, as best we can tonight, what's in those documents for you. But we do welcome you to go to the library and review the documents at any time that you please.

I want to go over just real briefly the Superfund process, in general, to bring you up with how we got to where we are and where we are currently because it is a somewhat confusing procedure.

As you see, it starts off with a

Site Discovery Process and the Smith's Farm Site, as you well know, has a history dating back to '87/'88, as far as the agency is concerned. After a site is discovered, and basically anyone can do that; a citizen, an industry, a state agency, a federal agency. And when I say "discover', that means that it goes into our inventory of Potential Hazardous Waste Sites. We have an inventory of approximately thirty-some odd thousand of potential hazardous waste sites in the nation.

After the site is discovered it is put on our surplus list of potential sites and we basically go out and do Preliminary Assessment, Site Inspection, if necessary. And eventually we go through a hazardous ranking process for those sites that warrant that type of attention.

After a site is ranked and put on the NPL, we go through a remedial investigation and feasibility study. We have done all of these things at the Tri-City Site and we're about somewhere right in here. Because we are here tonight to solicit community input on the proposed plan that is in the fact sheet at the back of the room. After we have done that we will go through what we call what we call a 'Record of Decision', and then the site will go through a Remedial

Design and Remedial Action. I'll explain a little bit about each of those.

Again, sites can be discovered and reported by anyone. That means if you know of other sites, we'd be glad to hear about them. Either the state or the federal government will look at that and make a preliminary assessment and Site Investigation that is required and determine if the site warrants further study.

For those sites that warrant further study we go through what is called a "Hazardous Ranking System". And it is basically a numerical way to rate sites so that you can get a way to compare sites across the nation to make sure that the federal government is working on those sites that are - - that pose the most potential risk or dangers because there are so many sites. Any site that scores over 28.5 currently goes on the on the National Priorities List.

There are several other ways to get on the NPL. The state can request one site per state to go on the NPL without going through a hazardous ranking. And there are certain others cases that if there is immediate threat and the score doesn't rank appropriate then it can be put on the in NPL.

Again, the NPL is just the

nation's highest priority sites. At a mininum the NPL is updated annually. We are going through a revamp of the Hazardous Ranking System currently but I think nationwide there are over twelve hundred sites on the National Priority List. Approximately 160 in Region IV, which is the eight southeast and southern states. And there are seventeen sites that are ranked in Kentucky. There are actually three in Bullitt County.

Again, just to emphasize that the whole purpose for the National Priority List and the Hazardous Ranking System is so that the federal government works on what are potentially the worst sites in the nation.

Okay. After a site is ranked and put on the NPL, the government can do what is called a 'Remedial Investigation'. And it is basically just to go out and look at the site and determine what the extent of contamination is. After we have determined the extent we will evaulate those contaminants and see what risk they pose, if any, to the public or the environment.

After the Remedial Investigation is done and we know basically the extent of the contamination, the types of contaminants and what risks they pose to the public or environments, we do a

Feasibility Study. And that is just a study that focuses on what type of remedial alternatives there are and which ones appear to be more useable at that site.

Again, what -- after we have done a Feasibility Study we will go in, after we have solicited public comments which we are doing part of that tonight, we'll review the public comments and finalize the decision in a Record of Decision. And that will be a formal document that the Regional Administrator at EPA, Region IV, will sign that says that this is the selected alternative for this site.

Again, you can see it is somewhat of a long system. But after the Record of Decision is is signed there is a Remedial Design. In other words, there is no detailed design when the Record of Decision is signed. There will be a detailed design done which will say, you know, to implement that alternative you need to first go in and study the structure of the soils, do more monitoring, et ceterra.

And then once the design is done generally that design will be bid out. Just like you wouldn't build a house unless you had a set of plans, the design is just simply that. It's to come up with a set of plans that you can bid out. And then the Remedial Action, whatever that is, is actually carried

out. That's pretty much the process.

With that, I'm going to turn the meeting over right now to Kim Gates who will go over the site background and what we found in the Remedial Investigation. And that's pretty much it for now. Thank you, very much.

MS. GATES: Hi, everybody. I'm Kim Gates. I'm Remedial Project Manager on the Tri-City Site. And I apologize if I do a little too much reading but I am very nervous. I have never done one of these meetings before. I am not a great public speaker, I am a better engineer.

The Tri-City Industrial Site, the Superfund Site, is located in northern Bullitt County, approximately 15 miles south of Louisville, in the community of Brooks. The Site is located south of State Highway 1526, on Klapper Road.

The Site was used as an industrial landfill from late 1964 to late 1967. The landfill accepted waste from several industries in the Louisville area and the bulk of materials disposed of at the Site reportedly consisted of were scrap lumber and fiber glass insulation. However, drum waste and bulk liquids were also disposed of at the Site.

The Site was a source of

complaints to local government officials from nearby residents during the disposal operations. The complaints were regarding the bad condition of the landfill, explosions, fires, smoke, and offensive odors. A civil lawsuit was filed in November, 1967, against Tri-City Industrial Services and the company agreed to stop disposing and burning of waste if the charges were dropped. At about the same time, however, a fire erupted at the Site that reportedly burned for two years.

The Kentucky Natural Resources and Environmental Protection Cabinet, and I'll refer to them as 'the Cabinet' as I go through my talk, the Cabinet conducted a Site investigation in April 1987, to determine if the potential environmental hazards of the Site were great enough for it to be included on EPA's National Priorities List.

The Site Investigation revealed that heavy metals and organic contaminants were present in on-site soil samples and the presence of tetrachloroethene in two springs that were being used for drinking water by nearby residents. EPA started providing water to the affected residents and resampled the springs to confirm the contamination.

The Site received further

attention when waste materials observed to be seeping out of the side yard of the Cox, Sr., residence which is located adjacent to the disposal area. EPA conducted an emergency removal in 1988 that resulted in the excavation of approximately 165 full or partially full drums, 400 gallons of free liquids, and a 1000 cubic yards of soil and debris.

The Site was included on the National Priorities List in March, 1989, based primarily on the potential hazard from contaminated groundwater, namely the springs.

In July 1989, EPA began the first phase of a long-term two-part detailed study of the Site. This first phase is called 'Remedial Investigation'. And the purpose of the Remedial Investigation is to characterize the Site conditions, determine the nature of the waste, and evaluate the risk to human health and the environment. Both phases of this detailed study, as well as the earlier removal, have been funded by the federal Superfund trust fund.

The Remedial Investigation included the sampling of groundwater, surface water, sediment, soils, and air. During the investigation six groundwater monitoring wells were installed and

sampled. The installation of seven other wells was attempted, but these wells were not completed because there was not enough water. Six surface water samples were taken from Brushy Fork Creek and four springs were sampled with a duplicate sample taken from the Cox Spring. Twelve sediment samples were collected in the areas of the springs and Brushy Fork Creek. Twenty surface soil samples and 25 subsurface soil samples were collected. And, 16 air samples were collected at three locations. The three air sample locations were selected based on the prevailing wind directions and the locations of the residents. A detailed discussion of results of the Remedial Investigation can be found in the report that has been included in the Administrative Record at the Ridgeway Memorial Library. And I'll refer to that when I talk about some of the documents and the information, I will refer back to the Administrative Record in the Ridgeway Memorial Library where you can look them up.

We are particularly concerned about the contamination found in the Cox Spring. Several volatile organic compounds, including tetrachloroethene, were found at levels above maximum contaminant levels which are enforceable drinking water standards developed under the Federal Safe Drinking

Water Act. Several of the same contaminants were found at similar levels in the sample collected by EPA in December 1990. During the Remedial Investigation tetrachloroethene was also found in the monitoring well next to the Cox, Sr., residence.

Volatile organic compounds were not found in the other springs sampled during the 1989 investigation. However, small quantities of contaminants were found in samples collected by EPA from the Klapper and Cattle Spring in December 1990. Although the quantities did not exceed the Maximum Contaminant Levels, we believe that additional monitoring is necessary in the event that future levels are higher.

Tetrachloroethene was also detected at low levels in two air samples. An additional sampling is recommended to determine if there is a source. One species of PCB and low levels of polycyclic aromatic hydrocarbons, also now known as PAHs, were found in one surface soil sample at the edge of the landfill. Low levels of PAHs were also found in one subsurface soil sample in the same area. And that subsurface soil sample was from about five to 13 feet deep. The EPA believes that further sampling in this area of the landfill is necessary to determine the

extent of any contamination.

Lead was detected in one sediment sample in a tributary of Brushy Fork Creek. However, additional sediment sampling is necessary in that area also to determine if there is an extent of lead contamination.

EPA conducted an ecological assessment in August 1990, along with the U.S. Fish & Wildlife Service. This was to determine if Site related contamination was causing ecological damage. The current impacts were determined to be minimal, but continued monitoring was recommended to identify any furture impacts.

Based on the results of the Remedial Investigation and the Baseline Risk Assessment, we have identified actions to be taken at the Site as the first Operable Unit. And as an aside, an Operable Unit is defined as one action or a set of actions that are taken to address site problems. An Operable Unit can include specific site problems such as the contamination in Cox Spring and interim actions such as further sampling that will be followed by later actions to address any identified problems. And we would include these later actions as another Operable Unit.

The actions that we have identified to be taken as the first Operable Unit at this Site involve not - - no use of the groundwater and spring water for drinking water purposes and a continued provision of water to affected residents, cleaning up the Cox Spring, further sampling of Site soils, the sediment in the tributary of Brushy Fork Creek and air. And long-term monitoring of groundwater in the other springs and the surface water sediment and ecology of Brushy Fork Creek.

If the additional sampling reveals contamination at levels that present a human health or environmental threat, the actions that are necessary to remove that threat will implemented as Operable Unit #2.

Glenn Adams is here to answer any questions you all may have regarding the Risk Assessment that was conducted as part of the Remedial Investigation.

EPA has recently completed second phase of the long-term two-part detailed study of the Site. This second phase is called Feasibility Study. The purpose of the Feasibility Study is the development and evaluation of cleanup alternatives for the Site based on available information. Four possible Remedial

Alternatives were identified to address the findings in the Remedial Investigation.

Each alternative was evaluated using eight of the nine evaluation criteria. The criteria involving community issues and concerns is being evaluated during this meeting and the Public Comment Period which ends June 1.

The criteria we look at when we evaluate alternatives include the overall protection of human health and the environment, compliance with state and federal and environmental public health laws, and requirements that apply or are relevant and appropriate to the site conditions. And the acronym ARAR that you see there, stands for Applicable or Relevant and Appropriate Requirements.

We also evaluate the long and short-term effectiveness and how well the alternative reduces the harmful nature of the contaminants, which we refer to as 'toxicity', the ability of the contaminants to move through the environment, and the volume or amount of contamination at the site. We also evaluate how easy the alternative is to construct and implement, the state acceptance of the alternative, the community acceptance and last, but certainly not least, the cost effectiveness of the alternative. Which

involves weighing the benefits of implementation against the total cost.

The evaluation of the alternatives proposed for the Tri-City Site are described in detail in the Feasibility Study Report that is available for review in the Administrative Record at the Ridgeway Memorial Library.

The four alternatives that were developed for the Site are: Alternative 1, is no action. By law, EPA is required to evaluate a No Action Alternative to serve as a basis against which other alternatives can be compared. Under the No Action Alternative the Site would be left as is and no funds would be spent.

The second alternative involves limited action which includes institutional control such as local ordinances, record notice, or some other appropriate measure to restrict people from using groundwater or spring water for domestic purposes. The provision of drinking water would continue until EPA determines that the spring water is safe for drinking. This alternative also involves the long-term monitoring of the groundwater and the springs and the surface water, sediment, and ecology of Brushy Fork Creek. Confirmatory sampling of site soils, the sediment in

the tributary of Brushy Fork Creek, and the air would also be conducted.

The third alternative involves the actions described in the second alternative and cleaning up the Cox Spring by treating the contaminated spring water in a carbon absorption system. This system is essentially a filtration system that contains an activated carbon filter. The contaminated spring water would pass through the system and the volatile or organic compounds would stick to the carbon. The water that leaves the system would be sampled regularly to determine when the filter needs to be replaced. The used filter would either be treated for reuse or properly disposed of.

The fourth alternative also involves the actions described in the second alternative in treatment of the contaminated spring water. However, this alternative consists of aerating the contaminated spring water to remove the contamination.

The aeration system would consist of what we are looking at this point, is approximately 30 concrete steps that would be constructed for the spring water to pass over as it runs down the hill. The purpose of the steps is to increase the mixing of

the air and water so that the volatile organic compounds leave the water and enter the air. Since this treatment method is not well-established, a study would have to be done to determine if it would be effective and if the contamination entering the air would also require treatment.

These alternatives were described in the Proposed Plan Fact Sheet and discussed in detail in the Feasibility Study Report.

Based on the analysis of alternatives conducted during the Feasibility Study we recommend Alternative 3 to address the actions we have determined to be needed at the Site.

As I mentioned previously, Alternative 3 involves institutional controls to restrict domestic use of the groundwater and spring water, provision of alternate water to affected residents, long-term monitoring and Confirmatory Sampling.

EPA prefers the third alternative for the following reasons: Number one, it is the alternative that is most protective of human health and the environment. It provides reliable protection over time with minimal risks during construction and implementation. It prevents contamination of Brushy

Fork Creek and the air. It utilizes a permanent solution. It uses a proven and widely available technology that is easy to implement. It reduces the toxicity, mobility and volume of contaminated spring water through treatment and it is cost effective. And it satifies EPA's preference for treatment as the principal element. And though we prefer Alternative 3 at this time, the selection of this alternative is preliminary. Based on new information or public comments, EPA in consultation with the Cabinet, may later modify this alternative or select one of the others I have presented or that was discussed in the Feasibility Study before.

After the Public Comment Period ends on June 1, 1991, EPA will review and consider all the comments received from the community. A document called the 'Responsiveness Summary', that summarizes EPA's responses to the comments received, will be issued with the Record of Decision this summer.

The Record of Decision documents EPA's final choice of a remedy and we anticipate issuing it in July of this year. After it is signed by the Regional Administrator, the Record of Decision will be included in the Administrative Record at the Ridgeway Memorial Library.

And if you would like further information about the Site, these people can be contacted: Suzanne, as you know, is here and I am here also. These addresses and phone numbers are also listed in the fact sheet. And with that, I'm going to turn things over to Suzanne Durham to talk to you about Community Relations Activities.

Thank you.

SUZANNE DURHAM: Good evening. I'm Suzanne Durham and I am the Community Relations Coordinator for this Site. Choosing the final response action is perhaps the most important decision made at any Superfund site. EPA's job is to analyze the hazards and to deploy the experts. But the agency needs citizen input as it makes choices for affected communities. Because the people in the community with the Superfund site are those most directly affected by hazardous waste problems and cleanup processes, we encourage citizens to get involved in that decision making process. Public involvement and comment does influence EPA cleanup plans by your providing valuable information about site condition, community concerns, and your preferences.

We recently issued a Proposed Plan Fact Sheet which summarizes the Remedial Investigation

and Feasibility Study. We also sent the Administrative Record to the Ridgeway Memorial Library. And that Administrative Record contains all the documents that we used in developing our Proposed Plan and Preferred Alternatives.

I hope you have had the opportunity to go by that library and look at the Administrative Record, if not, please do so and then ask your questions tonight and submit your written comments to the Agency. We are soliciting comments on all alternatives under consideration. The comment period began May 2, and extends through June 1, 1991. If you need additional time we can grant an extension. We need you to submit a request for that extension within two weeks of tonight's meeting however.

After the Public Comment Period ends the EPA prepares a document called a Responsiveness Summary. And that's where we summarize your comments and questions and then our responses to you. The Record of Decision, which is the document describing in detail the cleanup action to be used, will be signed after careful consideration of state and public comments. When the Record of Decision is signed by our Regional Administrator in Atlanta, a notice will be published in your local newspaper. And at that

point the Record of Decision and Responsiveness Summary would become available to the public as part of the Administrative Record.

An excellent opportunity for community involvement is through our Technical Assistance Grant or TAG Program. Congress recognized that our documents were quite lengthy and technical in nature and we can now provide the opportunity for a community group in to receive a grant in the amount of Fifty Thousand Dollars to hire an expert to interpret our data for you.

In summary, the goal of community relations is to keep you informed and involved in complex decisions which will affect your community. Kim, and I, are your two contacts at EPA and we want you to feel free to contact us anytime you have a question or a concern.

Right now, I'll ask Brook Dickerson, our attorney, to speak with you about the Enforcement Process.

BROOK DICKERSON: Thank you, Suzanne.

Can everyone hear me? Okay. My name is Brook Dickerson. I'm the Assistant Regional Counsel for Region IV. As Harold mentioned, those are

the eight southeastern states which of course includes Kentucky.

As you have just heard, the EPA has proposed a plan for cleaning up the Tri-City Industrial Site. The public will have an opportunity to comment on that proposed plan. And after those comments are received and looked at by EPA the Regional Administrator, for Region IV, will make the ultimate decision on exactly what remedy will be required to clean up the Site. I am here to talk about how we get the ball rolling in implementing that remedy.

A major goal of EPA is to have sites cleaned up by those persons whom the law has determined are responsible for cleaning up the site. The law sets forth four groups of persons who are determined to be potentially responsible. Those groups include either, number one, the current owners and operators of the property.

Number two, either the owners or operators of the property at the time that the hazardous substances were initially released or during the release.

The third group of potentially responsibile parties are transporters. Those persons who were involved in transporting hazardous substances

to the site.

And the fourth group are those persons who we call "Generators". Basically, they are the persons who arranged for the disposal of hazardous substances through the transporters and they - - and those substances eventually ended up at the site. We call these different groups of persons Potentially Responsible Parties, or PRPs for short. This means that they are potentially liable for performing the cleanup or for paying the cost of the cleanup generally is more appropriate.

EPA attempts to identify as many PRPs as possible and as early as possible in the, you know, scheme. Some parties may no longer be around. Some parties may not have the financial resources available to participate in a cleanup of the site. And some parties which would - - who would otherwise be potentially responsible may have valid defenses which are available under the law. If the PRPs are identified early enough EPA notifies them of the potential liability and offers them the opportunity to participate in the cleanup.

As you have seen, it is a very long process and we try to get private parties involved as early as possible. If they have not been identified

beforehand, or if they were identified but declined to participate, EPA notifies them again after the Record of Decision which is document outlining the final decision on what remedy will be appropriate.

This notification is called a 'Special Notice Letter'. The Special Notice Letter does three things. First it gives the potentially responsible parties more information about the site. Secondly, it gives them the opportunity to perform the work or to offer to pay for the work. Third, it places a moratorium on EPA activities for 60 days.

Now the moratorium period means that EPA will restrain from activities which would incur additional costs for cleaning up the site unless an emergency comes up and action is required. The reason we do that is so that the EPA and the PRPs can try to negotiate a settlement.

The PRPs have 60 days to show the EPA two things: First, they have to demonstrate to the EPA that they have a good faith intent to either perform the Remedial Action or to pay for that action. They must also demonstrate to EPA's satisfaction that they are capable of doing the work correctly and competently or that they are capable of financing the cost associated with the work. If they can demonstrate

these two things to EPA that's called a good faith offer. If the good faith offer is received within that first 60 day period then EPA will extend the moratorium for a second 60 days. So, we end up with a 120 days of a negotiation period or approximately four months. This is so that EPA and the PRPs, either all of them or whichever ones want to go forward in the negotiations, can work out the details of the agreement. EPA will invite the state and the natural resource trustees to participate in the negotiations if they choose. If an agreement is reached it is spelled out in a document called a 'Consent Decree'.

One thing I'd like to make clear is that when we negotiate with Potentially Responsible Parties we are not negotiating what work will be done at the site. That work is required by whatever has been included in the Record of Decision. We are negotiating other types of issues, usually legal issues. For example if there are past costs that might have been incurred before we got into the Remedial Investigation or the Feasibility Study that Kim described, and those are still outstanding, we might want to negotiate those kinds of costs.

The Consent Decree must be approved by the Department of Justice. That's required

by the law. After the Department of Justice approves the Consent Decree it is filed with the court. This usually takes approximately forty-five days. After it is filed with the court it is a public document and the public is invited to look through the terms of the specific agreement and to comment on those terms. If EPA receives comments which cause it to want to change terms of the agreement, it will amend the Consent Decree and then move that it be issued as final by the court. If no amendments are required then the Consent Decree becomes final as it stands. Now, once this is entered into as final by the court, it's an enforceable document. So that if there were ever any problems EPA would just go straight to the court to have it enforced as if it were a law. This process usually takes an additional thirty to 45 days. It can take longer if Public Comment raises substantial concerns or points to new issues which need to be considered.

Now, if the EPA and the Potential Responsible Parties have not been able to come to any type of an agreement, EPA has two options on how to proceed. First, it can issue an order to the Potentially Responsible Parties ordering them to perform the work as set forth in that Record of Decision. This order is called a 'Unilateral

Administrative Order' and it is also enforceable in court but not immediately because it hasn't been entered as final by the court. So, it doesn't take long to issue the order but if we needed to go in to enforce it because the Potentially Responsible Parties continue not to be cooperative then the trial may take some time.

EPA's second option is go in and perform the work itself using monies provided by the Superfund which was the trust fund that Kim mentioned earlier. After that, EPA would most likely sue those PRPs for reimbursement of its costs. This process can take some time but it important to try to get those who are responsible for cleaning up the site to clean up the site. It's in our interest to look to them expend resources before using up the very limited dollars which are available in the trust fund. For every site where we can use Potentially Responsible Party dollars or private funds the more money is left in Superfund to clean up new sites where there may not be any PRPs left or there may not be any PRP money.

One thing I would also like to mention is that even if Potentially Responsible Parties do agree to do the work, EPA will always oversee all of the work that is done to ensure that it is done

correctly and competently. If EPA ever determines that that work is not being done correctly, or if new information is discovered which leads EPA to determine that a change is required, EPA can always take back authority over the site and run the cleanup itself.

If you have any questions during the question and answer period, I will be glad to answer them.

Thank you.

HAROLD TAYLOR: What I would like you to do, if possible, is stand up and state your full name. And if it's a difficult name, spell it. I'd appreciate you spelling it. Direct your questions to me and then either I'll try to answer them or direct them to the appropriate party for them to answer.

So, if there are any questions.

Yes , ma'am.

RUTH KLAPPER. Yes. I am Ruth Klapper.

HAROLD TAYLOR: Yes, ma'am.

RUTH KLAPPER: I'd like to find out what about the health hazards in the future for the future generations of our children.

HAROLD TAYLOR: If I could, what I will do is turn that over to Glenn Adams. But

I'd like to say that we have done a Risk Assessment of potential hazards to the community over the short and the long-term. And I'll let Glenn sort of go over our process and what we think the health hazards are.

GLEN ADAMS: Yes, ma'am. What we do when it comes to Risk Assessment. The Remedial Investigation goes out and takes the samples of the soils, the surface water, the sediment, the groundwater; we do different things. We go through and we do a full-blown Risk Assessment which takes into account all the different exposure scenarios for a pathway, or exposure pathway is another term. For that to be complete it takes exposure to contamination, say with groundwater or springs, which isn't the case here at Tri-City. Someone has to be drinking that water which was occurring at the time of the discovery. That's why that was stopped by alternate bottled water.

So we went through and did the Risk Assessment looking at the soils; the surface soils which would be exposed. Say if children were out there playing or adults getting incidental ingestional where they have dirt on their hands and go to the mouth or something; dermal exposure just where it is on the hands absorbed in through the skin; the groundwater was looked at for ingestion. And this is all based on a

lifetime exposure which is 70 years. We looked at 365 days a year that this is occurring.

Also at the Tri-City Site we looked at the cattle to see if the cattle were raised on the Site and that being ingested for 365 days a year. If a vegetable garden was grown on the site and that 365 days a year. Out of all the exposure scenarios water was the greatest risk there. That is why we implemented this procedure in trying to clean up the groundwater or the spring water there.

The only other one that indicated a problem was the cattle or vegetable gardens. That was based on one surface soil sample that was on one edge of the Site that the soil sample was taken. We think if, you know, there is a possibility there could be a problem there so we're going to go out and resample that in the next part of the plan and try to find out if that was an anomoly or just one occurrence. Because there was twenty samples taken out there and that was the only one detected.

We have this quantification limits which are like - - I'm trying to think - - our instruments can detect - - they can detect below that but if we are not exactly sure what concentration. They just know it's there and it's an estimated

concentration.

The three - - the two different types of chemical that were detected, one of those was below detection and the other one was just above. They were below our action levels which, when you clean up sites, we usually go to at this time. So what we want to do is go back out there, take some samples around that area and try to determine if there is some contamination out there, high or low. And at that time we would go back and do another Risk Assessment on it to determine what levels we need to clean that up.

RUTH KLAPPER: Well, in other words, we are not supposed to be using our garden? I mean, soil was taken and we were never given a result of the soil testing.

GLEN ADAMS: Like I said, there was only one place out there that any contamination was found at very low levels. It does not indicate an unacceptable risk at this time. That's why we want to go out and take some more samples to determine that.

Like I said, these are based on seventy years; not on three years or seven years even. So we stretch it out over a seventy year period to determine whether it is acceptable or not at the levels

it's at.

RUTH KLAPPER: A seventy year period?

GLEN ADAMS: Yes, ma'am. That's the average lifetime.

BROOK DICKERSON: Meaning everyday for seventy years?

GLEN ADAMS: Yes.

RUTH KLAPPER: Also, what about the remaining material - - waste material still on the Cox property?

HAROLD TAYLOR: Are you referring to the debris?

RUTH KLAPPER: The stuff on the ground.

HAROLD TAYLOR: I'm sure you were there when the removal took place in 1988.

RUTH KLAPPER: Right.

HAROLD TAYLOR: As part of that removal they went around with the backhoe and trenched areas that had the highest anomalies according to the magnetometer studies that were done. And they basically found insulation, wood, ash, empty drums, basically nonhazardous garbage materials.

So, based upon the trenching and

based upon the sampling that we have done we don't see the need to remove any more materials.

We also, if you'll read the Proposed Plan and Feasibility Study, and analyzing some of the areas of topography. And in reviewing the sample results that we have there is some other areas out there that they think need further characterization. And the large part of the monetary expenditure where the first area of the community was essentially done is to go back and look at those areas in more detail to make sure that there is no more what we call source material; no more buried hazardous materials.

But based upon the study that we have done today and the analysis that we have done today, the materials that are there in the areas that we have looked at don't justify removal.

RUTH KLAPPER: Well, some of the places though that weren't dug up were places that were burning back when it was burning. So that's why I wondered what would still be under there now.

HAROLD TAYLOR: Yes, ma'am. And, again, I know what - - I think what you're saying is to be a hundred percent sure that there were no materials there you would need to dig the whole area

up. But what we have done is based upon, again, the sediment samples in the areas outside of the Site, based upon the monitoring wells that were put in, based upon the samples of the springs, based upon the subsurface soil samples and surface soil samples, we haven't found anything that warrants removal or treatment of this source material.

We do still have contamination in the springs. That contamination has varied somewhat since it was originally taken. Some of the contaminants have actually decreased since the removal. We're not sure enough to say that that's because we have gotten all of the material out or whether there is still source material left there at the Site.

So, what we are proposing is to going in and remediate that spring, continue to sample the springs, go in and do more investigation of the Site and make sure there is not more source. Even to the taking of samples in the area where the removal was done.

So, we are not confident. If we were confident we would know, quote/unquote, "No source material left", we would just say we're going to remediate the spring and we'll require that no one drink the water and that we are going to supply bottled

water for those people that are impacted and we are not going to do any more work. We're not going to do any more sampling. But we are not certain and that's why we are proposing quite a bit of additional sampling at the Site.

Based upon what we know today we don't think that - - and the results, there is any need for the removal of the material that we have sampled so far.

RUTH KLAPPER: So, based what you know today then the value of our property hasn't gone down any?

HAROLD TAYLOR: Again, I'm a scientist and I am really not a real estate person. So as far as property values, I really can't speak to that. Obviously, the Site was a disposal site. The Site is on the National Priorities List. It is a Superfund Site.

How that impacts the value, I am certainly not qualified to say.

RUTH KLAPPER: Thank you.

HAROLD TAYLOR: Yes, sir. Would you state your name, please?

EDGAR RASH: Edgar Rash.

HAROLD TAYLOR: Edgar Rash?

How do you spell your last name?

EDGAR RASH: R-A-S-H.

HAROLD TAYLOR: Yes, sir.

EDGAR RASH: You say insulation was found. Was it asbestos?

HAROLD TAYLOR: It was fiber glass insulation that was found. We did not find asbestos.

EDGAR RASH: I was just wondering. Because when - - I guess back in the 1960's or '70's, when they made fiber glass it was asbestos. And I was just curious.

HAROLD TAYLOR: Well, you know, back in that time there was asbestos insulation made. But at the same time there was also fiber glass insulation and rock wool insulation, you know, was also made.

Based on the sampling results that we have to date, there is fiber out there. Based upon our review of what's out there, the guys that dug up the trenches, it is not an asbestos fiber.

EDGAR RASH: Well, how long will this sampling take place? How many years are you talking about?

HAROLD TAYLOR: Maybe if I

could get Kim to go over the sampling that we have. We have really several different programs. One is the Confirmation Sampling Program to go out and make sure there aren't other source materials out there. That sampling could be done, you know, basically in a year's time like - - about like the Remedial Investigation over the same time frame.

Now, we are proposing to monitor the springs that are contaminated now for up to thirty years. Now, if the spring levels still continue to decrease and the levels drop off to acceptable drinking water standards we would monitor that in sufficient long enough time to make sure that it is safe. But then once we sample it long enough, in our minds we can say stop the monitoring and remove the carbon filtration.

We also have an ecological study monitoring. We have some sediment. Might go into that.

KIM GATES: I can go through it real quick if you are interested.

This is a diagram of the site. What we plan to do is we got a lead contaminated sediment sample on the tributary here of Brushy Fork Creek. So we are going to do some more sampling around that

hit of lead to determine if we have an area there that warrants excavation and removal.

We found a couple of air samples that had the tetrachloroethene in them along the edges of the landfill. So, we're going to do some sampling along the edges of the landfill here to determine if there is a potential source there that we need to remove.

We want to do some more sampling along these edges also to determine, again, if there is a source there of contamination that we need to remove. And we are going to do some soil sampling on-site.

This is a compiled figure. It was basically a compilation of two area photographs that were taken in 1966 and '67, when the disposal operations were occurring. And these were areas that we saw on the photographs as active areas. We don't really have that much sampling in these two areas. And we don't know that they are drum storage and disposal areas. That's, again, there is a question mark after that. They are distrubed areas and we couldn't tell whether or not they were just areas that were dug up for fill material or whether or not there were drums there. So we want to do some more sampling up in these areas.

And we wanted to do some sampling along the edge of the landfill where we found the PCB contamination; the one sample of PCBs.

And also, too, this is a figure, a very - - how do I want to put it?

HAROLD TAYLOR: It's a sketch.

KIM GATES: A sketch. That's good. A sketch of the Site that was done during the - - for the removal report. And the trench at the side of the Cox home, that's where the hundred and sixty-five drums were removed. But we would like to do some more sampling in this area to determine whether or not that we got all of the contamination out of this area. Because we believe that this is the source of the contamination in the Cox Spring. If indeed there is another - - more material there that could be contributing to contamination, we would like to do some more sampling in this area also.

So, that's really about it as far as the additional sampling we would like to do.

EDGAR RASH: What type of sampling? You said you had PCBs?

KIM GATES: We had one species of PCB found. Yes.

EDGAR RASH: What quality?

HAROLD TAYLOR: It was - - well, Aroclor 1260, I believe. And that's half a part per million. So EPA's kind of the most conservative standard for cleanup of a residential area would be one part per million.

EDGAR RASH: That's about half.

HAROLD TAYLOR: But I think it still warrants us going out there.

EDGAR RASH: What would be your all's - - how would you all handle the PCBs through the filtration that you all were discussing earlier?

HAROLD TAYLOR: Well, if it is PCBs in the soils we only would have to go to the Second Operative Unit of the Feasibility Study. PCBs can, you know at low levels, can be solidified and massed so that they're maintained and don't move or migrate. They can be buried somewhere.

If they're over certain levels, over like five hundred parts per million, they have to be incinerated. That's the law. You can isolate PCBs if they're on the surface and low levels it might just be necessary to just cap them in place if that's the only vector, so to speak. There are several different

ways. It depends on what levels are found.

EDGAR RASH: I know PCBs don't break down.

HAROLD TAYLOR: That's right. Well...

EDGAR RASH: (INTERRUPTING) The only true way is to do it through incineration.

HAROLD TAYLOR: Again, it really depends on how - - you know, right now we found point-four or five, or something like that. And that is not - - again, that's not two untypical of a lot of areas already since we used PCBs so widespread in our country for years and years and years. It's not too untypical of just virgin type areas, somewhat.

Yes, ma'am. Your name, please.

SHARON BURBA: Sharon Burba.

HAROLD TAYLOR: Yes, ma'am.

SHARON BURBA: You're talking about the Site and how the testing was coming out and it's just above or just below what you all consider to be okay. If it had of been done fifteen years ago would it have been the same or would the testings have proved to have been higher? Would it have been worse?

HAROLD TAYLOR: Again, I

really can't say. That's hard to speculate on. When you are talking of volatile organic compounds that are up on the surface perhaps fifteen years ago, obviously if it is volatile just by the definition of that word that it would volatilize to the air and not stay in the soil for a period of time. So, if there were solvents, say, on the ground they would be high at that time and over time they would either volatilize to the air or they would seep down to the groundwater.

But really, I can't speculate on what the levels would have been at this specific site.

SHARON BURBA: Can you tell me exactly how long EPA has known about this; about the problem?

HAROLD TAYLOR: To the best of my knowledge we were notified in 1988.

SHARON BURBA: EPA did not know before 1988?

HAROLD TAYLOR: Again, we were as, I understand it and as I recall, the information came to us from the state about the Site in 1988 and that is - - that was the contamination of that spring water. Which we went out to look at, we sampled and found that there was indeed contamination of the spring. We provided bottled water to those that were

drinking the water and then found the drums on the Cox property and removed those drums.

Yes, sir.

NED FITZGIBBONS: Ned Fitzgibbons, with the Health Department. Two questions really. First, in terms of the cleaning up of the Cox's Springs through the carbon absorption, I know we're looking at the original - - the treatment itself and then monitoring there. Do you have any kind of a time frame in terms of approximately how long it would take to make that spring, say safe to drink from the time you start; less than thirty years in other words?

HAROLD TAYLOR: Again, you know, I can speculate but I really - - groundwater clean up - - and I'd ask Tony Able to comment.

Groundwater treatment is a fairly complex technology at best. The levels that we have seen over the time frame that we have been looking at it, at least we tend to say they have decreased over that time frame. If we remove, you know, the majority of the source, and that should continue, the treatment would not go on for the whole thirty year period. If there is still a source out there, you know, low level, it may go thirty year period or it may take longer.

Tony, do you have anything to add?

TONY ABLE: I can give you an educated guess just from being involved with these type of sites and what I think might be happening.

If we have the contaminants removed from the soils, if the new soil samples don't show any more sources of contaminants, then that means that the contaminants are probably still in the rock and the limestones on top of the hill there. And these contaminants, they will be flowing through smaller cracks in the rock. And the rock can clean itself up faster or contaminants don't have the tendency to stick to the rock as well as they would be the soil.

Say if we had a drum of soil setting here and we poured some contaminants in it, and a drum full of rocks sitting here and we pour some contaminants in it, and allow the rain to wash over them for several months, the rocks would be washed off and cleaned up faster than the soil would.

So, in this case if we don't find anything in the soil, it is probably still in the rocks and it will flush itself out. Okay.

NED FITZGIBBONS: You say quicker in that last word. Quicker is what?

TONY ABLE: I was talking to Harold today and this is still an educated guess. I

would say within ten years, provided there are no soil sources. The levels aren't substantially higher than the drinking water standards that are established right now. So, we don't have that far to go. Okay.

HAROLD TAYLOR: Yes, sir. Your name, please, sir?

KEVIN HEATH: Kevin Heath; H-E-A-T-H.

Can you tell us what was in the drums and how far down underneath the drums did you excavate to find out? Did you dig down to uncontaminated earth and stop and what was in the drums? That's my two questions.

HAROLD TAYLOR: I might get Kim to speak a little bit about what was in them. We know PCE was the contaminant we found in the groundwater and we also found sludges and paints and those kinds of things.

The removal that was done, again there was obviously the drums, some liquids that were found, and there was contaminated soil that was removed. I don't know how familiar you are with the Site but it doesn't take too far, particularly in that area, to get down to bedrock.

The removal was done to get obviously all the build-up of sludge in the soil, the

drums that were found. And there were confirmation samples taken to see what the levels were in the soils at the time they quit digging.

In retrospect, on looking back at the site sampling that was done at the time, we in the Remedial Program, which is more concerned with the long-term impact of, say, the groundwater, we're not satisfied that the sampling that was done was sufficient. It was our own sampling. We're not satisfied that that sampling was sufficient to give us the kind of answer we need to say whether that area is totally clean or whether additional soils need to be removed from that area.

So in fact, Kim, you may know a little bit more about the materials that were found.

KIM GATES: The drum material included silicone and paint wastes and the analysis revealed metal contaminants and some semi-volatile organic contaminants. And if you want some more detail on that the Emergency Removal Report is in the Administrative record at the Ridgeway Memorial Library.

Just for your information too, it was - - the trench that was dug that removed the - - for the removal of the drums is thirty feet long by

twelve to fifteen wide, and ten feet deep. And they had - - in order for them to properly dispose of the soil that was taken out of the trench, analyses were done on the soil to determine whether or not it was hazardous and where it would need to be disposed of.

Again, there is more information on that in the Administrative Record.

KEVIN HEATH: Thank you.

HAROLD TAYLOR: Are there any more questions? Yes, sir.

NED FITZGIBBONS: Just one other then. Something that I raised about it earlier regarding the state acceptance or lack thereof, regarding the technical information about the Site.

Since Mr. Millanti and Mr. Padgett are here, I know this is your meeting but I'd like to hear from them what more information they would need in order to agree with essentially what you're shooting at in terms of removal and whether or not there is going to be some head knocking on it. I don't mean to put you on the spot, guys.

BOB PADGETT: I'm Bob Padgett and I'm with the State of Kentucky. I guess Ned is referring to in the fact sheet the State Acceptance portion that indicates that the State is not

in agreement with EPA on the remedy at this time.

There is two basic differences with the State and the EPA on this particular project. It first deals with just the way the two agencies view the Superfund and its mandate to clean up a certain level or to which laws apply to state or the federal governments.

EPA views this in one context to take it down to certain action levels based on risk to human health and environment. The State generally views cleanup at the background level or to a risk based number but the way we arrive at the numbers differs. And so it is the way the agencies handle that sort of information where we differ.

The bottom line is in that respect is that we generally require cleanup to a more stringent level than the EPA does and there is a difference of opinion how that is handled.

To answer the question more directly, what more information would be required. We would - - the usual phrase we look at in cleaning up a site when we characterize it as a site, is figure out exactly what is there. The phrase we usually use is determine the vertical and horizontal extent of contamination. And it was the State's opinion that the

sampling done to date was not adequate in all areas. They apparently indicated this and a need for additional sampling. That falls back then to the difference between the way the agencies handle that. The State does not deem, and we have said in the comments that we have sent to EPA, that it is proper at this time to issue a Record of Decision which says that this is the remedy if there is not enough information to say what needs to be remedied.

NED FITZGIBBONS: So, you just need to think that the study needs to go on longer before the final Record of Decision is made.

BOB PADGETT: There are two basic things to handle this information. The first one is when a decision is made to what level is the site being cleaned up by that decision. In other words, how much information do you have to make the decision that you are making.

BOB PADGETT: The other phrase we've used here is how clean is clean? The agencies have a disagreement over how clean is clean.

HAROLD TAYLOR: And then I'd like to point out that the disagreement that we have is not just over Tri-Cities. This disagreement is statewide. Basically the sites have been ongoing since

1988, beginning with the B.F. Goodrich/Airco Site, which we are in current disagreement on and have yet to settle on that. I think if we could ever come to terms perhaps with those sites that we will be in a better situation to handle the sites in the future. But until we do, we are continuing to try and work with the state and resolve our problems as best we can between the two agencies.

Yes, sir. Your name, please?

PEWEE MCGRUDGER: My name is McGruder. Local resident. How far downstream from these springs is pollution going?

HAROLD TAYLOR: Well, again, I may refer to Kim again to back me up here. You're familiar with where the springs are on the Site?

PEWEE MCGRUDER: Yes, sir. I drilled wells for thirty years.

HAROLD TAYLOR: You know, the sites are fairly high up on the topography of the areas.

You might show us - - the springs are high up on the topography of the area. The creeks are down at the bottom of the topography. As part of the Remedial Investigation we did sample upstream and downstream and right in the area where those streams

were discharged. Obviously the springs themselves are contaminated but by the time the water transverses down the banks, enters the creek and is diluted with the waters in the creek, you basically can't find a problem in the creeks down below the Site.

PEWEE MCGRUDER: Your all's basic concern is the underground water?

HAROLD TAYLOR: Yes, sir.

PEWEE MCGRUDER: Do you realize that for Two Million Dollars that between thirty-five and forty miles of water line could be run throughout that area and would solve that problem?

HAROLD TAYLOR: Well, let me say that the Two Million Dollars you see there is not for just providing water to those residents and for actually even treating the water that is there.

A great majority of that money that you see is for additional testing and sampling that we are doing today. But we did look into - - one of our problems is how to provide water to the impacted people in the most cost effective way. I think you're correct for probably Two million dollars, if that was the only thing the agency had to be concerned about, we could run a water line to provide those residents that are on that Site with water. But we would still have

the additional sampling that we need to do and the monitoring that we need to do.

So, I agree with you that if all we had to do was provide water to the impacted residents we could do that for the money.

PEWEE MCGRUDER: You could run thirty-five miles. You could run the whole area out there for Two Million Dollars.

HAROLD TAYLOR: Well, again, we have looked into what it would cost. But you are probably right about running water lines but obviously you have to get the water up on top of that hill somehow and have a reservoir for that water.

PEWEE MCGRUDER: Do you have an estimate of what that would run?

HAROLD TAYLOR: You know, Kim might - - I know you have talked to people about running water lines to that area. You might look it up real quick.

KIM GATES: Yeah. I did a little bit of research in this - - into this so I could speak intelligently about it. I talked to a Mr. Tad (sic) Burke, of the Kentucky Turnpike Water District. And he told me it would cost about 1.5 Million Dollars to get water lines up to the top of the hill to where

the residents are located that are affected. And we are looking at right now at an annual cost of $2200 to provide water to three families.

PEWEE MCGRUDER: How many feet from the top of the hill is it to this Cox property?

HAROLD TAYLOR: I don't understand the question.

PEWEE MCGRUDER: Well, how far from the top of Brooks Hill, back, are we talking about to these properties that are contaminated?

KIM GATES: Well, from what we have been able to tell, these properties are located at the top of the hill; up a knob.

PEWEE MCGRUDER: Two and a half miles from the top of the hill.

HAROLD TAYLOR: You're on the top of the area that you're at. But there is an area that is higher.

RUTH KLAPPER: He is talking about as you come up Brooks Hill Road. From the top of this hill, to there, to our property.

PEWEE MCGRUDGER: How far is that?

RUTH KLAPPER: It is about two and a half miles.

PEWEE MCGRUDER: It can be served cheaper than that I think.

EDGAR RASH: Back in the early '70's, we as a community looking at the cost and it was right around a hundred-forty-four-thousand at one time and that was just for the tank and the installation. Louisville Water Company, Mr. McGruder was over Turnpike Water Corporation at that time. And if Kentucky Turnpike Water Company would have turned the system over to Louisville they said they would definitely get water up there.

HAROLD TAYLOR: Again, to supply municipal water is really a state and local decision about whether to extend resources to put in water lines and water systems. EPA, the Superfund Program, we're not really in the business of installing municipal water systems unless that's the most cost effective way to handle a problem at a Superfund site.

Here we have basically a handful of residents that are impacted immediately by the Site. And to run water lines to tanks, to pumps, et ceterra, the lines out to those families is just not cost effective to us and that is why we have not chosen that alternative.

If we were talking about thousands

of people and it were more cost effective to provide a long-term water supply that is what we would propose tonight.

PEWEE MCGRUDER: Would five hundred thousand be cost effective?

HAROLD TAYLOR: No, sir. Not - - again, as I think we have stated, it is in the Two Thousand Dollar range to carry water, and that is probably a high estimate, to carry water to the impacted people on the Site on a yearly basis. We cost the whole thing out for thirty years as if it may take that long. It may only take ten years to do it. But if you're asking me is Ten Thousand Dollars cost effective as opposed to half a million dollars, then it's not.

PEWEE MCGRUDGER: (INTERRUPTING) But if this contamination spreads to other peoples' wells.

HAROLD TAYLOR: If the contamination were even in an area where it could then that would be a consideration. But we know these springs discharge on those hill slopes and that is the discharge of surface or groundwater as we know it. So, there is really no way for it to spread to wider communities.

Yes, ma'am.

CHARLOTTE FLOWERS: Charlotte Flowers, from Brooks. Does it spread to the wells? We have well water. Does it spread to the wells? We live at the foot of Brooks Hill.

HAROLD TAYLOR: Perhaps, Tony, it might be good to show the...

TONY ABLE: More than likely what is happening here is that this - - I think the Site - - the springs are in this location along the edges of this limestone formation here. Maybe I ought to go back and tell you what these formations are.

This is a cross section of the geology of the Site and these two formations here are limestones. And I was talking earlier how the water is probably moving through the cracks in the limestones. And these are sandstones here. And the difference in the water, the way the water moves through these things is that these limestones are kind of like - - they're calcium carbonate, almost like baking soda. And they can be dissolved more easily than these sandstones which are just the same chemical compound as glass. And so more flow channels can open up in these limestones and allow the water to move through them more easily than they do the sandstones.

So that is why we're getting the springs that are coming out of the sides of the hills near the location where these two formations come together. The rain water falls down into the limestones, goes down vertically until it hits these sandstones, and then comes out and discharges as springs on the sides of the hills. So that tells us that more than likely this stuff is not moving down to the lower aquafers.

CHARLOTTE FLOWERS: So, you don't think it would be in the wells?

TONY ABLE: No.

TONY ABLE: Was that sufficient?

CHARLOTTE FLOWERS: No.

KIM GATES: Where is your well in reference to the Site?

CHARLOTTE FLOWERS: It is at the foot of Brooks Hill.

TONY ABLE: Is it near - - is it on this map?

CHARLOTTE FLOWERS: I can't find it.

KIM GATES: Is it near the interstate?

CHARLOTTE FLOWERS: Uh-huh. We're between the railroad tracks and 65.

TONY ABLE: So that's a mile or two miles or three miles away?

CHARLOTTE FLOWERS: It is four miles.

TONY ABLE: Yeah. I would say absolutely no chance of this Site impacting you.

KIM GATES: Here's the Site and you're over near the interstate?

CHARLOTTE FLOWERS: Yeah. You don't think it would affect us?

TONY ABLE: No. I don't think there is any chance of it whatsoever.

HAROLD TAYLOR: As we currently understand that, getting back kind of I guess to this Site, ma'am, as we understand it the hydrology and geology of the area now, the rainfall percolates - - hits the Site, percolates down basically through these disposal areas here, goes immediately down and out those channels to the springs. And the only real groundwater that we are talking about being impacted is right basically under those areas of discharges of the springs. There is no regional movement of the groundwater away from the Site.

CHARLOTTE FLOWERS: I know. But it looks like if it is hitting the top of the ground, if there is a well there it would seep into the well.

TONY ABLE: If the well were right in the area of the surface aquifer contamination. If you drilled a well through it you might have a chance of carrying it through.

KIM GATES: And we're not seeing the Site impacting the wells at the bottom of the hill; just down the slope from the Site. Because, as Tony described, the contamination is coming out the springs. It is not going down into the deeper aquifers where we drilled these wells.

HAROLD TAYLOR: Yes, sir.

EDGAR RASH: Did you say you were close to 65?

CHARLOTTE FLOWERS: Uh-huh.

EDGAR RASH: Well, aren't those streams down through - - aren't they contaminated now; there by the truck stop?

CHARLOTTE FLOWERS: Yeah. I don't know what they're contaminated with.

EDGAR RASH: Of course you're closer to Smith's dump?

CHARLOTTE FLOWERS: No. No. We

live there - - we adjoin Sanders Lane. But those creeks are contaminated. They have tested them and everything but we don't know what it is.

HAROLD TAYLOR: Again, that's not related to the Tri-Cities or the Smith's Farm Site. But it is related to some other activity in the area I assume.

UNKNOWN: It may be an underground tank.

HAROLD TAYLOR: So, I - - and again, we're not aware of any specific problem. I'm - - I'll be glad to talk to you after the meeting to see if there is anything the EPA, as an agency, needs to be concerned with. But I don't believe those are related to the Tri-City Disposal Site.

DENNIS MITCHELL: Did you say that this Brushy Fork Creek, does it empty into Knob Creek? Did you also say that the PCBs never break down?

HAROLD TAYLOR: Kim? Well, PCBs are a long lived chemical compound. Never is a long word to use.

DENNIS MITCHELL: When I say 'never', are we talking about thirty, forty, fifty years would these still be around?

HAROLD TAYLOR: Yes, sir.

DENNIS MITCHELL: Okay. In other words, it means those PCBs can be in Knob Creek then?

HAROLD TAYLOR: Well, if you're saying that PCBs can be in Knob Creek, I can't say that they are or they are not. I am saying that as far as the Site, we only found one sample that had detectable levels of PCBs. That was around a half a part per million range. Which is not uncommon to find under transformers or any other places where there's been electrical transformer fluids used.

This Site is - - it is a source of - - it's not like this is a source of PCB contamination that could have spread miles and miles. And the sediment samples that we did in Brushy Fork Creek, right under the Site, didn't have PCB levels that we could discern.

So if we had PCBs leaving the Site, I would, number one, expect to find them on the Site still since they don't degrade and they don't migrate very far. Number two, if they had of been on the Site and they had of migrated, I would expect to find them close to the Site. And I found neither one of those.

So, I don't think that this Site would be a problem with PCBs in Brushy Fork Creek or to the creek that you have mentioned.

KIM GATES: And yes, in answer to your question. Brushy Fork Creek does, approximately two miles down, join Knob Creek. But, as I had already told you, EPA did an ecological reconnaissance of Brushy Fork Creek, along with Fish & Wildlife Service, in August of last year. And from what the Fish & Wildlife Service people were able to determine, and our own biologists that went out, this is a pretty healthy creek.

So, we are not seeing any site related impacts to the creek. And if you all are concerned about Knob Creek further downstream, there may be something impacting it beyond the Tri-City Site. But we're not even seeing the impact in the Brushy Fork Creek.

HAROLD TAYLOR: Yes, sir.

EDGAR RASH: Cox's house, isn't it built right over top of that dump?

KIM GATES: It is built to the side of the disposal area.

HAROLD TAYLOR: It might be good if we could go back to the areas that we have

marked...

KIM GATES: (INTERRUPTING)

Oh, the aerial. Yeah. This is an area of activity so, yeah.

HAROLD TAYLOR: It looks like in an area of activity from all of the aerial photographs.

EDGAR RASH: So, more than likely there is hazardous materials underneath the house. Would you say?

HAROLD TAYLOR: We haven't sampled under his house. We have sampled a portion of the areas that we have excavated and the trenches that we made through there. If it is material that similar to the other materials that we found then there is not very much hazardous substance in it. If further studies see that we have a bigger source area then - - I mean - - so far we are not - - I wouldn't say, based upon the information that I reviewed that hazardous substances, as we know them, are of concern in his house if it is consistent with the others.

Yes, sir.

GLENN ARMSTRONG: When will these other samples be made? Will we have another public hearing after you get these samples so we'll

know more of what we're looking at?

HAROLD TAYLOR: Glenn, what the other samples, as I tried to explain earlier today and as I think Brook Dickerson explained this afternoon, after tonight, after the Public Comment Period ends, EPA will review comments and review our decision to see if we need to change or modify our decision based upon the comments that we receive. Then we'll sign our Record of Decision with a response and a summary of the comments.

We'll enter then that - - what we're referring to as a 'Moratorium Period', where under our statutes we are restricted from spending federal money until we give the Potential Responsible Parties an opportunity to come forth in a good faith offer and to volunteer to do the work. That process takes, after the ROD is signed, takes a hundred twenty days or more. So, at best, we can't do any work during that Moratorium Period if that plays out the way it normally does.

After that Moratorium Period and we are successful in making the Responsible Parties say they will do the work and then that decree is entered in federal court and there is another Public Comment Period on that decree. And then the court action files

the decree and basically that's usually when the decrees are effected. And then that is when the PRPs, the Potential Responsible Parties, would go out and hire a contractor, submit a work plan to the agency for our review. We would review it, comment, and have them change or modify the report. Once we approve the report to the work plan then the sampling would begin.

So, that sampling may take anywhere from a half of a year, to a year from now, before it commences and it may take up to a year to complete. If we find contamination in those samples that warrant us doing what we call a 'Second Operative Unit', then doing what we're doing tonight we'll have another Public Comment Period, we'll have another public meeting, to go over the Alternatives and to seek public comment.

If we go out and find that there are no more contaminants, there is no more concern, then we wouldn't be required to have a public meeting. But more than likely, as we try to do throughout all sites we control, what we find will go in the Administrative Record at the Ridgeway Memorial Library. We'll continue the fact sheet process; we'll mail out to all interested parties updates on what is going on.

BROOK DICKERSON: Harold, can I

add something to that?

If you ever have questions about results or certain documents that you wanted to see that were not necessarily available in the Administrative Record, you do have the opportunity to request certain information from the EPA according to the Freedom of Information Act. And if you ever have questions about that I imagine you can contact Suzanne or you can just write directly to the EPA and direct it to the Freedom of Information Act Officer - - that makes sense - - just at our regional office at Atlanta which the address is in your fact sheet.

So, if that ever comes up, and you are interested in seeing something that is not otherwise available, that option is opened up to you.

HAROLD TAYLOR: Let me get to this lady that hasn't asked a question.

SUE HAYES: Sue Hayes. I think on the previous slide here, I think I live at the MW07 location, it is across from Hoosiers. It's right off of Brooks Hill Road.

They drilled on the property and they said I would get a report within six months and I still haven't heard anything and it's been almost two years. And I don't know the results of anything, and I

don't know if anything was found in that area or not. There is a spring on my property that I don't know if that was one of the contaminated springs or what.

HAROLD TAYLOR: What we'll do, and obviously we can't do it in the meeting, if you would, come up to us after the meeting. We'll make sure we have your complete name and address and get you the information.

Yes, ma'am, in the back.

SHARON BURBA: What properties do the EPA...(INAUDIBLE)

COURT REPORTER: I can't hear.

HAROLD TAYLOR: Again, the - - looking back at Kim, again, as I recall, we were reviewing the data that the state has a Preliminary Assessment and Site Investigation Grant from the Environmental Protection Agency to go out and - - if you remember at the start of the meeting when we were talking about site discovery and thirty thousand-plus sites around the nation. Obviously the Tri-City Site was indicated probably because that they had an old permit as a trash site, probably because of the old past history. And I may ask Carl or Bob if they know what originally brought it to the state or EPA's attention.

The actual EPA got involved when we received the data, I believe in 1987, investigations that the state had done. And as we reviewed that data we saw this problem, went out and sampled the wells and did the removal out there.

How about Bob or Carl know the original reason for the Tri-City Site being looked at by the state and federal agencies.

UNKNOWN: The original reason why the EPA...

HAROLD TAYLOR: (INTERRUPTING) The very original reason.

UNKNOWN: That I don't know. I would make the assumption that it was just the review of records and it was put on the EPA list funded by the EPA for the initial site.

HAROLD TAYLOR: The actual Site Discovery List that I referred to earlier came about as a result of several different lists. Senator Eckhart, from Texas, back in 1979 required the fifty major chemical companies in the United States to report to the EPA all of their disposal sites across the country. That created what we termed in '79 as the 'Eckhart List'. A few years later they a statute which says anybody who has any knowledge of disposal of more

than fifty-five gallons of what we term 'Hazardous Substances', was to notify the U.S. EPA of the location it was disposed of. As you can imagine that created quite a list of sites.

At the same time the EPA was, from the states, was maintaining their own list of Potential Hazardous Waste Sites. Those sites were indeed also added to what we now call the 'Inventory of Hazardous Waste Sites'. I can't really answer your question whether tonight whether it was on the Eckhart Study, whether it was part of Section 103-C, whether it was just a site where the state or the federal government had a past complaint and just entered it directly themselves or whether it was a citizen's complaint.

SHARON BURBA: Does the state know when...(INAUDIBLE).

UNKNOWN: May of 1988, I believe it was.

HAROLD TAYLOR: Yes, ma'am.

RUTH KLAPPER: Will there be a difference in the level of what you find in a wet season compared to a dry season.

HAROLD TAYLOR: In groundwater?

RUTH KLAPPER: Yes.

HAROLD TAYLOR: Tony, you might.

TONY ABLE: That is a possibility and we try to design that long-term monitoring of these things. I would recommend something like quarterly for one year and try to coordinate that. One of those sampling events with a rainy season, one with a dry season, and it could go either way. It could be higher in the summer or the dry season, because of less pollution. Or it could be higher in the wet season because of more flushing. We just have to wait and see.

HAROLD TAYLOR: I think the answer is yes. But whether it is higher in droughts, or lower in droughts, that is something to determine.

Yes, sir, in the back there.

DAVID BURBA: My name is David Burba. If the levels were above standards in '88, do you have any educated guess how long it had been that way?

HAROLD TAYLOR: I couldn't speculate as to how long it had been that way. No, sir. It is, like I say, it would be speculation on my part without the data to show.

DAVID BURBA: Would you

guess that maybe they were higher at one time than they were in '88?

HAROLD TAYLOR: Again, without, you know, more data it is hard to say. If the contaminants had been there and had been in contact with the water for a long period of time, the groundwater, and had moved as fast as the water moved, perhaps they had been there for a long time.

To be quite honest, what goes on underground is really hard for anybody to speculate on because of the rates of the transport of the water theory, rates of the transport of contaminants with that water, varies. It may have been there a long time. It may have been just - - we may have been lucky and found it on the first sample. Really can't say.

Yes, sir.

EDGAR RASH: How long - - now this is an 'if question'. EPA, is it going to be around for those seventy years or is there a possibility that it could dissolve and, if so, what would happen to the projects that are in working order now?

HAROLD TAYLOR: Again, let me restate the seventy years that we mentioned before was what we used for our Risk Assessments which we think is

the average life span that we try to calculate risk over a seventy year period of time.

What we are going for in this Record of Decision is to monitor and maintain these controls for thirty years, up to thirty years, depending on whether it is required and we have to re-evaluate the remedy at this Site every five years. That's what our statute requires us to do.

Whether you're asking me whether EPA will be here to enforce it, I can't really tell you that. We work at the whim of Congress and Congress can dissolve or create agencies at its will. Congress obviously had the intent to - - for us to do these kinds of things or they wouldn't have passed the kinds of statutes for our monitoring and controls for thirty years at a time.

If we enter into an agreement with the Potential Responsible Parties, that agreement would be lodged in federal district court and subject to that court's ruling, per se. So that any time there is a violation the court would have authority to take corrective actions. If indeed this goes into what we call 'Funding Response', the actual implementation of the remedy would be done generally by the federal government with ten percent state cost share.

COURT REPORTER: Excuse me?

HAROLD TAYLOR: And we would actually go out and monitor the sites for the first year to make sure everything was going properly and then the actual responsibilities for the next twenty-nine years would go to the Commonwealth of Kentucky and that is the way the statute is written.

So, I guess the next question is whether the Commonwealth of Kentucky would be here.

EDGAR RASH: Yeah. But how well will they do the job?

HAROLD TAYLOR: Again, the responsibility would be with the Cabinet.

Yes, ma'am.

REBA MILLS: I am Reba Mills. And talking about the time and nobody knowing when this happened. We were fighting this and Mr. Farris was helping us. And we thought everyone in Bullitt County knew about it at the time it was burning. It burned two years.

HAROLD TAYLOR: You're talking about 1969?

REBA MILES: Right.

HAROLD TAYLOR: Again, you know, EPA was created about that same time. So we

obviously weren't even around then. The actual program that controls ongoing generations of hazardous substances and hazardous waste wasn't created until 1980.

So, I understand what you're saying about the Site and the Bullitt County Health Department was involved.

REBA MILES: We didn't have zoning laws at that time either.

HAROLD TAYLOR: All I can say is that the federal government and state became involved and we had statutes when we became involved in the Site. And that was unfortunately well after the Site was a problem.

EDGAR RASH: No telling how much damage had been done. Right?

HAROLD TAYLOR: Well, I mean we know what...

EDGAR RASH: (INTERRUPTING) That has not been detected.

HAROLD TAYLOR: All we can say is what the current risks are and the future risks are. We can't evaluate what we went on before we became involved.

Yes, ma'am.

RUTH KLAPPER: Who actually discovered that the springs were contaminated; EPA or the state?

HAROLD TAYLOR: Well, again, the data was provided from the state, to EPA, and we reviewed that data and said, you know, it looks like we have a problem here and went out and sent people to resample those springs to make sure that those samples weren't polluted or were indeed correct. So that occurred in about 1988. I think the data that you're referring to was collected in '87.

Carl.

CARL MILLANTI: Harold, would you clarify something for us? Are the state's comments on this Proposal Plan included as part of public record maintained at the library?

KIM GATES: Yes.

HAROLD TAYLOR: The answer is yes.

CARL MILLANTI: For those here, the state does represent your interests in this matter and you ought to look at our comments too, in evaluating the whole process.

HAROLD TAYLOR: Yes, ma'am.

UNKNOWN: How does

Bullitt County feel about the Site itself?

HAROLD TAYLOR: Bullitt County Health Department?

UNKNOWN: And all the people.

HAROLD TAYLOR: Do they?

UNKNOWN: What they're coming in here to do; trying to clean it up.

HAROLD TAYLOR: Again, why we're here tonight is to try to explain what the alternatives are and get comments from the public. That process has not been done yet.

Yes, ma'am, in the back.

SHARON BURBA: At the time they discovered there was a problem and they got the test results in 1987, from that time, until when, did they get the people affected in that area on bottled water? How long were those people still drinking that water out of those springs and why was that allowed?

HAROLD TAYLOR: I think you're referring to the lapse between 1987 and 1988?

SHARON BURBA: I don't even care if it is a month. To me, I would want to know immediately. It seems like somebody had a responsibility here and didn't follow through with it.

HAROLD TAYLOR: I'll let Carl Millanti, with the Commonwealth, address that question.

CARL MILLANTI: I'll put it as tactfully as I can. There is no excuse for what happened and it was somebody's responsibility. They did not see to that responsibility and there were some serious repercussions over it. That is why I am in this position. There is no need to mince words. It was an oversight.

HAROLD TAYLOR: Are there any additional questions?

DENNIS MITCHELL: I might ask one thing: Has the state looked at this thing and is there any possibility that maybe the state is looking at maybe funding anything in this area, maybe water, to stop any potential problems that may happen ten years, fifty years down the road?

CARL MILLANTI: No, not really. Harold kind of hit on it early on. It wouldn't be cost effective for one thing. My main concern is to remove the people from the effects of the contamination and the remediated site. We feel they have been removed along with drinking contaminated water. It wouldn't benefit the Commonwealth in general to run that water line.

DENNIS MITCHELL: I mean, even help with it or anything?

CARL MILLANTI: I don't know what grounds we would have to have to get help.

UNKNOWN: As I understand it those wells are all disconnected.

MR. TAYLOR: If there aren't any additional questions I'd like to take a ten minute break and those of you that are interested in Smith's Farm we will come back at - - let's just call it 9:00 o'clock. We'll have Tony DeAngelo present a small presentation on Smith's Farm and then we will answer any questions on the the Smith's Farm Site.

Thank you very much for coming tonight.

(CONCLUSION OF PUBLIC MEETING FOR THE TRI-CITY INDUSTRIAL DISPOSAL SITE)

*** *** ***

STATE OF KENTUCKY

COUNTY OF BULLITT: SS

I, SHARON L. KLOSTERMAN, Notary Public in and for the State of Kentucky, at Large, do hereby certify that the foregoing transcript of the PROPOSED PLAN PUBLIC MEETING FOR THE TRI-CITY INDUSTRIAL DISPOSAL SITE, was taken at the time and place stated in the foregoing caption; that said meeting was taken by me in Stenograhic notes and afterwards transcribed by me; that this is a true, full, and accurate transcript to the best of my ability. Further, that I am not of kin nor related to this matter in any way.

Witness my hand this 5th day of June, 1991

Sharon L. Klosterman

SHARON L. KLOSTERMAN
Notary Public, State of Kentucky, at Large

My Commission expires: 7/1/92

ATTACHMENT 3

Sign-In Sheets

5/9/91

Tri-City Site Meeting
at the Bullitt Co. Health Dept.
in Shepherdsville, Kentucky

Suzanne Durham	EPA/Atlanta	404/347-7791
Mary Ann Blanton	Bullitt Co Health Dept	502/955-7831
Daryl Lee	Bullitt Co. P+Z	(502) 543-6832
Elaine Armstrong	" " Judge Exec.	(502) 543-2262
Mark Kaiser	" " D.E.S.	(502) 955-8023
Tammi Mitchell	" " Magistrate	955-4048
Neil Fitzgibbons	D. C. Health Dept	[illegible]
Harold W. Taylor	EPA/Atlanta	(404) 347-7791
Kimberly Gates	EPA/Atlanta	(404) 347-7791

SIGN-IN SHEET

SITE: TRI-CITY INDUSTRIAL DISPOSAL SITE

DATE: MAY 9, 1991 (Proposed Plan Public Meeting)

NAME (Please Print)	ADDRESS	REPRESENTING	PHONE #	ARE YOU RECEIVING FACT SHEETS IN THE MAIL?
RICH O'HARA	4641 PRINCE ST. DOWNERS GROVE, IL 60515	T.C.I.	852-4412	NO
[illegible] TAYLOR	USEPA Atlanta [illegible]	USEPA	404-347-7791	NA
TONY DEANGELO	USEPA, Atlanta, GA	USEPA	404-347-7791	N/A
Brooke Dickerson	USEPA, Atlanta GA.	US EPA	404 347-2641	N/A
Tom Kerl	17250 Newburgh Rd	Livonia, Mi 48152		no
Tony Hyatt	One Independence Square Lou.	WDRB-TV	561-7108	—
Vincent [illegible]	" " "	" "	" "	
Glenn Adams	US EPA Atlanta, GA	EPA	404/347-3866	—
Carl [illegible]	Ky DWM	DWM	502/564-6716	
[illegible] Mitchell	1180 Cow Branch Rd West Point, Ky 40177		9554048	~~No~~
Rick Hogan	Frankfort	DWM	502 564-6716	
Suzanne Durham	Atlanta	EPA		
Glenn Armstrong	Bullitt Co. Courthouse Shep. K. P.O. Box 397	Bullitt Co. Judge Exec.	502-543-2262	~~[illegible]~~
Ned Fitzgibbons	P.O. Box 278, Shepherdsville	Bull. Co. Health Dept	502-955-1680	
Thomas Barr	P.O. Box 98 Shep.	The Pioneer News	502 543-2284	
[illegible] E. Hoyt	167 Springbrook Dr.	—	543-2080	No
A. L. Heath	341 Meadowbrook Dr SHEP. 40165	A. L. Heath Shepherdsville, KY.	543-4671	NO
Barbara Motes-Heath	1101 E. St. Catherine	A.L. Heath Co.	636-5278	NO
Kevin Heath KEVIN HEATH	1101 E. ST. CATHERINE LOU. KY. 40204	A.L. HEATH CO.	636-5278	

SIGN-IN SHEET

SITE: _____

DATE: _____

NAME (Please Print)	ADDRESS	REPRESENTING	PHONE #	ARE YOU RECEIVING FACT SHEETS IN THE MAIL?
EUGENE McGRUDER	BOX 708 SHEPHERDSVILLE	CITIZEN	543-9480	NO
RUTH KNAPPER	BOX 105 BROOKS KY	CITIZEN	957-4580	YES
ROGER KNAPPER	BOX 105 BROOKS KY	CITIZEN	957-4580	YES
Edgar F. Rash	Box 3062 Brooks Hill Rd.	CITIZEN	957-4874	YES
Sue Hayes	4821 Brooks Hill Rd	"	957-3621	YES
SHIRLEY FLOWERS	367 Williams Ln	"	9574480	NO
Waymon Flowers	367 " "	"	9574480	NO
Joe Caswell	814 Franchise Dr Shp Ky	"	957-2471	NO
Reba Miller	2989 Brooks Hill Rd.	"	957-3396	Yes
Bob Padgett	18 Reilly Road	Ky. Dept. Env. Protection	564-6716	YES

SIGN-IN SHEET

SITE: ______________________

DATE: ______________________

NAME (Please Print)	ADDRESS	REPRESENTING	PHONE #	ARE YOU RECEIVING FACT SHEETS IN THE MAIL?
CAROLYN SEDORIS	4208 Knob Creek Rd Brooks	Citizen	922-4637	NO
Joseph Sedoris	" " " " "	"	"	NO

ATTACHMENT 4

EPA Memorandum dated May 16, 1991
Regarding the Provision of Public Water
to Site Residents

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4WD-NSRB

MEMORANDUM

DATE: MAY 16 1991

SUBJECT: Provision of Public Water to Tri-City Site Residents

FROM: Kimberly Gates, Remedial Project Manager Kim Gates

TO: Harold Taylor, Chief Harold Taylor
Kentucky/Tennessee Remedial Section
North Superfund Remedial Branch

Before the Proposed Plan Fact Sheet was mailed on April 19, 1991, I called the residents on the Tri-City Site to determine if they had any concerns that warranted a trip before the public meeting on May 9th. I talked with Mrs. William Cox, Sr. and Mrs. Ruth Klapper on April 9th, Mrs. Wenfrey Hoosier on April 10th, and Mr. William Cox, Jr. on April 11th.

One of the predominant concerns at the site was voiced by Mrs. Hoosier, and it was regarding the provision of public water to all of the people living in the area of the site. EPA started providing drinking water to the Cox, Sr. residence and the two Klapper residences in 1988 when it was revealed that the Cox and Klapper Springs were contaminated with volatile organic compounds above Maximum Contaminant Levels. Other residents in the area, including Mrs. Hoosier, use cisterns or buy water for potable use.

Following my conversation with Mrs. Hoosier, I looked into providing the Tri-City Site residents with public water. I contacted Mr. John Smither at the Kentucky Department for Environmental Protection (502/564-3410) and he suggested that I contact the water districts in the area of the site, the Salt River Water District and the Kentucky Turnpike Water District. Mr. Smither vaguely recalled looking into this issue a couple of years ago. He remembered that several miles of water line would be necessary and that the terrain was a problem so booster pumps would be needed. He thought that the water districts would probably provide the water, but that someone would have to pay for the water line. According to Mr. Smither, the area is sparsely populated and people typically buy water because there are no public water lines.

According to the receptionist at the Salt River Water District (502/955-9281), the Brooks area would be served by the Kentucky Turnpike Water District. I talked with Mr. Tad Burke, the commissioner of the Kentucky Turnpike Water District (502/955-9217), on April 24, 1991 and he was familiar with the situation. He said that it is in the "master plan" to provide water to the people living in the area of the Tri-City Site, but that it would cost approximately $1.5 million to run the line and install the two water tanks that are necessary. He asked me if any federal monies were available to finance the water line.

I talked with Mr. Bob Humphries in State Programs in EPA Region IV's Water Management Division on April 25th and he told me that EPA does not have provisions for providing funds in this situation. He suggested that state or local government agencies be contacted.

I talked with Mr. Greg Powell, the On-Scene Coordinator involved with the Emergency Removal Action conducted by EPA in 1988, on April 22nd and he looked into the cost of installing a water line to site residents in 1988. He remembered a cost of over $1 million, but he suggested that I contact Mr. Bob Padgett at the Kentucky Department for Environmental Protection for (KDEP) documentation.

I talked with Mr. Padgett at KDEP on April 25, 1991 and he did not recall being involved with investigating the feasibility of installing a water line. However, a letter dated May 26, 1989 from Mr. Carl Millanti of KDEP to Ms. Felicia Barnett, a previous Remedial Project Manager assigned to the site, indicates that Kentucky agreed with EPA providing water to the affected residents rather than extending the public water line based on the associated costs. Since I expected this issue to be raised during the public meeting on May 9th, I suggested that Mr. Padgett look into the availability of state funds for the water line for informational purposes.

I also reviewed the Guidance Document for Providing Alternate Water Supplies, EPA/540/G-87/006, February 1988 to determine if EPA had other provisions for providing water. However, it appears to be appropriate for EPA to only supply water to the residents affected by the contaminated sources (i.e., the Cox and Klapper Springs). And, using tank trucks to provide water is currently the most cost-effective method.

ATTACHMENT 5

Hand-Out from the Public Meeting
May 9, 1991

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION IV

PUBLIC INFORMATION MEETING

Tri-City Industrial Disposal
Superfund Site
May 9, 1991

Bullitt Lick Middle School
1080 West Blue Lick Road
Shepherdsville, Kentucky

AGENDA

- Introduction & Welcome
- Superfund Process Overview
- Tri-City Site Background & Remedial Investigation Summary
- Feasibility Study Results
- EPA's Recommended Alternative
- The Next Step
- Community Relations
- Enforcement Activities
- Tri-City Question & Answer Session
- Smith's Farm Site Presentation
- Smith's Farm Question & Answer Session

Administrative Record Location

Ridgway Memorial Library
Walnut Street
Post Office Box 146
Shepherdsville, Kentucky 40165
(502) 543-7675

SITE BACKGROUND

- Industrial waste landfill operated by Tri-City Industrial Services, Inc. from late 1964 to late 1967
- Bulk of the waste consisted of scrap lumber and fiberglass insulation materials
- Other waste consisted of drummed liquids and liquid wastes that were poured onto the ground at the site
- Site reportedly burned for 2 years from 1967 to 1969

SITE BACKGROUND (cont'd)

- Kentucky conducted a Site Investigation (SI) in April 1987 to determine the site's eligibility for inclusion on EPA's National Priorities List (NPL); site included on the NPL in March 1989
- SI revealed tetrachloroethene in 2 springs used by residents for domestic water; EPA has been providing water to affected residents
- EPA conducted an Emergency Removal Action at the site during the Summer of 1988 to excavate and remove 165 drums that contained liquid waste material

REMEDIAL INVESTIGATION

EPA conducted the Remedial Investigation (RI) at the site during 1989 and 1990 to:

- characterize site conditions,
- determine the type of waste present at the site, and
- assess risk to human health and the environment.

RI FINDINGS

- Cox Spring contained several volatile organic compounds, including tetrachloroethene (also known as PCE), at levels above the federally established Maximum Contaminant Levels (MCLs); PCE was also found in the monitoring well next to the Cox, Sr. residence
- PCE was detected at low concentrations in 2 air samples
- One species of polychlorinated biphenyl (PCB) and low levels of polycyclic aromatic hydrocarbons (PAHs) were found in one surface soil sample, and low levels of PAHs were also found in a subsurface soil sample in the same area
- Lead was detected in one sediment sample in a tributary of Brushy Fork Creek
- Minimal ecological impacts from the site on Brushy Fork Creek

RI SAMPLING

- Monitoring Wells = 6
  (a total of 13 wells were attempted)
- Surface Water Samples = 7
- Spring Water Samples = 5
- Sediment Samples = 12
- Surface Soil Samples = 20
- Subsurface Soil Samples = 27
- Air Samples = 16
  (at 3 locations)

RI CONCLUSIONS

Operable Unit One

- Restrict use of groundwater and spring water for domestic purposes, and provide water
- Clean up spring water contaminated above MCLs
- Confirmatory sampling of site soils, sediment, and air
- Long-term monitoring of groundwater and spring water, and the surface water, sediment, and ecology in Brushy Fork Creek

Operable Unit Two

- Actions determined to be necessary based on the results of the Confirmatory Sampling in Operable Unit One

FEASIBILITY STUDY

- EPA initiated the Feasibilty Study (FS) during the Summer of 1990 to develop and evaluate cleanup alternatives for the site.

- Four possible remedial alternatives were identified and each alternative was evaluated using eight of the nine evaluation criteria; the ninth criterion, community acceptance, is being evaluated during the public comment period.

POSSIBLE REMEDIAL ALTERNATIVES

Alternative 1 - No Action

Alternative 2 - Limited Action

- Institutional Controls
- Monitoring
- Confirmatory Sampling

Alternative 3 - Carbon Adsorption

- Carbon Adsorption
- Institutional Controls
- Monitoring
- Confirmatory Sampling

Alternative 4 - Aeration

- Aeration
- Institutional Controls
- Monitoring
- Confirmatory Sampling

EPA's RECOMMENDED ALTERNATIVE

Alternative 3 - Carbon Adsorption

- Institutional controls to prevent domestic use of the groundwater and spring water; provision of an alternate water supply.
- Treatment of contaminated spring water in a carbon adsorption system containing an activated carbon filter; spent carbon would be regenerated or appropriately treated/disposed.
- Long-term monitoring of groundwater, spring water, surface water, and sediments.
- Ecological monitoring of Brushy Fork Creek.
- Confirmatory sampling of site soils, sediment in the tributary of Brushy Fork Creek, and the air.

EPA's RECOMMENDED ALTERNATIVE

Alternative 3 - Carbon Adsorption is preferred for the following reasons:

1. Most protective of human health and the environment.
2. Provides reliable protection over time with minimal risk during construction and implementation.
3. Prevents contamination of Brushy Fork Creek and the air.
4. Utilizes a permanent solution.
5. Uses a proven and widely available technology that is easy to implement.
6. Reduces the toxicity, mobility, and volume of contaminated spring water through treatment.
7. Cost effective.
8. Satisfies EPA's preference for treatment as a principal element.

THE NEXT STEP

- Public comment period ends on June 1, 1991
- EPA will respond to the comments received and the responses will be summarized in a document called the Responsiveness Summary
- EPA's final choice of a remedy will be documented in the Record of Decision (ROD) to be issued in July 1991
- Signed ROD, which includes the Responsiveness Summary, will become part of the Administrative Record in the Information Repository

FOR FURTHER INFORMATION ABOUT THIS SITE, CONTACT:

Ms. Suzanne Durham
Community Relations Coordinator
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365
(404) 347-7791

QUESTIONS CAN ALSO BE DIRECTED TO:

Ms. Kimberly Gates
Remedial Project Manager
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365
(404) 347-7791

Mr. Bob Padgett
Environmental Coordinator
Division of Waste Management
Kentucky Dept. for Environmental Protection
18 Reilly Road
Frankfort, Ky 40601
(502) 564-6716

ATTACHMENT 6

EPA Letter dated August 26, 1991 to Concerned Citizen regarding Sampling Conducted at the Site

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4WD-NSRB

AUG 26 1991

Sue Hayes
4821 Brooks Hill Road
Brooks, Kentucky 40109

RE: Tri-City Industrial Disposal Site
Brooks, Bullitt County, Kentucky

Dear Ms. Hayes:

The purpose of this letter is to document the conversation we had following the Proposed Plan Public Meeting on May 9, 1991 for the Tri-City Site. The meeting was held in the library of the Bullitt Lick Middle School in Shepherdsville, Kentucky.

During the meeting you asked about the analytical results from the sampling of the groundwater monitoring well MW-07 and the spring on your property during the Remedial Investigation conducted by EPA in 1989. As I informed you after the meeting, the installation of monitoring well MW-07 was not completed due to insufficient groundwater. However, analyses were conducted on a surface soil sample collected from that location and on one subsurface soil sample collected at a depth of five to seven feet from a soil boring.

Toluene was found in the surface soil sample at a level of 72 parts per billion. Although this compound was detected in several other surface soil samples during the Remedial Investigation in similar or smaller concentrations, these levels are not indicative of a contamination problem that represents a threat to human health or the environment.

The Cattle Spring was sampled during the Remedial Investigation and again in December 1990 by EPA's Environmental Services Division. The results from the analyses of the two different samples are shown in the enclosed data sheets. The analytical data indicated that the Maximum Contaminant Levels (MCLs) established by the Safe Drinking Water Act were not exceeded during either sampling event. However, EPA has proposed restrictions on the domestic usage of the spring water until long-term monitoring shows that the water is of sufficient and consistent quality for human consumption.

Detailed information about EPA's investigations at the Tri-City Site is available in the Administrative Record in the Ridgway Memorial Library in Shepherdsville for your review. And, if you have further questions about the analytical information I have enclosed, please contact me at (404) 347-7791.

Sincerely yours,

Kimberly J. Gates, E.I.T.
Remedial Project Manager
Kentucky/Tennessee Remedial Section
North Superfund Remedial Branch
Waste Management Division

Enclosures

cc: Suzanne Durham, Community Relations Coordinator

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/25/89

PROJECT NO. 89-621 SAMPLE NO. 37924 SAMPLE TYPE: SURFACEWA PROG ELEM: SSF COLLECTED BY: P STONE
SOURCE: TRI-CITY INDUSTRIAL CITY: BROOKS ST: KY
STATION ID: TC-SP-04-1 COLLECTION START: 07/19/89 1430 STOP: 00/00/00
CASE NUMBER: 12345 SAS NUMBER: MD NUMBER: N648

UG/L	ANALYTICAL RESULTS
1000	ALUMINUM
30U	ANTIMONY
2U	ARSENIC
60U	BARIUM
2U	BERYLLIUM
4U	CADMIUM
52000	CALCIUM
4U	CHROMIUM
7U	COBALT
20U	COPPER
1300	IRON
5U	LEAD
8800	MAGNESIUM

UG/L	ANALYTICAL RESULTS
190	MANGANESE
0.20UJ	MERCURY
20U	NICKEL
3000	POTASSIUM
2UJ	SELENIUM
9UJ	SILVER
9200	SODIUM
3U	THALLIUM
NA	TIN
7U	VANADIUM
60U	ZINC

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/25/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-621 SAMPLE NO. 37924 SAMPLE TYPE: SURFACEWA PROG ELEM: SSF COLLECTED BY: P STONE
SOURCE: TRI-CITY INDUSTRIAL CITY: BROOKS ST: KY
STATION ID: TC-SP-04-1 COLLECTION START: 07/19/89 1430 STOP: 00/00/00
CASE.NO.: 12345 SAS NO.: D. NO.: N733 MD NO: N648

RESULTS	UNITS	PARAMETER
0.01UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 09/04/89

PROJECT NO. 89-621 SAMPLE NO. 37924 SAMPLE TYPE: SURFACEWA PROG ELEM: SSF COLLECTED BY: P STONE
SOURCE: TRI-CITY INDUSTRIAL CITY: BROOKS ST: KY
STATION ID: TC-SP-04-1 COLLECTION START. 07/19/89 1430 STOP: 00/00/00

CASE NO.: 12345 SAS NO.: D. NO.: N733

UG/L	ANALYTICAL RESULTS
10U	PHENOL
10U	BIS(2-CHLOROETHYL) ETHER
10U	2-CHLOROPHENOL
10U	1,3-DICHLOROBENZENE
10U	1,4-DICHLOROBENZENE
10UJ	BENZYL ALCOHOL
10U	1,2-DICHLOROBENZENE
10U	2-METHYLPHENOL
10U	BIS(2-CHLOROISOPROPYL) ETHER
10U	(3-AND/OR 4-)METHYLPHENOL
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
10U	ISOPHORONE
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
50UJ	BENZOIC ACID
10U	BIS(2-CHLOROETHOXY) METHANE
10U	2,4-DICHLOROPHENOL
10U	1,2,4-TRICHLOROBENZENE
10U	NAPHTHALENE
10U	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	4-CHLORO-3-METHYLPHENOL
10U	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2,4,6-TRICHLOROPHENOL
50U	2,4,5-TRICHLOROPHENOL
10U	2-CHLORONAPHTHALENE
50U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10UR	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
50U	3-NITROANILINE
10U	ACENAPHTHENE
50UJ	2,4-DINITROPHENOL
50U	4-NITROPHENOL
10U	DIBENZOFURAN
10U	2,4-DINITROTOLUENE
10U	DIETHYL PHTHALATE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	FLUORENE
50U	4-NITROANILINE
50UJ	2-METHYL-4,6-DINITROPHENOL
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
50U	PENTACHLOROPHENOL
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
20U	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10U	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10U	INDENO (1,2,3-CD) PYRENE
10U	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 09/04/89

PROJECT NO. 89-621 SAMPLE NO. 37924 SAMPLE TYPE: SURFACEWA PROG ELEM: SSF COLLECTED BY: P STONE
SOURCE: TRI-CITY INDUSTRIAL CITY: BROOKS ST: KY
STATION ID: TC-SP-04-1 COLLECTION START. 07/19/89 1430 STOP: 00/00/00
CASE NUMBER: 12345 SAS NUMBER: D. NUMBER: N733

UG/L	ANALYTICAL RESULTS
0.050U	ALPHA-BHC
0.050U	BETA-BHC
0.050U	DELTA-BHC
0.050U	GAMMA-BHC (LINDANE)
0.050UR	HEPTACHLOR
0.050U	ALDRIN
0.050U	HEPTACHLOR EPOXIDE
0.050U	ENDOSULFAN I (ALPHA)
0.10U	DIELDRIN
0.10U	4,4'-DDE (P,P'-DDE)
0.10U	ENDRIN
0.10U	ENDOSULFAN II (BETA)
0.10U	4,4'-DDD (P,P'-DDD)
0.10U	ENDOSULFAN SULFATE
0.10U	4,4'-DDT (P,P'-DDT)

UG/L	ANALYTICAL RESULTS
0.50U	METHOXYCHLOR
0.10U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
0.50U	GAMMA-CHLORDANE /2
0.50U	ALPHA-CHLORDANE /2
1.0U	TOXAPHENE
0.50U	PCB-1016 (AROCLOR 1016)
0.50U	PCB-1221 (AROCLOR 1221)
0.50U	PCB-1232 (AROCLOR 1232)
0.50U	PCB-1242 (AROCLOR 1242)
0.50U	PCB-1248 (AROCLOR 1248)
1.0U	PCB-1254 (AROCLOR 1254)
1.0U	PCB-1260 (AROCLOR 1260)

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.
*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 09/04/89

PROJECT NO. 89-621 SAMPLE NO. 37924 SAMPLE TYPE: SURFACEWA PROG ELEM: SSF COLLECTED BY: P STONE
SOURCE: TRI-CITY INDUSTRIAL CITY: BROOKS ST: KY
STATION ID: TC-SP-04-1 COLLECTION START. 07/19/89 1430 STOP: 00/00/00

CASE NO.: 12345 SAS NO.: D. NO.: N733

UG/L	ANALYTICAL RESULTS
10UJ	CHLOROMETHANE
10U	BROMOMETHANE
10U	VINYL CHLORIDE
10U	CHLOROETHANE
5U	METHYLENE CHLORIDE
10U	ACETONE
5U	CARBON DISULFIDE
5U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	1,1-DICHLOROETHANE
5U	1,2-DICHLOROETHENE (TOTAL)
5U	CHLOROFORM
5U	1,2-DICHLOROETHANE
10U	METHYL ETHYL KETONE
5U	1,1,1-TRICHLOROETHANE
5U	CARBON TETRACHLORIDE
10UJ	VINYL ACETATE
5U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
5U	1,2-DICHLOROPROPANE
5U	CIS-1,3-DICHLOROPROPENE
5U	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	DIBROMOCHLOROMETHANE
5U	1,1,2-TRICHLOROETHANE
5U	BENZENE
5U	TRANS-1,3-DICHLOROPROPENE
5UJ	BROMOFORM
10UJ	METHYL ISOBUTYL KETONE
10UJ	METHYL BUTYL KETONE
5U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5UJ	1,1,2,2-TETRACHLOROETHANE
5U	TOLUENE
5U	CHLOROBENZENE
5U	ETHYL BENZENE
5U	STYRENE
5U	TOTAL XYLENES

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

12/12/90

PURGEABLE ORGANICS DATA REPORT

PROJECT NO. 91-203 SAMPLE NO. 52958 SAMPLE TYPE: GROUNDWA PROG ELEM: SSF COLLECTED BY: C TILL
SOURCE: TRI CITY INDOSTRIAL CITY: BROOKS ST: KY
STATION ID: TRIC-08 SPRING CATTLEMAN COLLECTION START: 12/04/90 1219 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS
5.0U	CHLOROMETHANE
5.0U	VINYL CHLORIDE
5.0U	BROMOMETHANE
5.0U	CHLOROETHANE
5.0U	TRICHLOROFLUOROMETHANE
5.0U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
50U	ACETONE
12U	CARBON DISULFIDE
5.0U	METHYLENE CHLORIDE
5.0U	TRANS-1,2-DICHLOROETHENE
5.0U	1,1-DICHLOROETHANE
12U	VINYL ACETATE
5.0U	CIS-1,2-DICHLOROETHENE
5.0U	2,2-DICHLOROPROPANE
50U	METHYL ETHYL KETONE
5.0U	BROMOCHLOROMETHANE
5.0U	CHLOROFORM
5.0U	1,1,1-TRICHLOROETHANE
5.0U	1,1-DICHLOROPROPENE
5.0U	CARBON TETRACHLORIDE
5.0U	1,2-DICHLOROETHANE
5.0U	BENZENE
5.0U	TRICHLOROETHENE(TRICHLOROETHYLENE)
5.0U	1,2-DICHLOROPROPANE
5.0U	DIBROMOMETHANE
5.0U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
5.0U	CIS-1,3-DICHLOROPROPENE
12U	METHYL ISOBUTYL KETONE
0.58J	TOLUENE
5.0U	TRANS-1,3-DICHLOROPROPENE
5.0U	1,1,2-TRICHLOROETHANE
5.0U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5.0U	1,3-DICHLOROPROPANE
12U	METHYL BUTYL KETONE
5.0U	DIBROMOCHLOROMETHANE
5.0U	CHLOROBENZENE
5.0U	1,1,1,2-TETRACHLOROETHANE
5.0U	ETHYL BENZENE
5.0U	(M- AND/OR P-)XYLENE
5.0U	O XYLENE
5.0U	STYRENE
5.0U	BROMOFORM
5.0U	BROMOBENZENE
5.0U	1,1,2,2-TETRACHLOROETHANE
5.0U	1,2,3-TRICHLOROPROPANE
5.0U	O-CHLOROTOLUENE
5.0U	P-CHLOROTOLUENE
5.0U	1,3-DICHLOROBENZENE
5.0U	1,4-DICHLOROBENZENE
5.0U	1,2-DICHLOROBENZENE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 01/17/91

PROJECT NO. 91-203 SAMPLE NO. 52958 SAMPLE TYPE: GROUNDWA PROG ELEM: SSF COLLECTED BY: C TILL
SOURCE: TRI CITY INDUSTRIAL CITY: BROOKS ST: KY
STATION ID: TRIC-08 SPRING CATTLEMAN COLLECTION START: 12/04/90 1219 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS
10U	SILVER
30U	ARSENIC
N/A	BORON
30	BARIUM
5.0U	BERYLLIUM
5.0U	CADMIUM
10U	COBALT
10U	CHROMIUM
10U	COPPER
10U	MOLYBDENUM
20U	NICKEL
40U	LEAD
30U	ANTIMONY
40U	SELENIUM
25U	TIN
93	STRONTIUM
50U	TELLURIUM
20	TITANIUM
100U	THALLIUM
10U	VANADIUM
10U	YTTRIUM
14	ZINC
N/A	ZIRCONIUM
0.2U	MERCURY
580	ALUMINUM
25	MANGANESE

MG/L	ANALYTICAL RESULTS
91	CALCIUM
5.2	MAGNESIUM
0.58	IRON
9.1	SODIUM
2.0U	POTASSIUM

REMARKS

REMARKS

FOOTNOTES
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ATTACHMENT 7

Written Comments Received During Public Comment Period and EPA'S Responses

Waste Management of North America, Inc.
3003 Butterfield Road Oak Brook, Illinois 60521

May 31, 1991

Ms. Suzanne Durham
Community Relations Coordinator
Waste Management Division (4WD-NSRB)
United States Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Re: Comments to the RI/FS and Proposed Plan
Tri-City Industrial Disposal Site
Bullett County, Kentucky

Dear Ms. Durham:

Waste Management of Kentucky, Inc., (WMK) and Ford Motor Company (Ford), which were identified by USEPA as potentially responsible parties at the site, have reviewed the above-referenced documents and submit the attached comments for the Agency's review. WMK and Ford believe the site has been adequately characterized and the selected remedy is protective of human health and the environment. However, WMK and Ford believe the sampling and analytical requirements contained in the proposed plan should be modified, as indicated in the attached comments.

We would be pleased to meet with you at your convenience to discuss the comments.

Sincerely,

FORD MOTOR COMPANY

WASTE MANAGEMENT OF KENTUCKY, INC.

Brett D. Heinrich
Environmental Counsel
WASTE MANAGEMENT OF KENTUCKY, INC.

BDH:lc

Attachments

708/572-8800 • Telex: 253094 • TWX. 910-651-0029

COMMENTS ON PROPOSED PLAN FOR REMEDIAL ACTION AT THE TRI-CITY INDUSTRIAL DISPOSAL SITE OPERABLE UNIT ONE

MAY 31, 1991

PREPARED FOR:

WASTE MANAGEMENT OF KENTUCKY, INC.
FORD MOTOR COMPANY, INC.

PREPARED BY:

SIRRINE ENVIRONMENTAL CONSULTANTS, INC.

BACKGROUND

The U.S. Environmental Protection Agency (EPA) released a proposed plan for remediation of Operable Unit One at the Tri-City Industrial Disposal Site ("Site") in Brooks, Kentucky in April 1991. The preferred remedy involves:

- Treatment of the Cox, Sr., spring water with a carbon adsorption system to remove volatile organic compounds (VOCs)
- Confirmatory sampling of the area where waste materials were removed during EPA's Emergency Removal Action in 1988
- Additional sampling of site media to further delineate the extent of contamination
- Ecological monitoring of site surface waters (Brushy Fork Creek), biological tissue analysis, and potentially histopathological studies.

Waste Management of Kentucky, Inc. (WMK) and Ford Motor Company (Ford) have been identified by USEPA as potentially responsible parties (PRPs) at the Site. Tri-City Industrial Services, Inc., a predecessor company to WMK, leased the site from October 1966 to December 1967 and hauled waste for Ford Motor Company.

WMK and Ford have reviewed the proposed plan and herewith submit the rationale for our comments and requests consideration of changes in the plan based on these comments. WMK and Ford are prepared to review these comments with EPA at their request.

ADDITIONAL SAMPLING

Characterization of the Site was conducted during the following investigations:

- Kentucky DNREPC (April 1987)
- EPA Technical Assistance Team (August 1988)
- EPA Field Investigation Team (NUS, August 1988)

- Remedial Investigation
  - Phase I (July 1989)
  - Phase II (November 1989)
- EPA Environmental Services Division (December 1990)

In addition, EPA conducted an Emergency Removal Action in September 1988 involving the removal of drums, free liquids and contaminated soils from the Site. Magnetometer, electromagnetic and soil gas surveys were conducted midway through the investigations (August 1988) to identify potential source areas. Based on these surveys, subsequent investigations were focused on the southern portion of the Site. Site investigations involved analysis of the following:

- 5 waste samples
- 51 surface soil samples
- 26 subsurface soil samples
- 6 surface water samples
- 13 sediment samples
- 18 spring/groundwater samples
- 12 air samples

Six monitoring wells were installed while seven additional proposed wells could not be installed due to the absence of groundwater at the Site. The low permeability bedrock underlying the Site limits the vertical movement of groundwater and has led to preferential groundwater movement marked by the formation of springs, which have been thoroughly monitored.

The existing characterization of the Site is sufficient for the preparation of a baseline risk assessment and evaluation of potential remedial alternatives. Further characterization of the Site should be limited to presently identified areas of potential concern. Additional site sampling and analysis should be limited to the tasks outlined below per the headings given in the proposed plan.

Groundwater

Due to the underlying impermeable bedrock and the preferential flow to springs, only 6 out of 13 borings at the Site encountered free groundwater. Only one of the monitoring wells has sufficient yield to sustain flow. As a result, well-point extraction would not be possible. The 13 borings delineate the potential distribution of groundwater at the Site. Further characterization can best be accomplished through annual sampling of the springs for VOCs.

The Remedial Investigation indicated potential metals contamination at certain wells. However, the revised MCL for chromium is 100 ug/l (56 FR 3526; January 30, 1991). The maximum chromium level of 74 ug/l at the site (MW-12) is therefore within the MCL. The proposed corrective action level for nickel in groundwater is 700 ug/l (55 FR 30798; July 27, 1990). All Site groundwater and springs are within this level for nickel.

Soil

1) Confirmatory sampling of the waste disposal area affected by the Emergency Removal Action is appropriate to define the residual contaminant concentrations and assess their potential to impact spring water above MCLs.

2) PCBs were only found in 1 out of 20 surface soil samples collected during the RI. The detected concentration (0.490 mg/kg) is less than EPA's recommended CERCLA cleanup level of 1 mg/kg (OSWER Dir. No. 9355-4-01). PAHs were only found in 2 out of 20 locations and were detected at concentrations below the minimum quantitation limit. PCBs and PAHs were found at concentrations below regulatory concern in limited areas of the Site. These compounds are not mobile (Section 5.2.3 of the RI) and further characterization is not warranted.

3) Magnetometer, electromagnetic and soil gas surveys conducted by EPA FIT in 1988 found no evidence of a potential source area in the northeast corner of the Site. Results of these surveys were used to focus attention on the southern portion of the Site, which was extensively trenched during the removal effort without finding significant areas of

contamination outside of the removal action. No further characterization of the northeast area is warranted.

4) Surficial soil contamination along the periphery of the Site is generally absent except for trace levels of a PCB and PAHs. These compounds are not mobile through surface runoff and significant impact on the sloped areas is not anticipated. Any contamination in the sloped areas would be expected to be observed in the surface water and sediments of Brushy Fork Creek. With the possible exception of lead in sediments at one location (SD-06), no site-related compounds were detected in surface waters or sediments. In the absence of a significant source or impact, characterization of the sloped areas is not warranted.

Sediment

Sediment samples should be collected upstream, downstream and at sampling location SD-06 for lead. Duplicate samples should be collected to establish any variability in analyses.

Air

Trace levels of PCE were detected during 2 out of 4 sampling events at the background sampling location at the Site, approximately 450 feet away from the nearest residence. PCE was not detected in the ambient air at the Cox, Sr. or Cox, Jr. residences. The risk levels generated for inhalation of PCE are based on inappropriate exposure levels and toxicity factors (see attachment). The actual risk level from inhalation of maximum PCE levels at the Site is 1.1×10^{-7}, which is below the risk range identified in the NCP (40 CFR 300.430). The presence of PCE only at a background location, the absence of PCE at the residences, and the absence of significant risks indicates that ambient air concentrations are not a concern at the Site. Therefore, air monitoring is not warranted.

Surface Water

No site-related compounds were detected in any of the 11 surface water sampling stations. An assessment by EPA's Ecological Support Branch and the Kentucky Division of Water in August

of 1990 determined that any ecological impacts from the Site on Brushy Fork Creek are "minimal" and that additional biological testing of the water column and sediment was not necessary if:

1) the spring(s) of potential concern were treated
2) the source was remediated
3) water volume in the creek was monitored and impacted sediments were delineated.

These three requirements would be satisfied as follows:

1) treatment of the Cox, Sr. spring and monitoring of the remaining springs
2) confirmation sampling in the area of the Emergency Removal Action to define any residual source concentrations and their potential to impact groundwater
3) stream gauging and delineation of the lead concentrations in the vicinity of SD-06.

Biological monitoring is indicated only where there is chemical and/or observational evidence of environmental impact, neither of which exists at the Site. The ecological assessment concluded that any impacts on Brushy Fork Creek are the result of agricultural (nutrient) runoff. In the absence of any significant impact from the Site and considering proposed remedial and investigatory activities, biological monitoring of Site surface waters is not warranted.

Ecological

The only potentially site-related compound identified as posing a potential risk to the environment is lead in the vicinity of sediment sampling station SD-06. The lead concentration in sediments at SD-06 (610 mg/kg) is nearly ten times the highest concentration detected in Site soils (71 mg/kg), thereby calling into question the value at SD-06. Downstream sediment samples were not contaminated, indicating a localized condition. Lead concentrations in the vicinity of SD-06 and their potential risk to the environment will be addressed through sampling

during Remedial Design. Lead is not considered to be a bioaccumulative material, which precludes the need for any tissue analyses. Any ecological testing should be deferred pending the results of the resampling in the vicinity of SD-06.

SPRING WATER TREATMENT REQUIREMENTS

The characterization of treatment requirements for the Cox, Sr. spring in the Feasibility Study was sufficient for the evaluation of remedial alternatives. More detailed characterization of the treatment process will be required to assure the effectiveness of the remedy.

1) Sedimentation would be ineffective for the removal of particle sizes that could potentially plug activated carbon beds. Filtration, typically using a bag or cartridge filter, is the preferred method of pretreatment. Filtration can be readily implemented at the Site.

2) Naturally occurring iron levels at the Site can also cause plugging of carbon beds through scale formation. Iron levels need to be quantified to assess the potential for scale formation.

3) A single carbon column will not allow the most efficient use of carbon or provide a safety factor for discharge. Carbon adsorption design typically involves two or more columns in series.

4) Gravity flow at the Site will involve placement of the carbon system down a ravine, complicating operations and maintenance. Therefore, the design may have to be changed.

5) The point of discharge for treated water, effluent requirements, and monitoring requirements must be established prior to design. Contrary to the FS, discharge to a surface water would be based on Federal and Commonwealth Ambient Water Quality Criteria, not MCLs.

6) The period of carbon replacement will be defined once the influent loadings and effluent requirements are established. Design will anticipate a decrease in influent concentrations over time (life-cycle design).

Based on these considerations, projected costs given in the FS are likely underestimated but still within the required accuracy range of +50/-30 percent.

SITE ASSESSMENT SUMMARY

Following several investigations of Site springs, the installation of 6 monitoring wells, and the identification of the absence of groundwater at 7 locations, the only confirmed groundwater impact at the Site is at the Cox, Sr. spring. The most likely source is the adjacent area where the former drums and free liquids were removed by EPA in 1988. Total VOC concentrations at the spring have decreased more than 20 percent between the RI sampling (November 1989) and the EPA-ESD sampling (December 1990), indicating the effectiveness of EPA's removal action toward lowering VOC concentrations at the spring.

Attempts to locate another source at the Site included screening techniques (EM, magnetometer, and soil gas surveys) to identify potential source areas for subsequent detailed characterization. The screening techniques employed were extensive and allowed more effective assessment of a defined portion of the Site. The screening survey was followed by extensive test pitting and soil sampling. These procedures comply with EPA guidance for characterizing large areas containing heterogeneous fill materials such as landfills (Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites, EPA, February 1991). The results of this testing found no potentially significant source areas other than the area addressed by EPA's Emergency Removal Action. The absence of other source areas is corroborated by impacts identified only at the Cox, Sr. spring.

The only area of potentially significant environmental impact is associated with lead levels in sediments at the sampling station SD-06.

PROPOSED REMEDIAL RESPONSE

Areas of potential concern at the Site are limited to the following areas:

1) VOCs at the Cox, Sr. spring
2) potential residual VOCs in soils in the area of EPA's Emergency Removal Action of 1988
3) lead in sediments at sampling station SD-06 in Brushy Fork Creek.

To address these areas, the following activities should be undertaken during Remedial Design:

1) Conduct a more detailed evaluation of treatment system design for the Cox, Sr. spring, including:
    - proposed method for disposal of treated water discharge in accordance with applicable effluent requirements
    - specific design elements, including flow range and influent total organic carbon, iron, and total suspended solids concentrations
    - pretreatment for solids and scale-forming materials (e.g., iron)
    - whether the use of polishing carbon adsorber(s) would be necessary
    - establish regular (annual) monitoring of other Site springs.

2) Conduct confirmation sampling, via subsurface borings, of soils in the vicinity of the Emergency Removal Action for VOCs. Evaluate the potential impact of any residual VOCs on groundwater through unsaturated transport modeling (e.g., Vadose Interactive Process model). Evaluate the results with respect to potential human health risks and ARARs and establish the need for further remedial activities as Operable Unit Two.

3) Confirm the presence and extent of lead in sediments at SD-06. Based on these results, evaluate the need for bioassay testing and/or remedial measures.

Remaining media at the Site have been adequately characterized and further assessment is not warranted. Additional activities should further characterize only the areas of potential concern which have been presently identified.

ATTACHMENT: RISK ASSESSMENT OF PCE AIR CONCENTRATIONS

Risk levels identified in the Baseline Risk Assessment of airborne PCE are based on inappropriate exposure levels and toxicity factors. The rationale for more realistic risk levels follows.

PCE has been removed from the IRIS data base and presently is under review due to questions on the strength of evidence for carcinogenicity. Assuming PCE is a carcinogen, calculation of an alternative concentration level for air based on a 1×10^{-6} cancer risk yields a value of 38 ppb PCE (see attached equations). Likewise inhalation risk for residential exposure would be 1.1E-7 for adult exposure based upon use of the following EPA toxicity and exposure factors (references attached):

inhalation slope factor	=	1.8E-3 $(mg/kg\text{-}day)^{-1}$
inhalation rate	=	20 m^3/day (adult)
exposure time	=	3 hrs/wk (adult)
exposure frequency	=	350 days/yr
exposure duration	=	30 years (adult)

With regard to potential systemic toxicity, the use of an oral reference dose to calculate an inhalation pathway, as was done in the Risk Assessment, is inappropriate. EPA's Human Health Evaluation Manual (HHEM; 1989) guidance recommends contacting EPA's Environmental Criteria and Assessment Office (ECAO) for guidance when route-specific reference doses are not available. ECAO toxicologists will calculate a route-specific reference dose or recommend a reference dose based on extrapolation from available reference doses. In the absence of this information, HHEM guidance recommends a qualitative, not quantitative, treatment of risk. ECAO toxicologists were contacted and confirmed that an oral reference dose was inappropriate for exposure due to inhalation.

On a semi-quantitative level, the ACGIH TWA (time weighted average) for PCE is 50 ppm (339 mg/m^3), while the STEL (short term exposure limit) is 200 ppm (1370 mg/m^3) based on an 8-hour interval. These limits are set to prevent anesthetic effects and to provide a wide margin of safety of liver injury. The OSHA PEL (permissible exposure level) is 25 ppm (170 mg/m^3). The PEL establishes a safe level for worker exposure based on an 8-hour work day, which exceeds the 3-hour weekly exposure value established by EPA for residential exposure. The PEL level is approximately 6,000 times the maximum PCE air concentration measured at the Site. These factors would indicate that the risk estimates for the air inhalation pathway were inappropriately conservative. Considering the measured concentration, frequency and location of detects, any risks from PCE inhalation should be insignificant for present and future exposures.

The risk level of 1.1E-7 for inhalation of PCE is based on approved EPA factors and is more realistic than that presented in the Site risk assessment. Even this level is likely overly conservative considering that PCE was only found half of the time at a distance of 450 feet from the nearest residence and in light of the questions regarding PCE carcinogenicity. The risk level of 1.1E-7 is not considered significant per the NCP (40 CFR 300.430), and PCE air concentrations at the Site are not a concern.

TRI-CITY INDUSTRIAL DISPOSAL SITE

RISK LEVEL BASIS AND CALCULATIONS

Inhalation Slope Factor = $\frac{\text{Unit Risk} \times 70\ \text{kg} \times 10^3}{20\ \text{m}^3/\text{day}}$

= 5.2E-7 x 3500 = 1.8E-3 $(\text{mg/kg-day})^{-1}$

D_T (acceptable daily dose) = $\frac{1 \times 10^{-6}}{1.8 \times 10^{-3}}$ = 5.6×10^{-4} mg/kg-day

Inhalation PPLV = $\frac{D_T \times BW \times AT}{IR \times ET \times EF \times ED}$

= $\frac{5.6E\text{-}4 \times 70\ \text{kg} \times 25550\ \text{days}}{0.83\ \text{m}^3/\text{hr} \times 0.44\ \text{hr/day} \times 350\ \text{days/hr} \times 30\ \text{yr}}$

= 2.6E-1 mg/m^3 = 3.8E-2 ppm = 38 ppb

Inhalation Intake = $\frac{CA \times IR \times ET \times EF \times ED}{BW \times AT}$

= $\frac{2.8D\text{-}2\ \text{mg/m}^3 \times 0.83\ \text{m}^3/\text{hr} \times 0.44\ \text{hr/day} \times 350\ \text{d} \times 30\ \text{yr}}{70\ \text{kg} \times 25550\ \text{d}}$

= 6.0E-5

Risk = Intake x Slope Factor

= 6.05E-5 x 1.8E-3 = 1.1E-7

For Inhalation of Volatiles:

Slope Factor = 1.8E-3 $(\text{mg/kg-day})^{-1}$

PPLV = 2.6E-1 mg/m^3 = 38 ppb

Risk = 1.1E-7

In calculation of PPLV and Intake/Risk, factors used that are different than those used by the risk assessment (RA):

Slope Factor:	calculated from Unit Risk Factor found in EPA Health Effects Assessment Summary Tables (January 1991)
Inhalation Rate:	20 m^3/day, as per EPA Supplemental Guidance (March 25, 1991). The RA used 30 m^3/day.
Exposure Time:	3 hours per week time spent outdoor at residence by adult, as per EPA Exposure Factors Handbook (1990). The RA used 115 hours/week inside residence.
Exposure Frequency:	350 days/year, as per EPA Supplemental Guidance. The RA used 365 days/year.
Exposure Duration:	30 years upper bound time at one residence, as per EPA HHEM guidance. The RA used 48 years, broken down into six age groups. The risk level of 1.1E-7 is based on a 30-year adult exposure.

Office of the General Counsel

Ford Motor Company
Parklane Towers West, Suite 401
One Parklane Boulevard
Dearborn, Michigan 48126

June 25, 1991

Ms. Suzanne Durham
Community Relations Coordinator
Waste Management Division (4WD-NSRB)
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Re: Comments to the RI/FS and Proposed Plan
Tri-City Industrial Disposal Site
Bullitt County, Kentucky

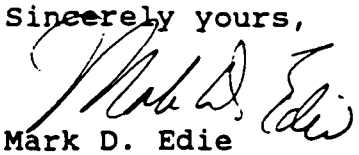
Dear Ms. Durham:

Under a cover letter dated May 31, 1991, and signed by Brett D. Heinrich, Environmental Counsel, Waste Management of Kentucky, Inc. ("WMK"), a document entitled "Comments on Proposed Plan for Remedial Action at the Tri-City Industrial Disposal Site Operable Unit One" ("Comments") was forwarded to you. This document was sent without an opportunity on the part of Ford Motor Company ("Ford") to review the final draft. The purpose of this letter is to clarify the position of Ford with respect to a statement which appears in the Comments.

The last sentence of the first paragraph on page 1 of the Comments states that "Tri-City Industrial Services, Inc., a predecessor company to WMK, leased the site from October 1966 to December 1967 and hauled waste for Ford Motor Company." This sentence is literally correct in that Tri-City did haul waste for Ford during the stated time period. However, to the extent the sentence may be read to imply that Ford waste was hauled to the Tri-City Industrial Disposal Site, Ford denies any such implication. Ford's position on this matter has been set forth in the pleadings filed in U.S. v. Waste Management of Kentucky, Inc., et al., Action No. C-90-0632-L(S), and the statement in the Comments does not represent a change in that position.

Please include this letter in the administrative record for the Tri-City Industrial Disposal Site. Thank you for your attention.

Sincerely yours,



Mark D. Edie
Staff Attorney

MDE:se

cc: Brooke F. Dickerson
Brett D. Heinrich
Robert E. Leininger
Paul G. Wolfteich

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET N.E.
ATLANTA, GEORGIA 30365

4WD-NSRB

AUG 0 2 1991

Brett D. Heinrich
Environmental Counsel
Waste Management of North America, Inc.
3003 Butterfield Road
Oak Brook, Illinois 60521

RE: Comments on the Proposed Plan
Tri-City Industrial Disposal Site
Brooks, Bullitt County, Kentucky

Dear Mr. Heinrich:

This letter is in response to the comments submitted by Waste Management of Kentucky, Inc. and Ford Motor Company on the Remedial Investigation (RI) and Feasibility Study (FS) Reports and the Proposed Plan for the Tri-City Industrial Disposal Site in Brooks, Kentucky. Since your comments were not itemized, this response will address the conclusions and recommendations as they appear in the submitted report dated May 31, 1991.

Although we concur that the selected remedy for Operable Unit #1 is protective of human health and the environment, we believe that confirmatory sampling is necessary to completely characterize the areas of concern on-site. Details regarding the numbers of samples and sample locations will be finalized during the Remedial Design (RD) phase.

EPA has the following responses to the comments in your report:

1) Page 2, Paragraph 3: The existing characterization of the Site is sufficient to address the groundwater contamination. As described in the RI (specifically, the Baseline Risk Assessment) and the FS Reports, definitive conclusions about surface soil contamination along the eastern edge of the former disposal area, sediment contamination in the tributary to Brushy Fork Creek, and ambient air contamination along the slopes of the Cox Lobe cannot be made based on existing data. Confirmatory sampling is necessary in these areas, the area where the Emergency Removal Action was conducted, and the northern portion of the Site (as shown in the EPIC aerial photograph taken in 1967) where drum storage and/or disposal potentially occurred to adequately characterize any contamination and assess the associated risk.

2) Page 3, "Groundwater" section: Although the levels of lead and nickel found in several of the groundwater monitoring well samples were above the action level for lead and the proposed Maximum Contaminant Level (MCL) for nickel, the detected levels did not appear to be reflective of any one water-bearing zone. Lead was detected in the wells screened in the Muldraugh Member and the Nancy Member. It was not detected in the zones immediately underlying the Site. Nickel was found in the Harrodsburg Limestone, the Muldraugh Member, and the Nancy Member.

Both metals occur naturally in the area of the Site, which is a sedimentary environment dominated by limestones, shales, and siltstones. Moreover, these metals were not detected in the spring samples, which were the primary sources of potable water for on-site residents. Consequently, remedial action is not justified based on the detections of lead and nickel.

Note: The proposed MCL for nickel is 100 ug/l (55 FR, July 25, 1990), not the 700 ug/l level stated in the comments report.

3) Page 3, Item 2: The Baseline Risk Assessment revealed a potential risk to human health from the ingestion of garden crops and beef from cattle raised on-site based on the levels of PAHs and PCBs found in surface soils during the RI and the previous soil sampling conducted by EPA in June 1988. However, the risk estimates calculated for the vegetable and beef pathways were based on only two positive detection values. Confirmatory sampling is necessary to generate data that better characterizes the area of concern. The number of samples and the sample locations will be finalized during the RD phase.

4) Page 3, Item 3: Although the geophysical survey conducted by EPA's Field Investigation Team in August 1988 included the northern portion of the Site, none of the sampling locations for the field analytical screening procedures (FASP) were in this area (see Figure 2-13 from the RI/FS Work Plan developed by NUS Corporation). An electromagnetically anomalous area was detected in the northern area of the Site immediately south of the Cox, Jr. residence (see Figure 2-8 in the RI/FS Work Plan). Moreover, based on the

analysis of two aerial photographs of the Site taken in 1966 and 1967, drum storage and/or disposal is a probability in this area. Consequently, confirmatory sampling is proposed in Operable Unit #1 to identify and determine the extent of any contamination that may be present.

5) Page 4, Item 4: The slopes of the Cox Lobe will be investigated further if the results of the additional air sampling indicate that a potential source exists.

6) Page 4, "Sediment" section: Although sediment quality criteria have not been estabilised for metals, effects levels have been estimated by the National Oceanic and Atmospheric Administration based on the response of test organisms to single-toxins, including metals. The effects range-lower (ER-L) is a concentration of a single analyte at the low end of the range in which effects have been observed. The ER-L values for chromium, lead, and mercury were exceeded in the sediment sample SD-06 collected from the drainage pathway of the unnamed spring into Brushy Fork Creek during the RI. The ER-L value for lead was also exceeded in the downstream sediment sample SD-11. Consequently, the sediment in the area of the sample SD-06 and extending to the area of the sample SD-11 will be sampled further during the RD/RA phase to determine the extent of the metals contamination.

7) Page 4, "Air" section: The exposure levels and toxicity factors used to generate the risk levels for inhalation of air contaminated with tetrachloroethene (also known as perchloroethylene, or PCE) were appropriate at the time the Baseline Risk Assessment was performed. Some of the guidance values discussed in the attachment to the comments were issued after the Baseline Risk Assessment was performed. For example, the Human Health Evaluation Manual Supplemental Guidance was issued on March 25, 1991 and the Baseline Risk Assessment for the Tri-City Site was finalized in August 1990.

The source of the toxicity values for PCE that were used in the Baseline Risk Assessment is the Health Effects Summary Tables (HEAST) generated in the Fourth Quarter of FY89. The carcinogenic classification of PCE has been verified and the slope factor has changed since that time. However, the values used in the Baseline Risk Assessment were correct at the time of their use.

Two out of three air samples that were collected at a location along a slope of the Cox Lobe contained PCE. These samples were collected over a period of one month during the RI. The Baseline Risk Assessment revealed that the air pathway is a current exposure pathway that is still of concern not only because of the risk associated with the detected contamination, but also because additional information regarding the source and seasonal variation in contaminant levels is necessary. The risk estimate based on the two positive detection values may be an underestimate and future sampling is necessary to determine if this is a one-time effect, if the PCE is originating on-site, and if there is a source of the PCE on-site. The risk estimate will be re-calculated based on the new data and current toxicity values.

8) Pages 4 & 5, "Surface Water" section: The U.S. Department of the Interior, as a federal natural resource trustee, recommended the performance of a biological contaminant monitoring program at the Tri-City Site. This recommendation was documented in a letter dated August 24, 1990 from Mr. Mark Wilson, Contaminant Specialist from the Fish & Wildlife Service, following a cursory site reconnaissance conducted jointly with EPA in August 1990. Since an evaluation of the potential threat to non-human (i.e., environmental) receptors has not been performed, a biological contaminant monitoring program will be included in Operable Unit #1. EPA has been in communication with Mr. Wilson to coordinate the development of a site-specific program. The details of the sample frequencies, locations, and media will be finalized during the RD phase.

9) Page 6, "Spring Water Treatment Requirements" section: The detailed design of the carbon adsorption treatment system for the Cox Spring will be developed during the Remedial Design phase of the Superfund process. Should you elect to conduct the Remedial Design/Remedial Action for Operable Unit #1, EPA will evaluate your design recommendations during that phase of the process.

The performance standards for the treatment system will include the standards established by the Safe Drinking Water Act and the Clean Water Act. Remediation of contaminated groundwater for a Class II-B aquifer is

required to meet MCLs as established by the Safe Drinking Water Act (40 CFR Part 141) and, if possible, to attain Maximum Contaminant Level Goals (MCLGs). Since the treated water will be discharged to the downstream tributary, the discharge is required to meet the National Pollutant Discharge Elimination System (NPDES) standards established by the Clean Water Act and regulated by the Commonwealth of Kentucky.

10) Page 7, Paragraph 1 of the "Site Assessment Summary" section: It is not possible, based on existing data, to quantitatively define a trend of decreasing VOC levels in all of the springs. The two tables included in this letter as Enclosures #1 and #2 summarize the data from the organic analyses of the samples collected from the Cox and Klapper Springs.

In the Cox Spring, quantities of 1,1-dichloroethane, 1,2-dichloroethene, 1,1,1-trichloroethane, and vinyl chloride increased between the sampling event conducted by EPA in May 1988 and the RI sampling conducted in July 1989. The minimum quantitation limits for the analyses of 1,1-dichloroethane, 1,1,1-trichloroethane, and vinyl chloride in the samples collected in December 1990 were set too high to produce comparable data. While the level of tetrachloroethene in the Cox Spring decreased from May 1988 to July 1989, it increased from July 1989 to December 1990. The level of toluene was also elevated in the December 1990 sample. Only the level of trichloroethene appeared to consistently decrease over time.

In the Klapper Spring, the levels of VOCs have decreased over time and only tetrachloroethene was detected in the December 1990 sample. The primary contaminant of concern in the Cattle Spring, toluene, has decreased from 9.4 ppb in May 1988 to an undetected level above the minimum quantitation limit of 5 ppb during the RI. Toluene was detected at an estimated level of 0.58 ppb in the December 1990 sample.

VOCs have not been detected in the samples collected from Brading Spring #2 by Kentucky in April 1987 and during the RI in July 1989. The unnamed spring has apparently only been sampled once and that was by Kentucky in April 1987. Trans-1,2-dichloroethene, 1,1,1-trichloroethane, trichloroethene, and tetrachloroethene were detected in the sample from the unnamed spring.

EPA believes that the drums removed during the 1988 action were the primary source of the groundwater contamination. However, confirmatory sampling in the area of the removal will determine if that source was completely removed. Moreover, long-term monitoring of the groundwater is necessary to identify a trend of decreasing VOC levels in the Cox Spring and the unnamed spring, and to ensure that contaminant levels remain below MCLs in the Klapper and Cattle Springs.

11) Page 7, Paragraph 2 of the "Site Assessment Summary" section: See EPA's response in Item 4 of this letter.

12) Page 7, last sentence: The areas of concern at the Tri-City Site that require further investigation have been previously discussed in this letter. With regards to potential contaminants in the sediment in the area of RI sample SD-06, see Item 6 of this letter.

13) Pages 8 & 9, "Proposed Remedial Response" section: The conclusions and recommedations on these pages have been previously addressed in this letter.

14) Pages 10-13, Attachment: The statement that PCE has been removed from the IRIS database is incorrect. The carcinogenic information for PCE has not been included in IRIS yet. The information has been verified and it is pending input into IRIS at the present time.

If you have any questions regarding this response, please contact me at (404) 347-7791.

Sincerely yours,

Kimberly J. Gates

Kimberly J. Gates, E.I.T.
Remedial Project Manager
Kentucky/Tennessee Remedial Section
North Superfund Remedial Branch
Waste Management Division

Enclosures

cc: Mark Edie/Ford Motor Company
Harold Taylor/EPA
Brooke Dickerson/EPA

Letter to Mr. Heinrich
August 2, 1991

ENCLOSURE #1
CONTAMINANT LEVELS IN COX SPRING (IN PPB)

CONTAMINANT	MAY 1988	RI	RI-DUP	DEC 1990
Chloroform	2.2J	5U	5U	100U
1,1-Dichloroethane	2.5J	4J	4J	100U
1,1-Dichloroethene	1.2J	5U	5U	100U
Cis-1,2-Dichloroethene	74J	260 *	280 *	48J
Trans-1,2-Dichloroethene	0.92J	--	--	100U
Tetrachloroethene	560	88	89	250
1,1,1-Trichloroethane	8.1	11	11	100U
Trichloroethene	69J	20	20	12J
Toluene	5.0U	5U	5U	21J
Vinyl Chloride	2.9J	31	32	100U

U indicates that material was analyzed for but not detected; the number is the minimum quantitation limit.

* indicates total level of 1,2-dichloroethene detected.

Letter to Mr. Heinrich
August 2, 1991

ENCLOSURE #2
CONTAMINANT LEVELS IN KLAPPER SPRING (IN PPB)

CONTAMINANT	KY SI	MAY 1988	RI	DEC 1990
1,1-Dichloroethene	1.1	50U	5U	5.0U
Cis-1,2-Dichloroethene	DNA	50U	5U *	5.0U
Trans-1,2-Dichloroethene	<1	50U	--	5.0U
Tetrachloroethene	311	48J	5U	0.77J
Toluene	DNA	50U	5U	5.0U
1,1,1-Trichloroethane	1.2	50U	5U	5.0U
Trichloroethene	<1	50U	5U	5.0U
Vinyl Chloride	DNA	50U	10U	5.0U

DNA indicates data not available

U indicates that material was analyzed for but not detected; the number is the minimum quantitation limit.

* indicates the total level of 1,2-dichloroethene detected

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4WD-NSRB
JUL 30 1991

Tom FitzGerald, Director
Kentucky Resources Council
Post Office Box 1070
Frankfort, Kentucky 40602

RE: Comments on Proposed Plan
Tri-City Industrial Disposal Site
Brooks, Bullitt County, Kentucky

Dear Mr. FitzGerald:

This letter is in response to your comments dated June 6, 1991 regarding the Proposed Plan for the Tri-City Industrial Disposal Site in Brooks, Kentucky. Although you concurred with the comments submitted by the Commonwealth of Kentucky to EPA in a letter dated April 4, 1991, your letter specifically addressed two of the Commonwealth's concerns.

EPA disagrees with the Commonwealth's position regarding not taking remedial action at the Tri-City Site until the site has been "completely" characterized. Based on the existing data from the sampling activities that have been conducted at the site, treatment of the Cox Spring is justified by the fact that this spring was a potable water source that still contains volatile organic contaminant levels in excess of Maximum Contaminant Levels (MCLs).

EPA identified other areas of concern during the Remedial Investigation, but these areas require additional sampling to determine the extent of any contamination and the associated risk. Consequently, EPA is addressing this site as operable units, as defined in the National Contingency Plan. Operable Unit #1 will include the remediation of contaminated groundwater as it vents to the surface and confirmatory sampling to identify any unacceptable levels of hazardous contaminants in areas of the site not otherwise addressed. Operable Unit #2 will involve the additional measures necessary to mitigate any threat to human health and the environment identified during the confirmatory sampling conducted in Operable Unit #1.

EPA is successfully using operable units to expedite needed remedial actions at Superfund sites where sufficient data exists to warrant a remedial action, but where additional data is needed to complete all potential remedial actions at the site. The alternative to not using operable units would be to delay needed remedial actions in order to collect additional data.

EPA does not recognize KRS 224.877 as a state Applicable or Relevant and Appropriate Requirement (ARAR) since it does not contain any specific, enforceable requirements that are more stringent than provided by federal law. EPA's position with regards to KRS 224.877 is explained in the letter dated July 24, 1991 in response to the Commonwealth's comments dated April 4, 1991. A copy of EPA's response is enclosed for your reference.

If you have additional concerns, please do not hesitate to contact me.

Sincerely yours,

Harold W. Taylor, Jr., Chief
Kentucky/Tennessee Remedial Section
North Superfund Remedial Branch
Waste Management Division

Enclosure

cc: Carl Millanti, Commonwealth of Kentucky

Kentucky Resources Council

Post Office Box 1070
Frankfort, Kentucky 40602
(502) 875-2428

June 6, 1991

Ms. Suzanne Durham
Community Relations Coordinator
Waste Management Division (4WD-NSRB)
U.S. Environmental Protection Agency
Region IV
345 Courtland Street NE
Atlanta GA 30365

Re: Tri-City Industrial Disposal Site
Proposed Remedial Plan

Dear Ms. Durham:

The Kentucky Resources Council, Inc. (Council), a non-profit membership organization comprised of Kentuckians concerned with the prudent use and conservation of the natural resources of the Commonwealth, submits these comments on the proposed remedial plan for the Brooks, Kentucky Tri-City Industrial Disposal Site.

The Council appreciates EPA allowing these comments to be submitted outside the formal comment period. After a review of the proposal, the Council concurs with the comments submitted by letter of April 4, 1991 by the Commonwealth of Kentucky, Division of Waste Management, Uncontrolled Sites Branch, and incorporates those comments herein as if fully set forth below.

The Council understands that EPA is under some pressure to produce "results" under the Superfund program, but external pressures cannot justify adoption of a remedial plan when the underlying site investigation and characterization has not been completed in a satisfactory manner that identifies fully the fate and transport of contaminants into the local environment.

The Council is also concerned that the provisions of KRS 224.877 have not been respected as the ARAR in this case. The state statute, which governs hazardous substance and environmental emergency remediation, plainly demands that the remediation be taken to naturally occurring backround levels, or that extensive documentation of the absence of environmental risk from residual contamination be provided where clean-up to less-than-background is proposed.

The inter-agency friction that has developed due to the failure to accord KRS 224.877 the proper respect as an ARAR in this and other cases is counterproductive and provides inadequate protection to the public and the natural environment. The Council urges your ofice to reconsider the proposed remedial plan, to reopen the remedial investigation in order to more fully characterize the site, and to propose a remedy consistent with KRS 224.877.

Thank you for your consideration of these comments.

Sincerely,

Tom FitzGerald
Director