United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R04-86/015
August 1986

EPA

Superfund Record of Decision:

Distler Brickyard, KY

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA/ROD/R04-86/015	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION Distler Brickyard, KY		5. REPORT DATE August 19, 1986
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report
		14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Distler Brickyard site is located near the Ohio River, approximately one-half mile south of West Point, Kentucky and about 17 miles southwest of Louisville. The 3-acre site is located on a 70-acre abandoned brick manufacturing plant property, and portions of the site lie within the 50-year and 100-year flood plains of the Ohio River. The site consists of the brick complex and associated buildings, and an open field covered with grasses and shrubs. In 1976, Mr. Donald Distler leased the brickyard property from Mr. Thomas Hoeppner, the owner, and began disposing wastes from Distler' Kentucky Liquid Recycling, Inc. firm. In December of 1976, KNREPC learned of the disposal and conducted investigations at the site. These investigations led to Franklin County serving a restraining order to Mr. Distler to discontinue disposal of wastes at the site. Despite the order, disposal continued until January 1979, when KNREPC issued an order to abate operations. A partial removal of drums occurred, leading to later removal of 2,310 drums and visibly contaminated soil. Contents of the drums included liquids, sludges and solids found to be corrosive, volatile and flammable. The RI/FS, begun in April 1984, indicated soil and ground water contamination in the site area. Primary contaminants of concern are VOCs including TCE, DCE, benzene and toluene, naphthalene, bis (2-ethylhexyl) phthalate, and heavy metals.

(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Distler Brickyard, KY Contaminated Media: soil, gw Key contaminants: VOCs, heavy metals, TCE, DCE, toluene, benzene, base-neutral compounds		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 82
	20. SECURITY CLASS (This page) None	22. PRICE

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16. ABSTRACT (continued)

The selected remedial action for the site includes: excavation and offsite disposal of soils contaminated above background levels in areas A and B; backfilling with "clean" natural granular soils; grading surface to existing grade and revegetating; and extraction and offsite treatment of contaminated ground water to background levels and reinjection into the aquifer. Estimated present worth cost of the remedy is $7,500,000 with O&M costs of $1,568,000 for years 1 and 2, and $44,000 for years 3-30.

RECORD OF DECISION

Remedial Alternative Selection

Site: Distler Brickyard, Hardin County, Kentucky

Documents Reviewed:

- -Distler Brickyard Remedial Investigation
- -Distler Brickyard Feasibility Study
- -Summary of Remedial Alternative Selection
- -Responsiveness Summary
- -Staff Recommendation Reviews

Description of Selected Remedy:

- Excavation of contaminated soils to a depth where contaminant concentrations are at background levels in areas A & B.
- Backfill with "clean" natural granular soils
- Grade surface to existing grade and revegetate
- Offsite landfill disposal
- Extraction and off-site treatment of contaminated groundwater to background levels and reinject into the aquifer
- Mowing and maintenance of vegetation and repair of any erosion for a period of one year

DECLARATIONS

The selected remedy is Consistent with the Comprehensive Environmental Response Compensation, and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300), I have determined that the excavation and removal of contaminated soils and pumping treating of contaminated groundwater with reinjecting clean water alternative at the Distler Brickyard site is a cost effective remedy and provides adequate protection of public health, welfare and the environment. The Commonwealth of Kentucky has been consulted and agrees with the approved remedy. Future operations and maintenance activities, to ensure continued effectiveness of the remedy will be considered part of the approved action and eligible for trust fund monies for a period of one year.

I have also determined that the action being taken is appropriate when balanced against the availability of trust fund monies at other sites.

In addition, the offsite disposal is more cost effective than other remedial actions and will provide protection to public health, welfare and environment.

AUG 1- 1986
DATE

Lee A. DeHihns III, Deputy
Jack E. Ravan
Regional Administrator

RECORD OF DECISION

Summary of Remedial Alternative Selection
DISTLER BRICKYARD SITE
Hardin County, Kentucky

Site Location and Description

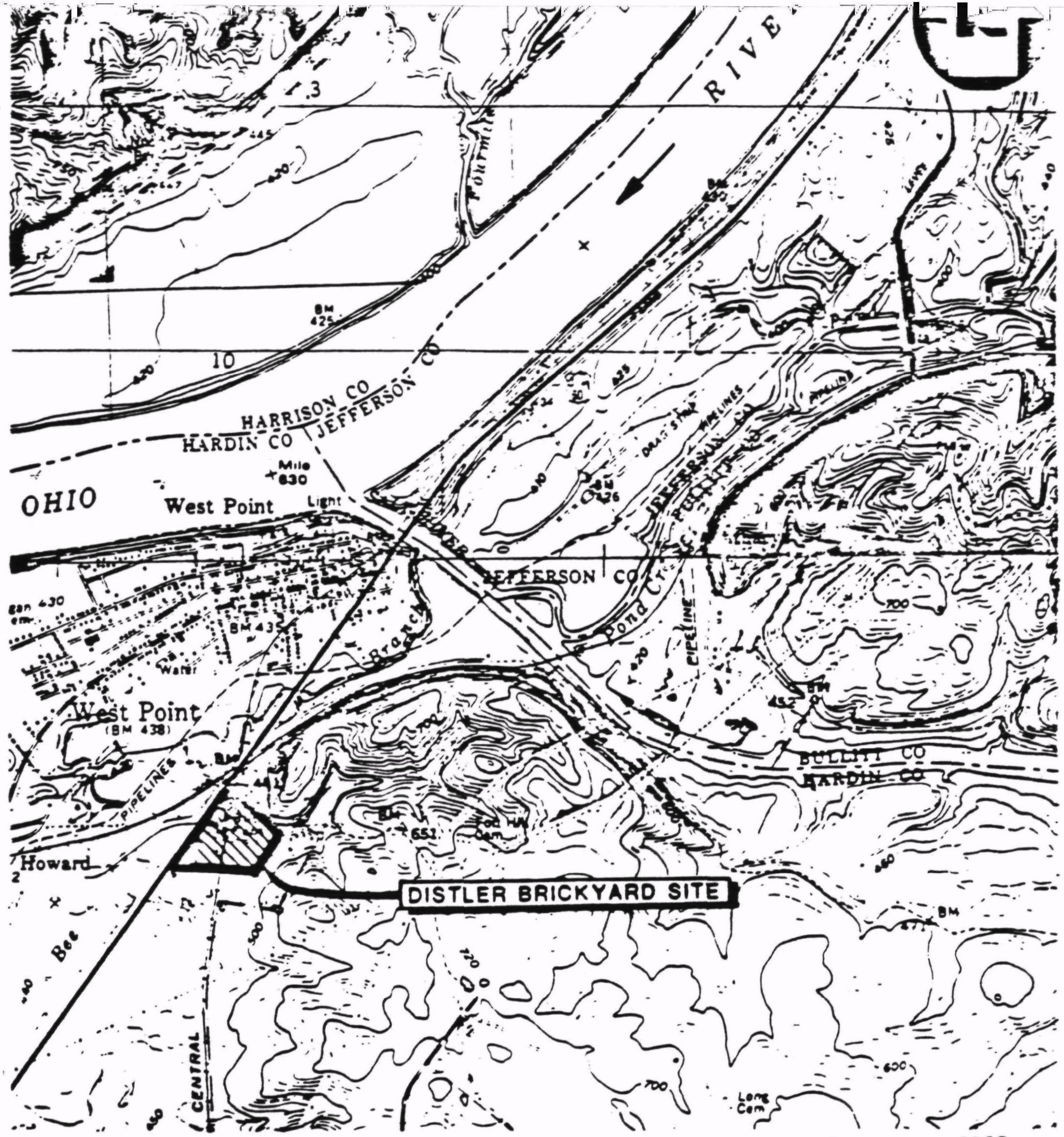
The Distler Brickyard Site is located near the Ohio River, approximately one-half mile south of West Point, Kentucky and about 17 miles southwest of Louisville, Kentucky (Figure 1). It is located on a 70-acre abandoned brick manufacturing plant property, which is divided by Dixie Highway (U.S. Route 60/31W). Waste storage activities have occurred within a three-acre area ('Distler Brickyard Site') on the eastern half of the property, east of the highway. Portions of this site lie within both the 50-year and 100-year floodplains of the Ohio River and flooding may be expected to occur again in the future.

The three-acre site includes the brickyard complex, which consists of five brick kilns, a combined office/blower house, and a large warehouse adjacent to the kilns (see General Site Plan, Figure 2). The balance of the waste storage site, south of the brickyard complex, is an open field covered with grasses and shrubs. The surrounding area is primarily forested land. An unnamed tributory of Bee Branch receives run off from the site. An Illinois Central railroad track runs through the site parallel to the brick kilns. Several house foundations and an old barn are situated about 300 feet to the east of the railroad. A dirt road runs from the area of the foundations due west, across the railroad tracks to the Dixie Highway. A chain-link fence parallels Dixie Highway, with a gate at the dirt road; this gate is the main entrance into the property. Other boundaries of the property are unprotected.

Site History

The Hardin County Brick and Tile Company operated the brick manufacturing plant from the 1950's through the mid-1970's. Kentucky Liquid Recycling Inc., founded by Mr. Donald Distler, leased the brickyard property from the owner, Mr. Thomas Hoeppner, and began transporting wastes to the site in the fall of 1976.

KNREPC first learned of the waste storage activities at the brickyard property in December 1976. In April 1977 the EPA and KNREPC conducted an initial site inspection and sampled 28 drums. Later in April, the Franklin Circuit Court served a restraining order on Mr. Distler prohibiting storage or disposal of industrial wastes at the brickyard property. Despite the restraining order, active storage operations apparently continued until January 1979, when KNREPC issued an Order to Abate and Alleviate Operations. This action prompted a partial removal of drummed wastes from the property. Apparently no additional wastes were brought onto the property after that time. Between January 1979 and December 1981 KNREPC issued several follow



REFERENCE: USGS QUAD (1961), FORT KNOX,KY

0 2000
SCALE IN FEET

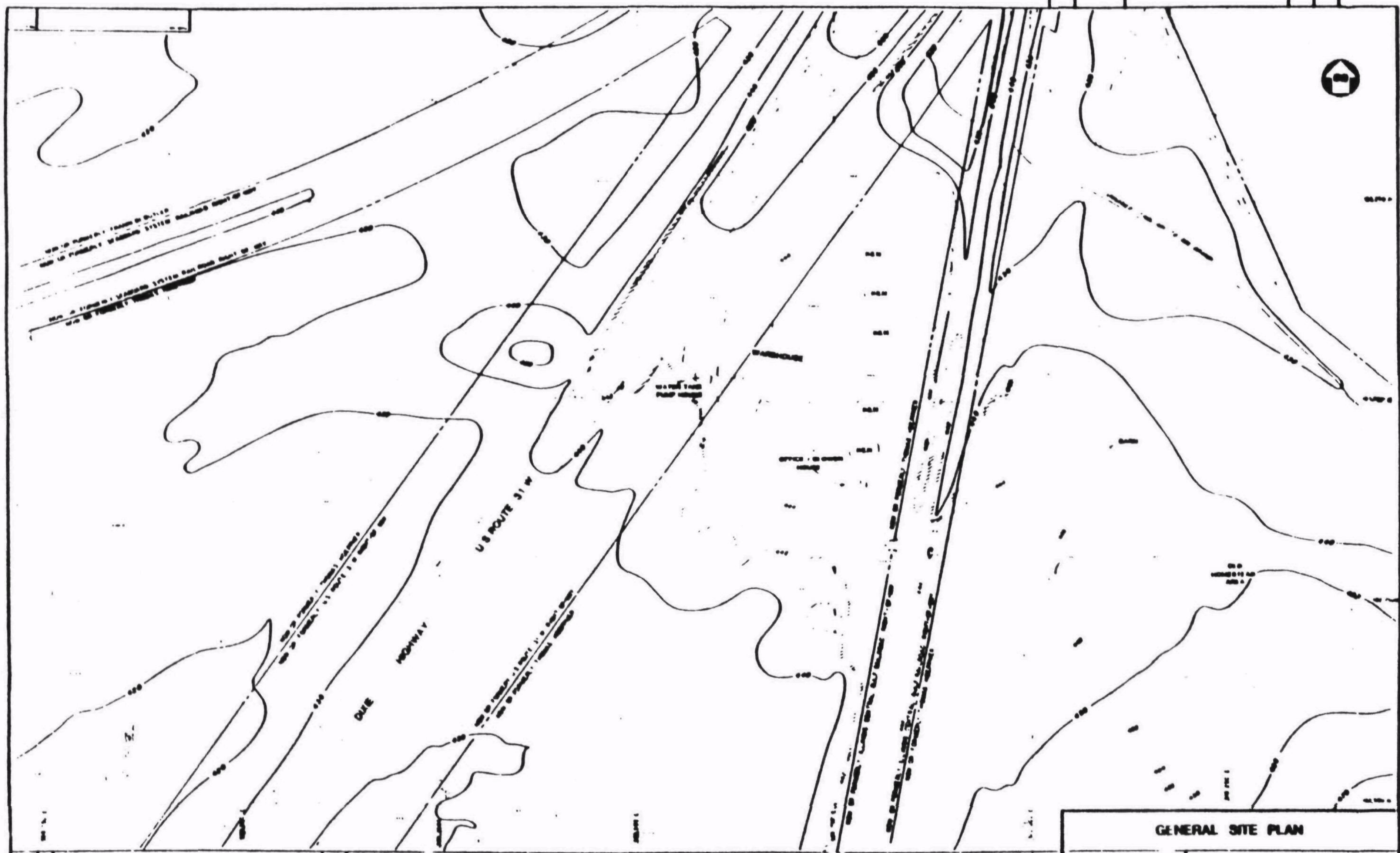
FIGURE 1-1

SITE LOCATION MAP

DISTLER BRICKYARD SITE
WEST POINT, KENTUCKY

NUS CORPORATION
A Halliburton Company

DRAFT



100 YEAR FLOOD LEVEL ELEVATION 442 FEET (MSL)

RIGHT OF WAY / PROPERTY LINE (NOT ESTABLISHED BY FIELD SURVEY)

430 — GROUND SURFACE ELEVATION CONTOURS

ELEVATIONS REFER TO FEET ABOVE MEAN SEA LEVEL (MSL)

NUS

GENERAL SITE PLAN

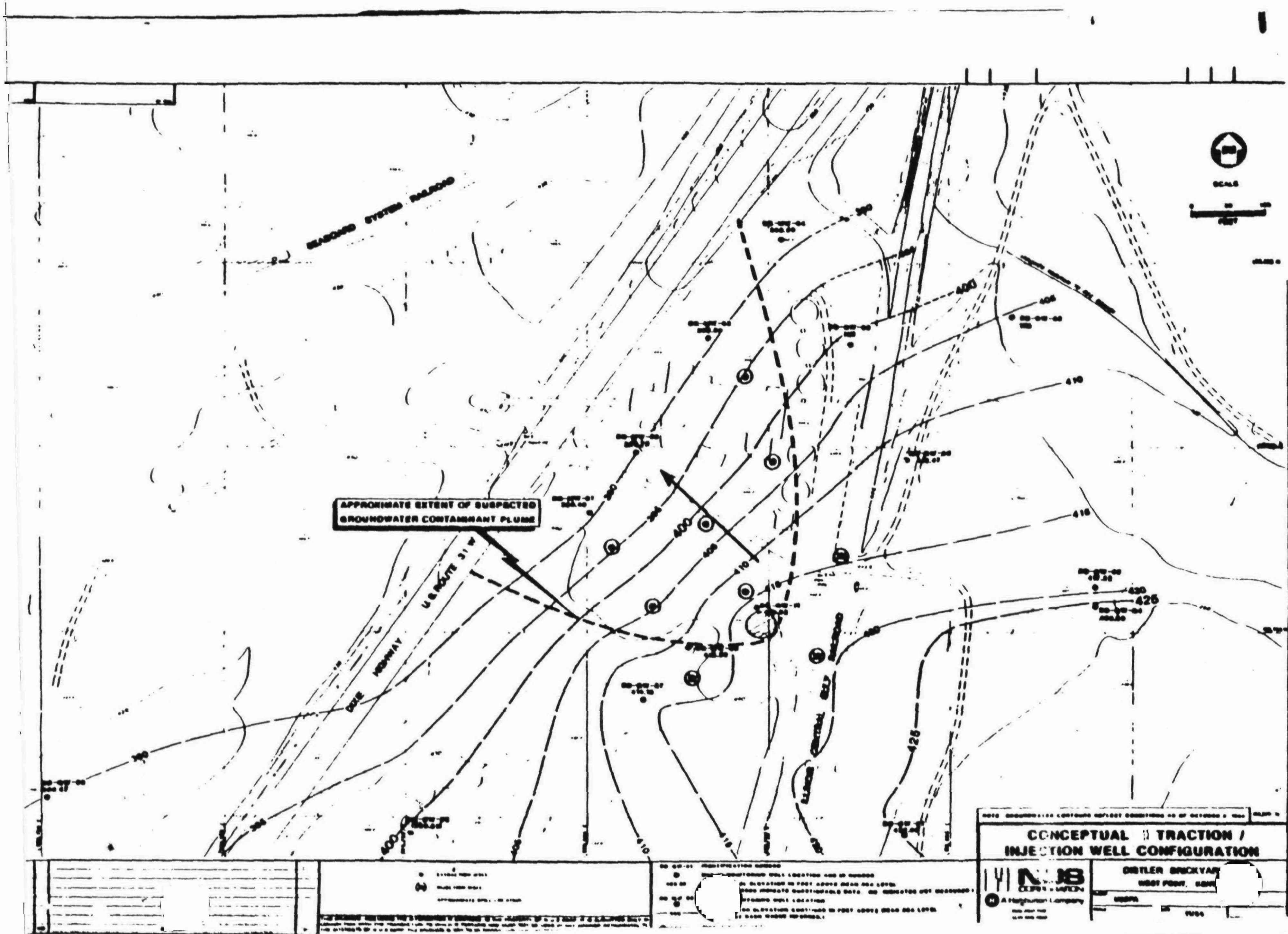
DISTLER BRICKYARD SITE

WEST POINT, KENTUCKY

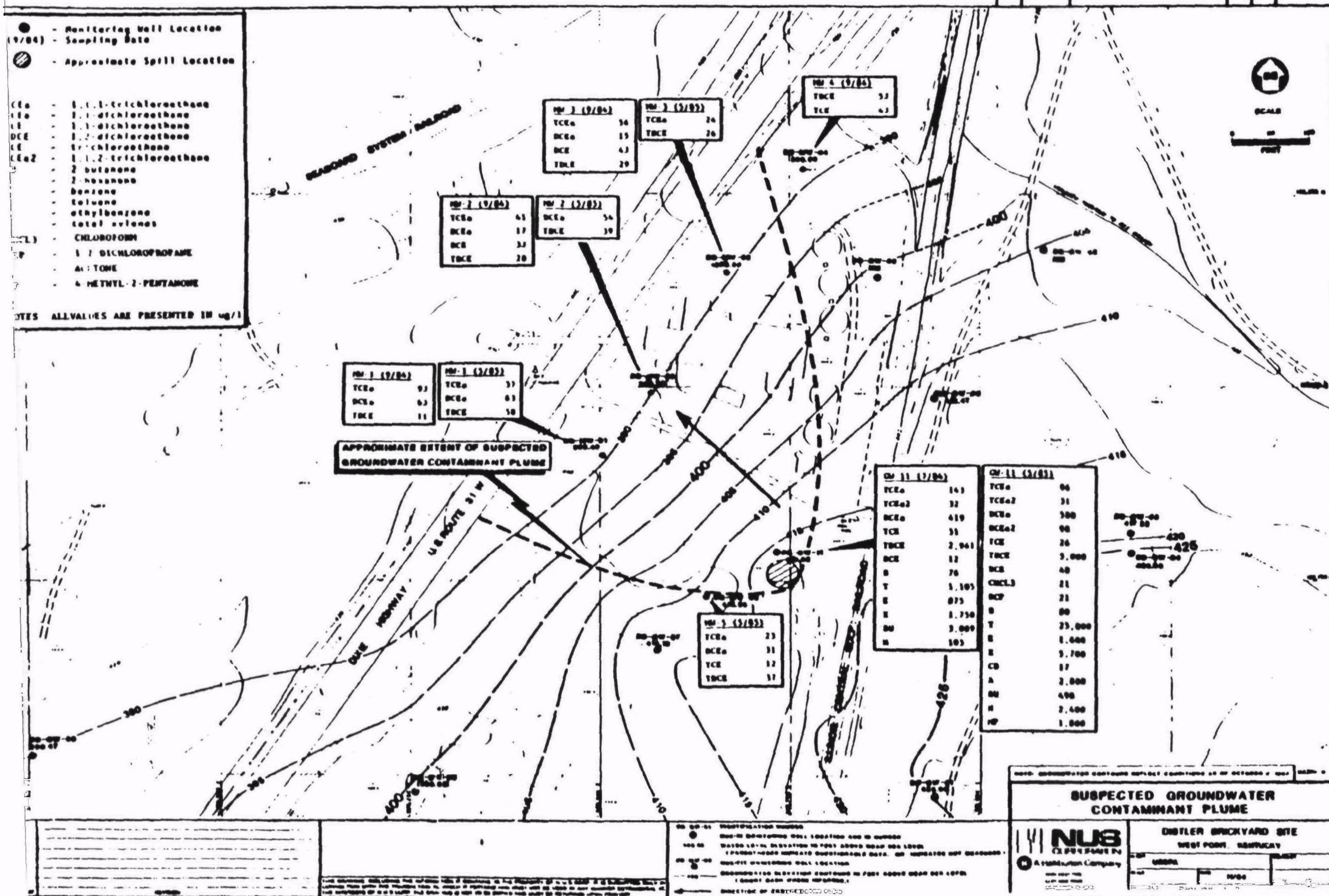
USEPA

FIGURE 1-2

DRAFT



SEABOARD SYSTEM RAILROAD
APPROXIMATE EXTENT OF SUSPECTED
GROUNDWATER CONTAMINANT PLUME
DIXIE HIGHWAY
U.S. ROUTE 31 W
ILLINOIS CENTRAL GULF RAILROAD
400
405
410
415
420
425
CONCEPTUAL TRACTION /
INJE TION WELL CONFIGURATION
DISTLER BRICKYAR
WEST POINT, KEN
A Halliburton Company



- Monitoring Well Location
(9/84) - Sampling Date
- Approximate Spill Location
- 1,1,1-trichloroethane
- 1,1-dichloroethane
- 1,1-dichloroethene
- 1,2-dichloroethene
- trichloroethene
- 1,1,2-trichloroethane
- 2 butanone
- 2-hexanone
- benzene
- toluene
- ethylbenzene
- total xylenes
- CHLOROFORM
- 1,2 DICHLOROPROPANE
- ACETONE
- 4-METHYL-2-PENTANONE
NOTES ALL VALUES ARE PRESENTED IN ug/l
SEABOARD SYSTEM RAILROAD
MW-1 (9/84)
TCEa 93
DCEa 63
TDCE 11
MW-1 (5/85)
TCEa 57
DCEa 63
TDCE 58
MW-2 (9/84)
TCEa 61
DCEa 17
DCE 37
TDCE 20
MW-2 (5/85)
DCEa 54
TDCE 39
MW-3 (9/84)
TCEa 56
DCEa 15
DCE 43
TDCE 29
MW-3 (5/85)
TCEa 26
TDCE 26
MW-4 (9/84)
TDCE 53
TCE 43
MW-5 (5/85)
TCEa 23
DCEa 31
TCE 12
TDCE 57
OW-11 (9/84)
TCEa 143
TCEa2 32
DCEa 419
TCE 33
TDCE 2,941
DCE 12
B 76
T 5,505
E 875
X 1,750
BU 3,009
H 505
OW-11 (5/85)
TCEa 96
TCEa2 31
DCEa 300
DCEa2 98
TCE 26
TDCE 3,000
DCE 40
CHCL3 21
DCP 21
B 80
T 25,000
E 1,600
X 5,700
CD 17
A 2,000
BU 490
H 2,400
MP 1,000
APPROXIMATE EXTENT OF SUSPECTED GROUNDWATER CONTAMINANT PLUME
U.S. ROUTE 31 W
DIXIE HIGHWAY
380
390
400
405
410
420
425
SCALE
SUSPECTED GROUNDWATER CONTAMINANT PLUME
DISTLER BRICKYARD SITE
WEST POINT, KENTUCKY
NUS CORPORATION
A Halliburton Company

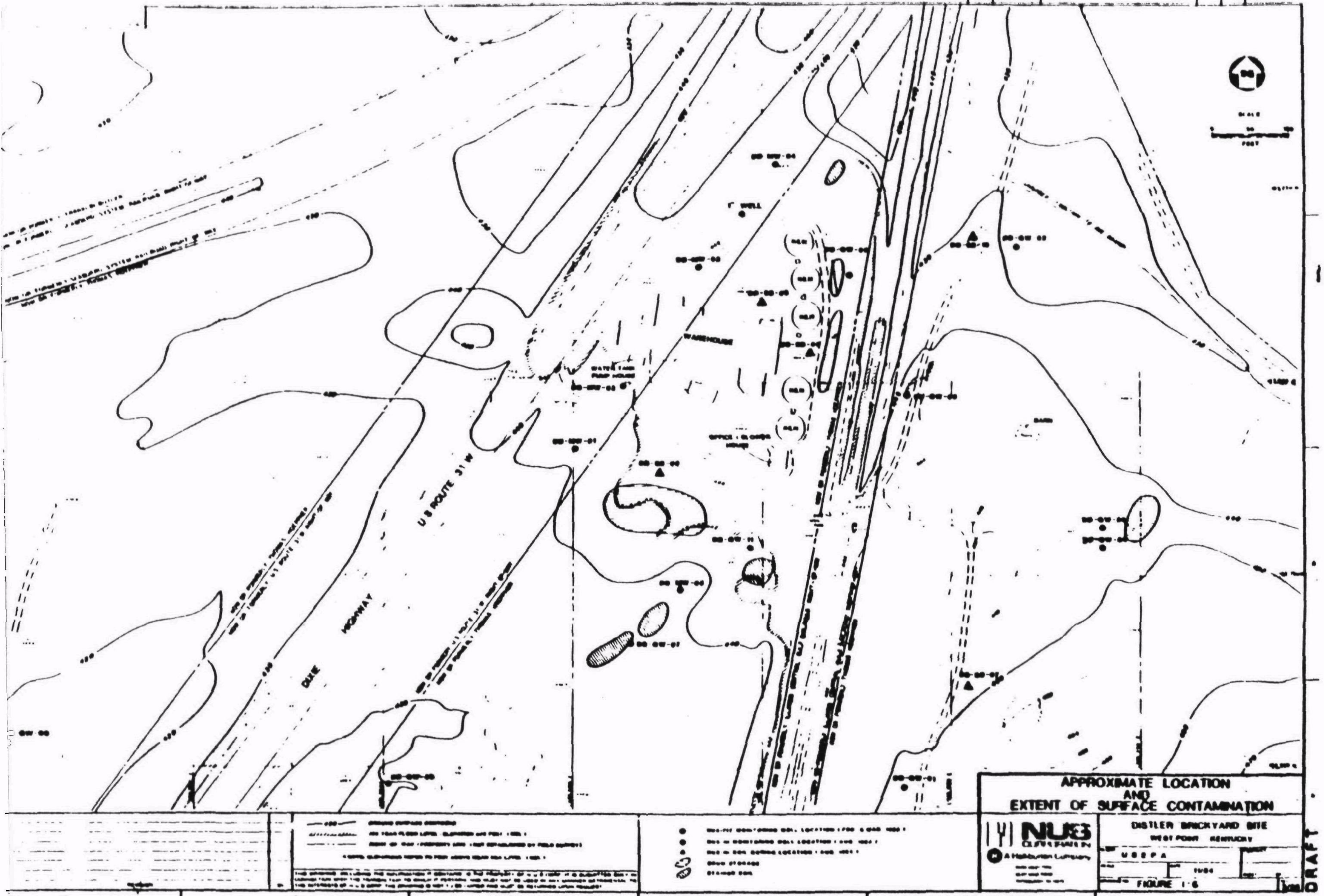

U S ROUTE 31 W
DIXIE
HIGHWAY
WAREHOUSE
APPROXIMATE LOCATION
AND
EXTENT OF SURFACE CONTAMINATION
NUS
DISTLER BRICKYARD SITE
WEST POINT KENTUCKY
U S E P A
FIGURE 1-6
DRAFT

TABLE 2
SUMMARY OF REMEDIAL TECHNOLOGIES SCREENING
DISTLER BRICKYARD SITE

Technology	Retained for Further Consideration
Surface Sealing/Capping	Yes
Surface Grading and Revegetation	Yes
Surface Water Diversion	Yes
Leachate Collection	Yes
Excavation/Removal of Contaminated Materials	Yes
Hydraulic Dredging	No
Landfill Disposal	Yes
Land Treatment	No
Incineration	No
Solution Mining	No
Microbial Degradation	No
Groundwater Extraction	Yes
Plume Containment	Yes
Water Table Adjustment	No
In-Situ Treatment of Groundwater	No
Engineered Impermeable Barriers	Yes
Permeable Treatment Beds	No
Groundwater Treatment	Yes
Forced-Air Stripping	Yes
Carbon Adsorption	Yes
Precipitation, Flocculation and Sedimentation	Yes
Filtration	Yes
Biological Treatment	Yes

TABLE 3

RESULTS OF REMEDIAL ACTION ALTERNATIVES SCREENING DISTLER BRICKYARD SITE

Media	Description of Alternative	Retained for Further Consideration
Soil Contamination	No Remedial Action	Yes
	Surface Sealing/Capping; Surface Grading and Revegetation	Yes
	Surface Sealing/Capping; Surface Grading and Revegetation; Surface Water Diversion	No
	Surface Sealing/Capping; Leachate Collection and Onsite Treatment; Surface Grading and Revegetation; Surface Water Diversion	No
	Partial Excavation and Removal of Contaminated Materials; Landfill Disposal Onsite; Surface Sealing/Capping; Surface Grading and Revegetation	Yes
	Partial Excavation and Removal of Contaminated Materials; Landfill Disposal Offsite; Surface Sealing/Capping; Surface Grading and Revegetation	Yes
	"Total" Excavation and Removal of Contaminated Materials; Landfill Disposal Onsite; Backfilling; Surface Grading and Revegetation	Yes
	"Total" Excavation and Removal of Contaminated Materials; Landfill Disposal Offsite; Backfilling; Surface Grading and Revegetation	Yes
Groundwater Contamination	No Remedial Action	Yes
	Impermeable Barriers; Plume Containment	No
	Groundwater Extraction/Treatment; Plume Containment; Impermeable Barriers	No
	Groundwater Extraction/Treatment	Yes

up orders to Mr. Distler for removal of the industrial wastes stored on the property. No action resulted. In December 1981 KNREPC requested that the EPA initiate an immediate removal action at the site.

In March, 1982 the EPA removed 2,310 drums from the site. Of these, 850 were empty. The remainder contained various liquids, sludges, and solids, which were found to be toxic, corrosive, volatile, or flammable. All of the drums and drummed wastes had been stored above-ground. During the cleanup operation it became evident that some drum contents had been released, and that soil contamination existed. Patches of contaminated soils were also removed at this time. Small containers of wastes, found in underground air passages in the five kilns, were also removed.

When all drums containing wastes, and visibly contaminated soils had been removed, the principal remaining concerns regarding the site were possible buried wastes, soil contamination, groundwater contamination, and the potential for surface water contamination. In March 1983 the NUS Field Investigation Team (FIT) under a Technical Direction Document(TDD) contract with EPA Region IV, completed subsurface investigations, installation of 10 groundwater monitoring wells on or near the site, and a groundwater sampling and analysis program. Offsite wells, surface waters, and sediments were also sampled during this investigation.

The purpose of the FIT investigation was to determine whether groundwater contamination had occurred as a result of past waste storage practices. While installing the monitoring wells, the FIT also explored suspected drum burial areas that had been identified by a magnetometer survey performed in February 1982. No buried drums were found.

From groundwater samples, the FIT investigation confirmed the presence of contaminated groundwater, but the data were not extensive enough to fully define the extent of groundwater contamination or the movement of contaminants within the groundwater regime.

The RI, begun in April 1984, confirmed that the site did not contain buried wastes. It also confirmed that contaminated soils and groundwater are present at the site. Further investigations have confirmed that no further significant site-related contamination has yet appeared in surface water, site sediment, or residential wells outside the property boundaries. Also, the RI has confirmed that airborne contaminants are not a problem at the Distler Brickyard site.

NUS completed the RI site investigations in September 1984 and submitted a Draft RI report to the EPA in September 1985. The RI assessed the nature and extent of onsite and offsite contamination resulting from the storage of hazardous wastes on the brickyard property, and evaluated hazards to human health and the environment. The site was characterized in terms of:

- Geology and soils
- Surface and groundwater hydrology
- Hazardous substances present
- Nature and extent of contamination
- Contaminant mobility characteristics and migration pathways
- Potential receptors
- Human health and environmental concerns

Details of the remedial site investigation and laboratory analyses are documented in the Draft Remedial Investigation Report submitted by NUS to the EPA in September 1985. (A revised RI report, containing EPA review comments and NUS responses, was submitted to the EPA in March 1986.)

Current Site Status

The hazardous substances in the form of source material are not present on the site. Drum storage areas and some suspected spill locations have been confirmed as being contaminated. These areas are considered to be the likely sources of possible future releases of contaminants.

The site poses no threat to the public through airborne contaminants. Organic vapor monitoring at various times since January 1982 has not revealed concentrations above four parts per million.

Surface water and sediment samples showed little contamination, by either organic or inorganic compounds, that could be attributed to onsite contaminants.

The absence of substantial contamination of surficial soils by the more mobile organic compounds indicates that volatilization or mass transfer of chemicals into runoff and surface water does not constitute a migration pathway at this time.

The presence of the less mobile organic and inorganic compounds in surficial soils indicates that erosion of contaminated soils could constitute a migration mechanism. The absence of these substances in sediments and surface water samples offsite leads to the conclusion that migration by this pathway has not occurred to an appreciable extent in the past. Storm events of unusual intensity or flooding could reverse this trend. Portions of the site lie within both the 50-year and 100-year floodplains of the Ohio River and flooding may be expected to occur in the future.

Volatile, semi-volatile and trace element contamination of site soils has been confirmed. Groundwater contamination by volatile and semi-volatile contaminants has been confirmed.

Surface Water/Sediment Contamination

Chemical analyses have revealed little contamination of surface water or sediment samples. Organic compounds were detected in surface water bodies during 1984 sampling round.

These compounds (Phthalate esters) have been detected at their highest concentrations in surface water samples obtained upstream of the site. The possibility that these contaminants are site-related is considered to be remote; their presence in the upstream sample may indicate that their presence in samples obtained closer to the site might also be attributable to another source.

The results of analyses of surface water samples for inorganic compounds also indicate no definitive site-related contamination. The only trace element detected above the National Interim Primary Drinking Water Standard (NIPDWS) was manganese.

Results of chemical analyses on sediments also reveal little site-related contamination. Organic contaminants have been identified in sediment samples obtained during a 1984 sampling round from the unnamed tributary to Bee Branch just above its confluence with Bee Branch. These contaminants may be site related as they were detected in other media at the site.

Comparison of inorganic analytical results for upstream and downstream sediment samples reveal little site-related impact with one exception. Lead, detected in samples taken near the site (18 mg/kg and 37 mg/kg) is the only trace element that differs substantially from the concentration detected in an upstream sample (8J mg/kg). 'J' is a laboratory qualifer indicating the value is approximate.

Soil Contamination

Chemical analyses indicate that surface soil samples taken in the vicinity of monitoring well DB-GW-11 contain volatile organic compounds. A surface soil sample collected in the vicinity of monitoring well DB-GW-04 contained Trichloroethene at a concentration of 6,600 ug/kg (micrograms per kilogram).

Contaminants of concern identified in the soil near DB-GW-11 include: Trichloroethene, and 2-Butanone. With the exception of Trichloroethene, none of these compounds was detected in other soil samples obtained at the site. Trichloroethene was identified in one sample to the east of the railroad tracks at a concentration of 6,600 ug/kg. No other soil samples contained this compound, except those collected near DB-GW-11.

Volatile contamination of site soils is thus confined to the south central portion of the site surrounding monitoring wells DB-MW-05 and DB-GW-11, and the area around monitoring wells DB-GW-04 and DB-GW-03 (abandoned homestead area) to the east of the Illinois Central Railroad.

There are several areas of contamination containing base/neutral and acid extractable compounds. As with the volatiles, surface soil samples obtained from an area immediately southeast of DB-GW-11 contained semi-volatile compounds. Surface soil samples obtained from the former drum storage area between the kilns and the Illinois Central Railway were also contaminated. Semi-volatile compounds detected in these areas and identified as contaminants of concern include napthalene and Bis (2-Ethylhexyl)Phthalate.

Several pesticides were also identified in site soils. Samples obtained from the area around DB-GW-11 and from the drum storage area behind the kilns were found to be contaminated. Several other surface soil samples obtained from the drum storage area to the south of the warehouse and east of the railroad tracks opposite from the kilns reportedly contained either chlordane or DDT at concentrations ranging up to 97 ug/kg. The contaminated area is about 7 feet in depth.

To determine the extent of trace element contamination in the soil, attention was focused upon Arsenic, Chromium, and Lead, which were detected in groundwater samples above the primary drinking water standards. The toxic nature of these compounds and their presence in groundwater makes their occurrence of primary concern. As with organic contamination, trace elements were identified in former drum storage or spill areas. The occurrence of arsenic, chromium, and lead in site soils is discussed below.

Arsenic contamination is evidently confined to two areas of the site. Arsenic concentrations reached up to 75 mg/kg in the former drum storage area between the kilns and the railway. Arsenic was also identified near the old homestead area. This sample was obtained near monitoring wells DB-GW-03 and DB-GW-04, an area where a spill was identified in 1977 and where a magnetometric anomaly was identified during the hydrogeologic investigation. Arsenic was not found above detection limits in the background sample.

Chromium and Lead were identified in test pit and surface soils samples obtained in the drum storage area behind the kilns and the spill areas in the northern, eastern, and southern portions of the site. Chromium was also detected in surface soil samples obtained from the former drum storage area to the south of warehouse. Lead and Chromium concentrations reached values as high as 122 mg/kg and 16 mg/kg, respectively.

Groundwater Contamination

The nature of the past waste storage operations at the site leads to the conclusion that possible sources of groundwater contamination are confined to spill or drum leakage onto surface soils, with subsequent migration to the water table.

Chemical analyses have revealed that groundwater in the vicinity of monitoring well DB-GW-11 is the most highly contaminated at the site. Organic contaminants detected in groundwater obtained from this well, and identified as contaminants of concern, are 1-1 Dichloroethene, 1-1,2 -Trichloroethane, Trichlorothene, 2-Butanone, Benzene, Toluene, and [illegible]

Organic contaminants of concern identified in other monitoring well samples are 1-1-1 Trichloroethane, Benzene, Toluene, and Bis (2-Ethylhexyl) Phthalate.

Trichloroethene (TCE) was found in two surface soil samples (1.8 ug/kg - 6600 ug/kg) and seven monitoring well samples (4-200 ug/l). TCE was not found above detection limits in subsurface soil, surface water, sediment, or residential well samples.

Trace elements identified in site groundwater above the drinking water standards are Lead, Arsenic, and Chromium. Chemical analyses reveal no apparent pattern of trace element contamination in groundwater at the site.

In the residential well sampling and chemical analyses program, toluene was identified in three of the five wells sampled. The concentrations reported for all three wells were 2 ug/l.

Lead and Chromium were also identified in the residential wells. Chromium was identified in a sample obtained from the City Hall well (6 ug/l). This well is located farthest from the site. No conclusive evidence that this occurrence is attributable to site contamination can be offered.

Lead was identified in water samples obtained from a residential well, located about 3000 feet to the west and 6000 feet to the southwest of the site, at levels of 13 ug/l and 2.2 ug/l, respectively. Again, no clear link to site contamination can be identified. Note that none of the trace element concentrations identified in residential wells is above drinking water standards with the exception of iron and manganese identified in the City Hall well. The direction of flow is in a southwesterly direction and is at an approximate depth of 25-50 feet.

Migration Pathways

The major contaminant transport pathway impacting on potential human and environmental receptors is the movement of groundwater under the site. A suspected groundwater contaminant plume has been identified onsite. Contaminants could be transported via groundwater which discharges to the Ohio River.

Other comparatively minor routes of transport of contaminants from the site include the following:

- Contaminated sediment transport via surface water run-off. Surface water run-off could carry continted soil particles to the unnamed tributaries of Bee Branch, located north and south of the site. The available chemical analytical data does not indicate that transport by this mechanism has occurred.

- Physical transport of site contaminants during flooding conditions of the Ohio River. Portions of the site are located in the 50-year floodplain of the Ohio River. During the 100-year flood, most of the site would be inundated.

ENFORCEMENT ANALYSIS

On November 12, 1985, EPA sent information request/notice letters to approximately thirty (30) potentially responsible parties (PRPs), including Donald Distler, the owner/operator of the Distler Farm site. The letter requested any records, documents, etc. regarding business transactions with Kentucky Liquid Recycler, informed the PRPs of their potential liability at the site and offered them each an opportunity to participate in the design and implementation of the remedial action plan and to contribute to any monitoring and maintenance necessary after completion of remedial work.

Only a small percentage of the PRPs expressed any interest in participating in the RD/RA procedures and of those that expressed interest, their participation was conditioned upon EPA providing them more convincing proof of their liability at the site. The majority of the PRP responses were either complete denials or professed no knowledge or belief that any business transactions were conducted with Kentucky Liquid Recylers (KLR) or Donald Distler.

A second round of letters to PRPs was issued by EPA on March 12, 1986. These letters contained information which EPA had compiled that established a connection between individual PRPs and the KLR, provided a list of all known PRPs and again requested copies of any material that pertained to the KLR and the Distler Farm site. The responses to the March 12, 1986, letters provided additional information regarding several PRPs.

The PRPs have made some attempt to organize a steering committee in order to engage in negotiations with EPA. However, to date said committee has not been formed and formal negotiations have not been conducted. Accordingly, at the present time it is difficult to predict the outcome of such negotiations.

The strategy employed by EPA has been to use fund monies unless PRPs consent to enforceable agreement for the cleanup. The RD/RA section of the work remains open for negotiation.

EPA's overriding concern is to ensure that the selected remedy complies with the National Contingency Plan. In this regard, there is little flexibility for negotiations. Any technical differences in design and construction approaches used to achieve the remedy may be the subject of negotiations. However, as a practical matter, the PRPs have presented no alternative design and construction models and, therefore, no comparisons can be made at this time.

Alternatives Evaluation

The purpose of the remedial action is to mitigate and minimize contamination in the soils and groundwater and to reduce potential risks to human health and the environment. The objectives in developing remedial action at the Distler Brickyard site were:

° Surface Contamination:

Source control

Reduce concentration of contaminants

Control potential migration of surface and subsurface contaminants resulting from contaminated soils

Prevent or minimize surface erosion and consequent contaminant runoff, including environmental hazards associated with potential flooding of the Salt River and/or Ohio River

Prevent, minimize, or eliminate the onsite potential for exposure by direct contact; the onsite potential for airborne releases; the potential for contaminant migration by surface water pathways and

° Groundwater Contamination:

Management of migration

Prevent increase of contaminant concentrations

Reduce concentrations of contaminants

Prevent or minimize further migration of contaminants (plume control)

An initial screening of applicable alternative technologies was performed to select those which best met the criteria specified in Section 300.68 of the National Contigency Plan (NCP). Following initial screening of technologies, potential remedial action alternatives, shown in Table 2, were identified and analyzed. These alternatives were screened and the most promising were retained and were developed further. Table 3 summarizes the results of the screening process. Each of the six remaining alternatives was evaluated based upon technical considerations, institutional issues, environmental issues, public health aspects, and cost criteria. A cost summary is presented in Table 4. The results of this final evaluation are given below.

Alternative 1: No Remedial Action

Under the no-action alternative, remedial activities would not be performed. Soil and groundwater contamination would be left in their current conditions. As it exists, the site would continue to be a potential source of contamination. Contaminants have been present in surface materials for about eight years. Some might have volatilized and will continue to do so, decreasing in concentration. Others, especially the less mobile compounds, would remain as they are now. Some would continue to migrate into groundwater by infiltration. Although the site is not considered to be an immediate threat to potential receptors, the potential for future migration of contaminants into air, surface water and groundwater, and by direct contact, would continue to exist since any leachate generated by precipitation, or wind-caused migration could occur unchecked into these pathways.

Regulatory requirements and strategies in connection with protection of groundwater regimes exist. The aquifer underlying the site could be classified as Class I, which indicated that it could be a sole source of drinking and domestic water supplies for downgradient communties. Regulations require that such aquifers not be degraded or contaminated.

Available data indicate that receptors are not presently exposed to significant levels of contaminants and are not exposed to an immediate health risk. However, receptors could be exposed at some future time if migration of contaminants were to occur-specifically, through ingestion or dermal contact with surface waters and surface materials, and groundwater.

Alternative 2 Soil Contamination: No Remedial Action
Under Soil Contamination
Groundwater contamination: Extraction/Treatment/Injection

With respect to groundwater contamination this alternative involves extraction of groundwater and its contaminants using "deep" well technology. Contaminated groundwater would be extracted from the aquifer by pumping from wells, and treated at an onsite water treatment plant. Treated groundwater would be injected back into the aquifer through injection wells. The objective of this remedial action is to reduce the concentrations of contaminants in the groundwater to levels where potential risks to human health and the environment are also reduced to acceptable levels.

No remedial action with respect to soil contamination would mean that potential contamination releases and associated pathways would remain unchecked. Contaminated soils would continue to be potential sources of groundwater contamination. No remedial action on contaminated soils will not satisfy any currently applicable or relevant state or federal (RCRA) standards for the closure of a site containing hazardous materials and wastes. This alternative is unacceptable on an environmental basis.

Atlernative 3 Soil Contamination: Surface Capping;
Surface Grading and Revegetation; Fence Around Capped Areas
Groundwater Contamintion: Extraction/Treatment/Injection

This alternative involves the placement of a seal, or cap, over contaminated areas. Contaminated soils and materials would remain in place and be covered by the cap. Contaminated groundwater would be extracted through pumping wells, treated at on onsite water treatment plant, and injected back into the aquifer. The cap would be constructed by placing 2 feet of compacted clay and 2 feet of topsoil (loam) on the area to be capped.

The purpose of this alternative is to reduce the impact of contaminants in site soils by reducing risks associated with direct contact and by reducing the potential for contaminant migration via surface water, groundwater, and air pathways. To achieve this purpose a cap would be constructed over areas of contamination which would act as a barrier by isolating the contaminants and would minimize infiltration. Contaminated groundwater would be extracted, treated and injected back into the aquifer. Details of groundwater remediation were described under Alternative 2.

The same strategies would also be used in Alternative 3.

Part of the site is in the 100-year floodplain. However, it is assumed that as it is in the periphery of the 100-year flood level, that flood velocities there would be relatively low, and that the cap can be designed and constructed in a manner to resist the effects of flooding.

This option reduces the risks to human health that currently exist at the site. Capping isolates contaminated materials from exposure to atmospheric conditions, and eliminates the risk of direct contact by the public, thereby reducing the risk to public health.

Alternative 4 Soil Contamination: Surface Capping ("RCRA Cap")
Surface Grading and Revegetation; Fence Around Capped Areas
Groundwater Contamination: Extraction/Treatment/Injection

This alternative involves the construction of a seal or cap over contaminated areas. Contaminated soils and materials would remain in place and be covered by the cap. Contaminated groundwater would be extracted and treated at an onsite treatment plant. Treated groundwater would be injected back into the aquifer.

This alternative is identical to Alternative 3 in almost all respects related to capping and groundwater treatment. The only difference in Alternative 4 is that the surface seal would have a more stringent design consideration, and would meet RCRA goals; and that groundwater remediation would be to MCL and PPCL Levels, which would also meet RCRA closure requirements.

Alternative 5 Soil Contamination: Excavation to Seven Feet-Backfilling; Surface Capping ("RCRA Cap"); Surface Grading and Revegetation; Onsite Landfill Disposal; Fence Around Capped Areas
Groundwater Contamination: Extraction/Treatment/Injection

This alternative includes partial excavation and removal of contaminated soils and materials and their disposal in a landfill to be constructed on the site. The excavations would be backfilled and surface cap would be constructed along with grading and revegetation. Groundwater would be extracted, treated onsite to recommended levels, and injected back into the aquifer as described in Alternative 2. The depth of excavation is the depth to which we have proven contamination exists.

This is an effective alternative in terms of permanently reducing the volume of currently uncontrolled contaminated materials. In combination with backfilling the excavations and installing a "RCRA cap" over the remaining contaminants in the excavated areas, the overall performance of this option is estimated to be highly effective in providing a barrier between the remaining contaminants and the environment. Since this alternative will remove a significant portion of the source of hazardous contamination, along with providing the protection of a cap, it would provide a higher degree of reliability in reducing onsite and potential offsite migration of contaminants as compared to alternatives where excavation is not performed. The landfill will be constructed in full compliance with all requirements for landfilling and will be placed on-site outside the 100 year floodplain, in an area where surface and/or groundwater contamination has not been encountered. The landfill will include liner, final cap over the filled area, leachate collection and groundwater monitoring system.

Alternative 6 Soil Contamination: Excavation to Background Levels or Groundwater-Backfilling; Offsite Landfill Disposal; Surface Grading and Revegetation
Groundwater Contamination: Extraction/Treatment/Injection

This alternative represents a more comprehensive remedial measure than the preceding alternatives as nearly all contaminated soils would be removed from the site and disposed of in an offsite permitted hazardous waste landfill. The quantity of wastes to be landfilled is greatly increased in this alternative, as is the cost of excavation and disposal, since all areas of contamination would be removed.

Since the contaminated soils will be excavated, the source of contamination will be removed and, therefore, a seal or cap will not be required under this alternative. Excavations would be backfilled; "clean" native granular soils would be suitable for this purpose. The final surface of backfill would be graded to converge with local topography, and revegetated.

Under this alternative, contaminated soils would be excavated to depths where groundwater is encountered, about 25 feet below the ground surface. Groundwater would be extracted, treated and injected back into the aquifer as described for Alternative 2. Cleanup criteria under Alternative 6 would be to recommended levels.

This alternative represents a substantial site remediation effort. Risks of potential future contaminant migration would be minimized or eliminated under this alternative.

Alternative Suggested by Public at Public Meeting (Public)

The City of West Point offered to extend water service to the residents of the areas surrounding Distler Farms which might be impacted by migration of contaminated groundwater. The same offer was made by the Louisville Water Company which included serving the City of West Point for about $700,000. Although this alternative would assure all residents of high quality water supply, it would permit the contamination to remain on site and would be the same as the no action alternative with the addition of public water.

Alternative 7 Soil Contamination: Excavation of contaminated soils to a depth where contaminant concentrations are at background levels (expected to be seven feet or less as is required to remove contaminated soil areas A & B); Backfilling; Surface Grading and Revegation; Offsite landfill disposal; extraction and on-site treatment of contaminated groundwater. Groundwater will be cleaned to background levels and reinjected into the aquifer.

This alternative includes excavation of contaminated soils to a depth where contaminant concentrations are at background levels. The depth is expected to be seven feet or less. Groundwater would be extracted, treated onsite to "background" levels, and injected back into the aquifer through injection wells. The objective of this remedial action is to reduce the concentrations of contaminants in the groundwater to levels where potential risk to human health and the environment are also reduced to acceptable levels.

The contaminated soils would be removed from the site and disposed of in an offsite permitted hazardous waste landfill. Since the contaminated soils will be excavated, the source of contamination will be removed and therefore, a seal or cap will not be required under this alternative. Excavations would be backfilled; "clean" native granular soils would be suitable for this purpose. The final surface or backfill would be graded to converge with local topography and revegetated under this alternative, contaminated soils would be excavated in areas identified during the RI/FS to depths of about seven feet below ground surface. This depth was selected for discussion and costing purposes as wells as due to insufficient data to establish depths where background levels would be reached in the soil profile. Depths of excavations could be less (or more) based on additional investigations that would be needed before finalizing plans should this alternative be selected for implementation.

Guidelines will be established to determine the depth and extent of the excavations. A drilling and sampling program will be established to obtain representative samples from the soil profile. Complete analyses of these samples will performed at an EPA approved laboratory. Background levels for the contaminants will be designated before excavations begin.

Samples for field screening analysis can be obtained from pre-set increments of material being removed from the excavations. This sampling/removal approach allows filed action decisions to be made within an appropriate amount of time and also permits cleanup activities to proceed at an acceptable rate. When contamination in the samples from the excavation reaches "background" levels, removal of materials would cease. At this point samples from the excavation limits would be taken and analyzed at an EPA approved laboratory. This complete analysis would determine whether or not removal of contaminant to background levels has been achieved.

Groundwater treatment will be accomplished in a two phase system. Inorganic contaminants would be removed in the first phase, and organic treatment would follow in the second phase. Inorganics treatment would be accomplished by the precipitation coagulation, and clarification of dissolved metals.

The final treatment step would be dedicated to the removal of organic contaminants. Since all of the critical organic contaminants are volatile compounds, air stripping was determined to be the most effective treatment process.

Community Relations

The surrounding community has concern about the condition of their drinking water. The level of concern was not high as a result of the public meeting which was attended by 40 + people, and written comments were received from one private citizen, and two attorneys for PRPs. The Louisville Water Company expressed interest in supplying water to these residents.

Consistency with other Environmental Laws

It is EPA policy to give prime consideration to remedial actions that attain or exceed applicable or relevant federal environmental or public health standards. State and local standards also should be considered; however, State standards that are more stringent than Federal standards may be the basis for the remedy only if the result is consistent with the cost effective remedy based on federal standards. The State may also pay the additional cost necessary to attain the State standard(s). The environmental or public health laws which may be relevant or applicable to the site are:

-The Toxic Substances Control Act (TSCA) does not and is not expected to apply to the final site actions for Distler Brickyard.

-The Clean Water Act (CWA) Does not presently apply to final site action based on Section 4 of the RI/FS. Section 4 reveals that surface water contamination is not attributed to the site.

-The Resource Conservation and Recover Act (RCRA) will apply to final action at the site if clean-up remedy alternatives are selected that require excavation and offsite landfill disposal.

-Floodplain Management Executive Order 11988 (E.O. 11988)
Floodplain management is a concern at this site since it is partially within the 100 year floodplain. Any action taken at the site as proposed in the feasibility study would not adversely affect the floodplain. This is the floodplain of the Ohio River and is a vast area.

-Groundwater Protection Strategy (GWPS)
The GWPS is an applicable standard for this site. The cleanup of the groundwater to level recommended by Region IV Office of Groundwater Protection would require two years to accomplish. The selected alternative will guarantee clean water for users of groundwater.

-Occupational Safety and Health Administration (OSHA)
Any applicable OSHA requirements will be addressed during the detailed design phase of the selected alternative. OSHA requirements address such concerns as on-site worker safety and health. All alternatives can be designed to be in full compliance with all OSHA requirements.

- Other
There are no other known applicable and relevant Federal Laws or regulations which apply to the site.

FLOODPLAIN ASSESSMENT

The Distler Brickyard Site is located near the Ohio River and the Salt River. The Ohio River Division of the U. S. Department of the Army Corps of Engineers has determined, through frequency studies, water surface elevations for various flood conditions (Wright 1986):

Frequency	Elevation
10 - year	431.8 feet
25 - year	436.1 feet
50 - year	439.9 feet
100 - year	442.9 feet
500 - year	449.0 feet

The ground elevations at the Distler Brickyard Site range between 418 to 451 feet. The brickyard complex is at an elevation of approximately 444 feet. East of the complex toward the old homestead, the elevation increases to 451 feet. The areas prone to flooding are along the northeast and southwest portions of the site. Occurrence of a 100 year flood would inundate the majority of the site, except the brickyard complex and the old homestead area.

At the Distler Brickyard Site, potential remedial action(s) would be designed, constructed, operated, and maintained to prevent washout of any hazardous materials by a flood event.

The area of the site affected by potential remedial action(s) would be less than three acres. This is quite small, even insignificant compared to adjacent areas in the 100-year floodplain. Potential remedial action would not be expected to have any calculable effect on flood levels or flood volumes.

Since surrounding area is within the 100-year floodplain, present land-use is not expected to change from its predominately rural status. Thus, potential remedial action(s) would not lead to further development that would create additional floodplain impact.

Recommended Alternative

In compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR) 300.68) the alternative recommended in this decision document will eliminate contamination of the groundwater and will eliminate any future contamination of the groundwater as well as any exposure to any remaining contamination. It is a permanent solution to the environmental problems at the site, and is the most cost effective alternative.

This alternative includes excavation of contaminated soils (Areas A & B) where contaminant concentrations are at background levels. The depth is expected to be seven feet or less. Groundwater would be extracted, treated onsite to "background" levels, and injected back into the aquifer through injection wells. The objective of this remedial action is to reduce the concentrations of contaminants in the groundwater to levels where potential risk to human health and the environment are also reduced to acceptable levels.

The major costs for this alternative are the three (3) million dollars to excavate the contaminated soil at the site and haul it to Ohio for disposal. It will cost approximately four and one-half (4 1/2) million dollars to clean up the groundwater at the site to background levels. The combined cost of this remedial action alternative is approximately seven and one-half (7 1/2) million dollars. These costs represent Baseline Present Worth values and are summarized in Table 1. Attachment A presents the costing detail for the soil alternative. Attachment B does the same for the groundwater alternative.

Operation and Maintenance (O&M)

This remedy will require 2 years to accomplish. The operating cost will be for pumps, maintenance of these pumps injection devices and site maintenance as well. When the remedy is completed O & M will be required to maintain the site, mowing and reparing erosion gulleys which might occur in the restored areas.

In order to haul the contaminated soils that will be excavated, preparation of access roads might be necessary to establish a durable wearing surface that could withstand the anticipated truck traffic. It is estimated that about 8,000 cubic yards of material would be excavated from areas A & B combined.

It is recommended that this site be funded at 90% federal funds and 10% Commonwealth funds with a one year period of O & M to commencing after all remediation has been completed and the site restored.

Schedule

The planned schedule for completion of the clean up at the Distler Brickyard site is as follows:

August 20, 1986 Record of Decision The Commonwealth has indicated that they do not have the required 10% matching funds available at this time. A schedule for continuation of remediation at the Distler Brickyard site is contingent upon the availability of both Federal and Commonwealth funds. Ten (10) months will be required for design; six (6) months is required to select a contractor, after which 2 years of activity at the site will culminate in a full remediation of the contamination at the site.

Future Action

As part of the design, additional studies will be performed to completely define the areal extent of contamination in the groundwater and establish depths where background levels would be reached in the soil profile.

Depths of excavations could be less (or more) based on additional investigations that would be needed before finalizing plans for the implementation of this alternative.

This is an effective alternative in terms of permanently removing the source of contamination. In combination with backfilling the excavations and revegetating the area, the overall performance of this option is considered to be very effective in protection the environment.

TABLE 4-3

SUMMARY OF POTENTIAL REMEDIAL ACTION ALTERNATIVES
DISTLER BRICKYARD SITE

Alternative	Soil Contamination	Groundwater Contamination: Method	Groundwater Contamination: Cleanup Criterial
1	No Remedial Action	No Remedial Action	----
2	No Remedial Action	Groundwater Extraction/Treatment/Injection	PPCL
3	Surface Capping ("CERCLA Cap"); Surface Grading and Revegetation; Fence Around Capped Areas (Areas A and B)	Groundwater/Extraction/Treatment/Injection	PPCL
4	Surface Capping ("RCRA Cap"); Surface Grading and Revegetation; Fence Around Capped Areas (Areas A and B)	Groundwater Extraction/Treatment /Injection	MCL, PPCL
5	Excavation to Seven Feet; Backfilling; Surface Capping ("RCRA Cap"); Onsite Landfill Disposal; Surface Grading and Revegation; Fence Around Capped Areas (Areas A and B)	Groundwater Extraction/Treatment/Injection	Background Levels
6	Excavation to Background Levels or to Groundwater; Backfilling; Offiste Landfill Disposal; Surface Grading and Revegetation (Areas A and B)	Groundwater Extraction/Treatment/Injection	Background Levels
7	Excavation to Depth where soil contaminants are at Background levels (Expected to be ≤ Seven Feet, Areas A & B); Surface Grading and Revegetation (Areas A & B); Offsite Landfill Disposal	Extraction and Onsite Treatment of contaminated Groundwater; Groundwater will be cleaned to Background Levels and Reinjected.	Background Levels

PPCL: Preliminary Protective Concentration Limit (Based on 10^{-6} Unit Cancer Risk)
MCL: Maximum Contaminant Level

TABLE 4-4

COST SUMMARY OF POTENTIAL REMEDIAL ACTION ALTERNATIVES
DISTLER BRICKYARD SITE

Remedial Action Alternative	Baseline Capital Costs	Operating and Maintenance Costs			Present Worth Range		
		Year 0	1 & 2	3-30	Low	Baseline	High
1	--	--	--	--	--	--	--
2	1,369	44	1,568	44	4,258	4,474	4,689
3	1,587	44	1,570	46	4,444	4,711	5,011
4	1,686	44	1,571	47	4,525	4,819	5,165
5	2,728	44	1,587	63	5,485	6,013	6,750
6	27,442	44	1,568	--	23,480	30,206	33,027
7	--	44	1,568	44	--	7,467	--

ALL COSTS IN THOUSANDS OF DOLLARS (000's)

TABLE 1

REMEDIAL ACTION ALTERNATIVE 7
ESTIMATED COSTS
(BASELINE VALUES)

Soil Contamination: Excavation to Depth Were Soil Contaminants are at Background Levels (Expected to be ≤ Seven Feet, Areas A & B); Surface Grading and Revegetation (Areas A & B); Offsite Landfill Disposal

Groundwater Contamination: Extraction and Onsite Treatment of Contaminated Groundwater; Groundwater Will be Cleaned to Background Levels and Reinjected.

	Media		
	Soil	Groundwater	Total
PRESENT WORTH ($)	2,993,000	4,474,000	7,467,000
CAPITAL EXPENDITURES	2,980,000	1,369,000	4,349,000
ANNUAL OPERATING COSTS ($)			
Year 0	265	44,000	44,265
Year 1 and 2	1,360	1,568,000	1,569,360
Year 3-30	1,360	44,000	45,360
TOTAL OPERATING COSTS FOR 30 YEARS	41,000	4,412,000	4,443,000

TABLE 2 — 13

CONCENTRATION VALUES USED TO CALCULATE GROUNDWATER TREATMENT TIME ESTIMATES DISTLER BRICKYARD SITE

Contaminant	Concentration (ug/l) Maximum	Concentration (ug/l) Average	PPCL (ug/l)	MCL (ug/l)	Background (ug/l)+
1,1,1-Trichloroethane	143	28	21.9	200	5
Benzene	200	18	0.673++	5	5
1,1-Dichloroethene	50	62	0.283	NR	5
Trans-1,2-Dichloroethene	6,000	579	270*	NA	5
Toluene	58,000	3,754	15,400	2000***	5
Trichloroethene	61	8	1.84	NR	5
2-Butanone	9,000	1,113	700**	NR	5

* Health Advisory Limit
** Allowable Daily Intake
*** Recommended Maximum Contaminant Levels
PPCL Preliminary Protective Concentration Limits
MCL Maximum Contaminant Level
NA Not Available
NR Not Reported
\+ Detection Limit was used as Background Value
++ Ambiant Water Quality Criteria for Drinking Water, not PPCL (PPCL Not available)

TABLE 3 - 8

BACKGROUND CONCENTRATIONS FOR CONTAMINANTS OF CONCERN DISTLER BRICKYARD SITE

Contaminant	Soils ug/l	Groundwater ug/l
1,1,1-Trichloroethane	2.5	5
Benzene	2.5	5
1,1-Dichloroethene	2.5	5
Trans-1,2-Dichloroethene	2.5	5
Toluene	2.5	5
Trichloroethene	2.5	5
2-Butanone	100	5
Naphthalene	10	20
bis(2-ethylhexyl) phthalate	10	20
Arsenic	20R	4.9
Chromium	Detection Limit	4.4
Lead	Detection Limit	5

Note: Background values are actually the detection limits (i.e., compound was analyzed for but not detected). This is true for all compounds except Arsenic in soils.

R Laboratory qualifier indicating result is a false positive.

D

TABLE 1-2 B

CONTAMINANTS OF CONCERN
DISTLER BRICKYARD SITE

Contaminant	Media	Concentration Range	Observations/Number Samples
Benzene CAS No. 71-43-2	Monitoring Wells	3 - 200 ug/l	5/22
1,1,1-Trichloroethane CAS No. 71-55-6	Surface Soils	9.4 ug/Kg	1/22
	Monitoring Wel	4 - 143 ug/l	4/22
1,1-Dichloroethene CAS No. 75-35-4	Monitoring Wells	3 - 50 ug/l	4/22
Trans-1,2-dichloroethene CAS No. 156-60-5	Monitoring Wells	5 - 6,000 ug/l	8/22
Toluene CAS No. 108-88-3	Monitoring Wells	2 - 58,000 ug/l	7/22
	Residential Wells	2 ug/l	3/5
Trichloroethene CAS No. 79-01-6	Surface Soils	1.8 - 6,600 ug/Kg	2/22
	Monitoring Wells	4 - 61 ug/l	4/22
2-Butanone CAS No. 78-93-3	Subsurface Soils	3,200-300,000 ug/Kg	4/7
	Monitoring Wells	3,089 - 9,000 ug/l	4/22
Naphthalene CAS No. 206-44-0	Surface Soil	750 - 2,400 ug/Kg	3/22
	Subsurface Soils	2,000 - 8,700 ug/Kg	5/7
	Monitoring Wells	20 ug/l	1/22
Bis (2-ethylhexyl) phthalate CAS No. 117-81-7	Surface Soil	6 - 3,200 ug/Kg	6/22
	Subsurface Soils	400 - 5,700 ug/Kg	7/7
	Monitoring Wells	2 - 28 ug/l	5/22

(continued)

DI

B

TABLE 1-2 (CONTINUED)
CONTAMINANTS OF CONCERN-
DISTLER BRICKYARD SITE
PAGE TWO

Contaminant	Media	Concentration Range	Observations/Number Samples
Arsenic	Surface Soils	5.3 - 75 mg/Kg	22/22
CAS No. 7440-38-2	Subsurface Soils	2.7 - 8.0 mg/Kg	16/16
	Sediment	5.1 - 16 mg/Kg	13/13
	Monitoring Wells	20 - 1,600 ug/l	19/31
Chromium	Surface Soils	5.5 - 15 mg/Kg	22/22
CAS No. 7440-47-3	Subsurface Soils	6.25 - 14.5 mg/Kg	16/16
	Sediment	6.9 - 12.8 mg/Kg	7/13
	Surface Water	7-14 ug/l	3/7
	Monitoring Wells	20 - 2,000 ug/l	13/31
	Residential Wells	6 ug/l	1/5
Lead	Surface Soils	1.4 - 122 mg/Kg	22/22
CAS No. 7499-92-1	Subsurface Soils	7.26 - 22.5 mg/Kg	16/16
	Sediment	6 - 37 mg/Kg	13/13
	Surface Water	13 ug/l	1/7
	Monitoring Wells	10 - 1,000 ug/l	25/31
	Residential Wells	2.2 - 13 ug/l	3/5

Notes: (1) CAS No. - Chemical Abstract Service Number.
(2) Analytical Results from the NUS FIT Investigation (March, 1983) and the NUS Remedial Investigation (May, 1984 - September, 1984).
(3) ug/l - micro gram per liter.

TABLE 3-3B PAGE 1 OF 1
METALS AND CYANIDE IN SURFACE SOIL
DISTLER BRICKYARD SITE, WEST POINT, KY
SAMPLED BY NUS CORPORATION (5/85)
RESULTS PRESENTED IN mg/Kg

SAMPLE NO. DB-SS			301
Traffic Report No.			MDC-136
Sample Type			BACKGROUND
P.P. No.	**CAS No.**	**Contaminant**	
		Toxic Metals	
114	7440-36-0	Antimony	
115	7440-38-2	Arsenic	20R
117	7440-41-7	Beryllium	
118	7440-43-9	Cadmium	
119	7440-47-3	Chromium	
120	7440-50-8	Copper	20J
121		Cyanide, Total	
122	7439-92-1	Lead	21J
123	7439-97-6	Mercury	
124	7440-02-0	Nickel	
125	7782-49-2	Selenium	
126	7440-22-4	Silver	
127	7440-28-0	Thallium	
128	7440-66-6	Zinc	44J
	7429-90-5	Aluminum	9400J
	7440-39-3	Barium	
	7440-70-2	Calcium	
	7440-48-4	Cobalt	
	7439-89-6	Iron	16000J
	7439-95-4	Magnesium	
	7439-96-5	Manganese	450
	7440-09-7	Potassium	
	7440-23-5	Sodium	
	7440-31-5	Tin	
	7440-62-2	Vanadium	
		Moisture %	21

Laboratory qualifier indicating result is approximate.
[illegible]

STAFF RECOMMENDATIONS

CHARLOTTE E. BALDWIN
SECRETARY

MARTHA LAYNE COLLINS
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

FORT BOONE PLAZA
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ERRR/RAS
RECEIVED
AUG 11 1986
EPA-REGION IV
ATLANTA, GA

August 7, 1986

Mr. Richard D. Stonebraker, Acting Chief
Emergency and Remedial Response Branch
U. S. Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365

Dear Mr. Stonebraker:

The purpose of this letter is to comment on the proposed alternative remedial actions and Records of Decision at the Distler Brickyard and Distler Farm sites. These actions were recently revised by EPA in light of the State comments forwarded to you in my letter of July 3, 1986. The comments for each site are given below.

DISTLER BRICKYARD SITE

The proposed remedial action components described in Alternative 7 are acceptable to the State. This alternative includes the following: Excavation of soils to a depth where contaminant concentrations are at background levels (expected to be seven feet or less as is required to remove contaminated soil areas A and B); backfilling; surface grading and revegetation; offsite landfill disposal; extraction and onsite treatment of contaminated groundwater (groundwater will be cleaned to background levels and reinjected into the aquifer).

Two additional issues are relevant to the Brickyard Site: (1) Cleanup levels, and (2) Operation and Maintenance. First, the State understands that there will be no additional cost to the State in Alternative 7 to achieve background cleanup levels in the soil and in the groundwater. Second, it appears that O and M costs for the surface covering ($1,360/yr) would be unnecessary after the first year since surface contaminants have been removed and there is no "cap" to be maintained. Also, the O and M costs for groundwater monitoring ($44,400/yr, which are shown in the cost estimates but not mentioned in the revised ROD narrative) may not be necessary 2 to 3 years after cleanup of the groundwater is achieved. The State suggests that the frequency and duration of the groundwater monitoring be established at the end of the first year of O and M.

The State understands that the total present worth cost of Alternative 7 has been estimated to be $7,467,000. The elimination of the O and M costs mentioned above would slightly lower the estimated total present worth cost to $7, 203,000.

DISTLER FARM SITE

The proposed remedial action components described in the revised Alternative 6 are acceptable to the State. This alternative includes the following components : excavation of contaminated soils to a depth where contaminant concentrations are at background levels (expected to be 11 feet or less in depth); backfilling; surface grading and revegetation; offsite landfill disposal; groundwater extraction; offsite groundwater treatment/disposal; reinjection of uncontaminated water (if this is necessary beyond natural recharge of aquifer).

Two additional issues are relevant to the Distler Farm Site: (1) Cleanup levels, and (2) Operation and Maintenance. First, the State understands that there will be no additional cost to the State in Alternative 6 to attain background cleanup levels in the soil and in the groundwater. Second, the O and M costs for the surface covering (not estimated in the cost summary but described in the revised ROD) would be unnecessary after the first year of O and M, since surface contaminants were removed and there is no cap. Also, the O and M costs for groundwater monitoring ($20,200/yr, which are included in the cost estimates but not mentioned in the revised ROD), may not be necessary 2to 3 years after cleanup of the groundwater is achieved. The State suggests that the frequency and duration of groundwater monitoring be established at the end of the first year of O and M.

The State understands that the total present worth cost of Alternative 6 has been estimated to be $11,996,000. This cost would be slightly lower with the reduction of the O and M costs mentioned above.

ADDITIONAL COMMENTS

In a July 2, 1986, letter from Secretary Baldwin to Mr. Ravan the State requested the lead on these two sites. To date, we have not received a reply from EPA on this important matter. It is important to finalize the "lead" issue as soon as possible so that appropriate project planning and scheduling can be established. The State does not concur with the schedule shown in the revised RODs.

Second, the State Hazardous Waste Management Fund contains $627,000, which would be insufficient to fund the 10% State Match requirements on either of these sites. Approximately $140,000 per year is generated by the Fund. In order to proceed on either site, it will be necessary to clarify when the State will need to submit matching funds to EPA. It will also be necessary for the State to obtain sufficient matching funds.

With these comments, the State understands that EPA may proceed with the completion of the RODs. Please contact me if you have any questions or require further information.

Sincerely,

J. Alex Barber, Director
Division of Waste Management

JAB/lm

cc: Mike Helton
Caroline Patrick Haight
Barry Burrus

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

JUL 22 1986

REF: 4WD-ER

Mr. J. Alex Barber
Commonwealth of Kentucky
Natural Resources and Environmental
Protection Cabinet
Department for Environmental Protection
Fort Boone Plaza
18 Reilly Road
Frankfort, KY 40601

Dear Mr. Barber:

In your letter dated July 3, 1986, you stated that the Commonwealth could approve a remedial alternative for the Distler Brickyard site containing the following components:

1. "Excavation of contaminated soil to depth where contaminant concentrations are at background levels (expected to be less than 7 feet depth). The excavated soil could be either transported off-site to a permitted hazardous waste disposal facility or treated on-site to render it nonhazardous. The resulting treated soil would then need to be delisted under RCRA so that it could be left on-site. Excavated soils would be replaced by clean soils, and the resulting site regraded and revegetated.

2. Extraction and on-site treatment of contaminated groundwater. Groundwater would be cleaned to background levels and reinjected into the aquifer."

During the Remedial Investigation/Feasibility Study and since the preparation of the draft Record of Decision, the EPA contractors have evaluated and considered several Remedial and Advance Technologies. The Technologies are Microbial Degradation, In-situ Treatment of Groundwater, In-situ Toxic Waste Detoxification, Terra Vac Process, On-site destruction (using a Rotary Kiln incinerator) and Solution Mining. None of the technologies listed above were retained for further consideration. One of the alternatives is considered a proven, reliable technology. The other five (5) alternatives, are considered experimental, unproven technologies.

The cost to excavate 8,000 cubic yards of contaminated soils and on-site decontamination of the organic constituents by a Rotary Kiln incinerator is $10,700,000. The Removal of contaminated

ATTACHMENT A

COSTING DETAIL
FOR SOIL REMEDIATION
(ALTERNATIVE 7)

DISTLER BRICKYARD
SOIL ALTERNATIVE NO 7
(DBPEXON)

Item	Qty.	Unit	Unit Cost Sub.	Unit Cost Mat.	Unit Cost Labor	Unit Cost Equip.	Total Cost Sub.	Total Cost Mat.	Total Cost Labor	Total Cost Equip.	Total Direct Cost	Comments
Clear and Grub	1.2	ACRE			390.00	820.00			468	984	1,452	
Excav. Contam. Soil	8,000	CY			.28	.55			2,240	4,400	6,640	
Backfill W/Compaction	6,860	CY		1.50	1.20	2.81		10,290	8,232	19,227	37,799	
Grade Area	970	CY			.39	1.59			378	1,542	1,920	
Topsoil	1,140	CY		5.50	1.20	2.81		6,270	1,368	3,203	10,841	
Revegetate	53	MSF		24.60	5.60	4.45		1,304	297	236	1,837	
Transportation	156,000	MI	4.00				624,000				624,000	20 cy truck
Disposal	10,800	TON	110.00				1,188,000				1,188,000	CECOS Landfill 390 miles
Subtotal 1							1,812,000	17,864	12,983	29,642	1,872,489	
Working Level C/Norm = .25									3,246	7,410	10,656	
							1,812,000	17,864	16,229	37,052	1,883,145	
Burden @ 13% of Labor Cost									2,119		2,119	
Labor @ 15% of Labor Cost									2,445		2,445	
Material @ 5% of Material Cost								893			893	
Subcontract @ 10% of Sub. Cost							181,200				181,200	
Total Direct Cost							1,993,200	8,757	20,793	37,052	2,069,802	
Indirects @ 75% of Total Direct Labor Cost									15,595		15,595	
Profit @ 10% Total Direct Cost											206,980	
											2,292,377	
Health & Safety Monitoring @ .04											91,695	
Total Field Cost											2,384,072	
Contingency @ 20% of Total Field Cost											476,814	
Engineering @ 5% of Total Field Cost											119,204	
TOTAL COST FOR THIS PAGE											2,980,089	

DISTLER BRICKYARD
O&M COST
ALTERNATIVE NO: 7

SURFACE COVERING

Item	Qty	Unit	Unit $	Item $	Frequency	Notes
Mow Grass	53	MSF	5.00	265	0-30	Slope & level areas
Replace Topsoil	97	CY	9.51	922	1-30	10% replacement
Revegetate	5	MSF	34.65	173	1-30	
Total Annual Costs (first year)				265		
Total Annual Costs (1-30)				1,360		

DISTLER BRICKYARD
SOIL ALTERNATIVE NO. 7
PRESENT WORTH ANALYSIS (BASELINE)

Cost Component	COST/YEAR COST OCCURS ($000'S) 0	1	2	3	4	5	6	7	8	9	10	11
1. Capital Cost	2,980											
2. O&M Costs	0.265											
3. Annual Costs	2,980	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
4. Annual Discount Rate=10%	1	.909	.826	.751	.683	.621	.564	.513	.467	.424	.386	.35
Present Worth =	2,980	1.3	1.2	1.1	1.0	.9	.8	.7	.7	.6	.5	.5

	12	13	14	15	16	17	18	19	20	21	22	23
O&M Costs	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Annual Discount Rate=10%	.319	.29	.263	.239	.218	.198	.18	.164	.149	.135	.123	.112
Present Worth =	.4	.4	.4	.3	.3	.3	.2	.2	.2	.2	.2	.2

	24	25	26	27	28	29	30
O&M Costs	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Annual Discount Rate=10%	.101	.092	.084	.076	.069	.063	.057
Present Worth =	.1	.1	.1	.1	.1	.09	.08

TOTAL PRESENT WORTH ($000'S) 2,993

ATTACHMENT B

COSTING DETAIL
FOR GROUNDWATER REMEDIATION
(ALTERNATIVE 7)

HISTLER HAICAYARD
Groundwater Extraction/Injection
Alternatives No. 7
(HBGRLXI)

Item	Qty	Unit	Unit Cost Sub.	Unit Cost Mat.	Unit Cost Labor	Unit Cost Equip.	Total Cost Sub.	Total Cost Mat.	Total Cost Labor	Total Cost Equip.	Total Direct Cost	Comm
Mobilization of Driller		LS	2000.00				2000				2000	
Drill wells (12" dia.)	9	EA	15000.00				135000				135000	
a. Well Screen (6" S.S.)												
b. Well Casing (6" S.S.)												
c. Gravel Pack												
d. Grout Seal												
e. Develop Wells												
Well Head (pitless unit)	6	EA	1500.00				9000				9000	
a. Submersible Pumps (25 gpm)												
b. Riser Pipe (2" dia.)												
Valves (2 @ ea. well)	9	LOCS	400.00				3600				3600	
Manifold Piping (4" PVC)	1050	LF	6.95				7298				7298	
Valve Vault	9	EA	1975.00				17775				17775	
							174673	0	0	0	174673	
Working Level N/A									0	0	0	
							174673	0	0	0	174673	
Burden @ 13% of Labor Cost									0		0	
Labor @ 15% of Labor Cost									0		0	
Material @ 5% of Material Cost								0			0	
Subcontract @ 10% of Sub. Cost							17467				17467	
Total Direct Cost							192140	0	0	0	192140	
Indirects @ 75% of Total Direct Labor Cost									0		0	
Profit @ 10% Total Direct Cost											19214	
											211354	
Health & Safety Monitoring @ .1											21135	
Total Field Cost											232489	
Contingency @ 20% of Total Field Cost											46498	
Engineering @ 5% of Total Field Cost											11624	
TOTAL COST THIS PAGE											290611	

HISTLER BRICKYARD
Groundwater Treatment Plant
Alternative No. 7
(DBBWP1)

Item	Qty	Unit	Unit Cost Sub.	Unit Cost Mat.	Unit Cost Labor	Unit Cost Equip.	Total Cost Sub.	Total Cost Mat.	Total Cost Labor	Total Cost Equip.	Total Direct Cost	Cc—
PIPING												
Supply Piping	200	LF		19.50	10.50			3900	2100		6000	
Interconnecting Piping	400	LF		39.00	21.00			15600	8400		24000	
Line Feed Piping	100	LF		6.00	4.00			600	400		1000	
Chemical Piping	300	LF		3.70	1.35			1110	405		1515	
Steam Stripping Piping		LS						10500	5700		16200	
Utility Piping	300	LF		13.00	7.00			3900	2100		6000	
Underflow Piping	100	LF		6.00	4.00			600	400		1000	
pH Control System	1	EA		4000.00	1000.00			4000	1000		5000	
Valves (1°)	12	EA		250.00	50.00			3000	600		3600	
Valves (2°)	12	EA		500.00	50.00			6000	600		6600	
Gauges	8	EA		150.00	25.00			1200	200		1400	
FOUNDATIONS												
Foundations	97	CY		200.00	375.00	25.00		19400	36375	2425	58200	Inc.
Treatment Building	600	SF	30.00				18000				18000	build
ELECTRICAL												
Motor Starter #1	25	EA		800.00	200.00			20000	5000		25000	
Disconnect Switch	4	EA		800.00	200.00			3200	800		4000	
Transformer	1	EA		2500.00	800.00			2500	800		3300	
Conduit, Cable, Control	25	EA		452.00	600.00			11300	15000		26300	
Grounding	1	LOT		4000.00	4000.00			4000	4000		8000	
Misc. Wiring	1	LOT		9000.00	9000.00			9000	9000		18000	
							18000	119810	92880	2425	233115	
Working Level D = .15									13932	364	14296	
							18000	119810	106812	2789	247411	
Burden @ 13% of Labor Cost									13886		13886	
Labor @ 15% of Labor Cost									16022		16022	
Material @ 5% of Material Cost								5991			5991	
Subcontract @ 10% of Sub. Cost							1800				1800	
Total Direct Cost							19800	125801	136719	2789	285109	
Indirects @ 75% of Total Direct Labor Cost									102540		102540	
Profit @ 10% Total Direct Cost											28511	
											416159	
Health & Safety Monitoring @ .1											41616	
Total Field Cost											457775	
Contingency @ 20% of Total Field Cost											91555	
Engineering @ 5% of Total Field Cost											22889	
TOTAL COST THIS PAGE											572219	

HISTLER BRICKYARD
Groundwater Treatment Plant
Alternative No. 7
(DBGWP)

Item	Qty	Unit	Unit Cost Sub.	Unit Cost Mat.	Unit Cost Labor	Unit Cost Equip.	Total Cost Sub.	Total Cost Mat.	Total Cost Labor	Total Cost Equip.	Total Direct Cost	Comm
EQUIPMENT												
Equalization Tank	1	EA		7000.00	800.00			7000	800		7800	
Trmt. Supply Pumps	2	EA		3000.00	200.00			6000	400		6400	
Feed System	1	EA		4000.00	400.00			4000	400		4400	
Polymer Feed System	1	EA		4500.00	400.00			4500	400		4900	
Ferric Sulfate Feed System	1	EA		15000.00	3000.00			15000	3000		18000	
Lime Feed System	1	EA		16000.00	3000.00			16000	3000		19000	
Static Mixer	1	EA		1000.00	200.00			1000	200		1200	
Mixing Tank	1	EA		1700.00	600.00			1700	600		2300	
Mixer	1	EA		2700.00	300.00			2700	300		3000	
Floc Tank	1	EA		1200.00	600.00			1200	600		1800	
Floc Tank Mixer	1	EA		2500.00	300.00			2500	300		2800	
Clarifier	1	EA		45900.00	11900.00			45900	11900		57800	
Sand Filters	2	EA		20000.00	2000.00			40000	4000		44000	
Backwash Tank	1	EA		5000.00	1000.00			5000	1000		6000	
Backwash Pumps	2	EA		5500.00	300.00			11000	600		11600	
Steam Stripping	1	EA		51000.00	3600.00			51000	3600		54600	
Stripper Supply Pumps	2	EA		3500.00	400.00			7000	800		7800	
Plate/Frame Filter Press	1	EA		10000.00	1000.00			10000	1000		11000	
Sludge Holding Tanks	1	EA		700.00	300.00			700	300		1000	
Sludge Feed Pumps	2	EA		3500.00	200.00			7000	400		7400	
							0	239200	33600	0	272800	
Working Level D = .15									5040	0	5040	
							0	239200	38640	0	277840	
Burden @ 13% of Labor Cost									5023		5023	
Labor @ 15% of Labor Cost									5796		5796	
Material @ 5% of Material Cost								11960			11960	
Subcontract @ 10% of Sub. Cost							0				0	
Total Direct Cost							0	251160	49459	0	300619	
Indirects @ 75% of Total Direct Labor Cost									37094		37094	
Profit @ 10% Total Direct Cost											30062	
											367776	
Health & Safety Monitoring @ .1											36778	
Total Field Cost											404553	
Contingency @ 20% of Total Field Cost											80911	
Engineering @ 5% of Total Field Cost											20228	
TOTAL COST THIS PAGE											505691	

HISTLER BRICKYARD
O & M COST
ALTERNATIVE NO.1 No. 7

GROUNDWATER TREATMENT
PLANT

ITEM	QTY	UNIT	UNIT $	ITEM $	FREQUENCY	NOTES
UTILITIES						
a. Electrical	200000	Kw-hr	.07	14000	2 yrs.	
b. Fuel	874000	gal	.87	762120	2 yrs.	
CHEMICALS						
a. Sodium Hypochloite	949	LB	1.05	996	2 yrs.	
b. Polymer	8760	LB	3.50	30660	2 yrs.	
c. Ferric Sulfate	13.3	TONS	138.00	1835	2 yrs.	
d. Lime	15		40.00	600	2 yrs.	
MAINTENANCE						
3% of Capital Cost Subtotal ($505,600)				15168	2 yrs.	
LABOR						
Operators	3	EA	25000.00	75000	2 yrs.	
BOILER RENTAL	12	MO	50000.00	600000	2 yrs.	
SLUDGE HANDLING						
a. Hauling	5	LDS	1000.00	5000	2 yrs.	
b. Disposal	70	TONS	95.00	6650	2 yrs.	
MONTHLY SAMPLING & ANALYSIS	12	MO	1000.00	12000	2 yrs.	

Total Annual Costs (first year) 0

Total Annual Costs (2 yrs.) 1524030

MISTLER BRICKYARD
O & M COST
ALTERNATIVE NO.: No. 7 MONITORING & ANALYSIS

ITEM	QTY	UNIT	UNIT $	ITEM $	FREQUENCY	NOTES
Monitor Leachate Collection System	N/A	LS			1 - 30	Quarterly (inc. in Item 2)
Sample Monitoring Wells	N/A	LS		2400	1 - 30	2 men @ 10 hrs ea. $30/hr.; Quarterly
Analysis	32	EA	1000.00	32000	1 - 30	7 MW's plus blank for RCRA parameters
Reporting	N/A	LS		10000	1 - 30	Quarterly, Semi-annual & Annual reports
Total Annual Costs (first year)				0		
Total Annual Costs (1 - 30)				44400		

SITE: DISTLER BRICKYARD
ALTERNATIVE NO.1 7
4474

PRESENT WORTH ANALYSIS

COST/YEAR COST OCCURS ($000'S)

COST COMPONENT	0	1	2	3	4	5	6	7	8	9	10
1. CAPITAL COST	1369										
2. O & M COSTS	44	1568	1568								
3. ANNUAL COSTS	1413	1568	1568	44	44	44	44	44	44	44	44
4. ANNUAL DISCOUNT RATE=10%	1	.909	.826	.751	.683	.621	.564	.513	.467	.424	.386
PRESENT WORTH =	1413	1425	1295	33	30	27	25	23	21	19	17

	12	13	14	15	16	17	18	19	20	21	22
O & M COSTS	44	44	44	44	44	44	44	44	44	44	44
ANNUAL DISCOUNT RATE=10%	.319	.29	.263	.239	.218	.198	.18	.164	.149	.135	.123
PRESENT WORTH =	14	13	12	11	10	9	8	7	7	6	5

	24	25	26	27	28	29	30	TOTAL PRESENT WORTH (000'S)
O & M COSTS	44	44	44	44	44	44	44	
ANNUAL DISCOUNT RATE=10%	.101	.092	.084	.076	.069	.063	.057	
PRESENT WORTH =	4	4	4	3	3	3	3	4474

TABLE [illegible]-4

COST SUMMARY OF POTENTIAL REMEDIAL ACTION ALTERNATIVES
DISTLER BRICKYARD SITE

Remedial Action Alternative	Baseline Capital Costs	Operating and Maintenance Costs			Present Worth Range		
		Year 0	1 & 2	3-30	Low	Baseline	High
1	--	--	--	--	--	--	--
2	1,369	44	1,568	44	4,258	4,474	4,68[illegible]
3	1,587	44	1,570	46	4,444	4,711	5,01[illegible]
4	1,686	44	1,571	47	4,525	4,819	5,165
5	2,728	44	1,587	63	5,485	6,013	6,750
6	27,442	44	1,568	--	23,480	30,206	33,02[illegible]

ALL COSTS IN THOUSANDS OF DOLLARS (000's)

TABLE 1 – B

ESTIMATES OF TIME (IN YEARS) TO TREAT GROUNDWATER TO DESIRED CONCENTRATION LIMITS DISTLER BRICKYARD SITE

Contaminant	PPCL Levels		MCL Levels		Background Levels	
	at Maximum Concentration	at Average Concentration	at Maximum Concentration	at Average Concentration	at Maximum Concentration	at Average Concentration
1,1,1-Trichloroethane	2.0	0.3	NC3	NC3	3.6	1.9
Benzene	0.5++	4.3++	5.4	2.0	5.4	2.0
1,1-Dichloroethane	15.6	13.6	NC3	NC3	NC2	NC2
Trans-1,2-Dichloroethene	7.6	1.9	NC3	NC3	17.6	11.8
Toluene	7.3	NC1	16.8	0.4	50.8	34.9
Trichloroethene	7.3	3.1	NC3	NC3	NC2	NC2
2-Butanone	2.6	0.4	NC3	NC3	6.4	4.73

PPCL Preliminary Protective Concentration Limits
MCL Maximum Contaminant Level
NC1 Not Calculated, Average Concentration is below PPCL
NC2 Not Calculated, PPCL is lower than background
NC3 Not Calculated, MCL not reported or not available
++ Ambient Water Quality Criteria for Drinking Water, Not PPCL (PPCL not available)

TABLE ●-3

SUMMARY OF POTENTIAL REMEDIAL ACTION ALTERNATIVES
DISTLER BRICKYARD SITE

Alternative	Soil Contamination	Groundwater Contamination: Method	Groundwater Contamination: Cleanup C
1	No Remedial Action	No Remedial Action	----
2	No Remedial Action	Groundwater Extraction/Treatment/Injection	PPC
3	Surface Capping ("CERCLA Cap"); Surface Grading and Revegetation; Fence Around Capped Areas (Areas A and B)	Groundwater Extraction/Treatment/Injection	PPC
4	Surface Capping ("RCRA Cap"); Surface Grading and Revegetation; Fence Around Capped Areas (Areas A and B)	Groundwater Extraction/Treatment/Injection	MCL, P
5	Excavation to Seven Feet; Backfilling; Surface Capping ("RCRA Cap"); Onsite Landfill Disposal; Surface Grading and Revegation; Fence Around Capped Areas (Areas A and B)	Groundwater Extracton/Treatment/Injection	Backgroun
6	Excavation to Background Levels or to Groundwater; Backfilling; Offsite Landfill Disposal; Surface Grading and Revegetation (Areas A and B)	Groundwater Extraction/Treatment/Injection	Background

PPCL: Preliminary Protective Concentration Limit (Based on 10^{-6} Unit Cancer Risk)
MCL: Maximum Contaminant Level

soils to a permitted disposal facility is estimated around $3,500,000.

A depth of seven feet was used in the Feasibility Study, this depth was selected for discussion and costing purposes due to insufficient data to establish depths where background levels would be reached in the soil profile. Depths of excavations could be less (or more) based on additional investigations that would be needed before determining the exact amount of contaminated soil to be excavated. Guidelines will be established to determine the depth and extent of the excavations.

A drilling and sampling program will be established to obtain representative samples from the soil profile. Complete analyses of these samples will be performed at an EPA approved laboratory. Background levels for the contaminants will be designated before excavations begin.

Samples for field screening analysis will be obtained from preset increments of material being removed from the excavations. This sampling/removal approach allows field action decisions to be made within an appropriate amount of time and also permits cleanup activities to proceed at an acceptable rate. When contaminations in the samples from the excavations reaches "background" levels, removal of materials would cease.

Alternative 7 will consist of the following:

- Excavation of contaminated soils to a depth where contaminant concentrations are at background levels (expected to be seven feet or less as is required to remove contaminated soil - Areas A & B); Backfilling; Surface Grading and Revegation; Off-site landfill disposal; Extraction and on-site treatment of contaminated groundwater. Groundwater will be cleaned to background levels and reinjected into the aquifer.

  This alternative includes excavation of contaminated soils to a depth where contaminant concentrations are at background levels. The depth is expected to be seven feet or less. Groundwater would be extracted, treated on-site to "background" levels, and injected back into the aquifer through injection wells. The objective of this remedial action is to reduce the concentrations of contaminants in the groundwater to levels where potential risk to human health and the environment are also reduced to acceptable levels.

It will cost approximately 3 1/2 million dollars to excavate the contaminated soil at the Distler Brickyard site and haul it to Ohio for disposal. It will cost approximately 5 million dollars to cleanup the groundwater at the site to background levels. The combined cost of this remedial action alternative is approximately 8 million dollars. Background levels will be shown on enclosed tables.

Please consider this alternative and by return electronic mail, no later than Monday, July 28, 1986, let me know the Commonwealth decision.

Sincerely yours,

R. D. Stonebraker

Richard D. Stonebraker, Acting Chief
Emergency & Remedial Response Branch

Enclosure

CHARLOTTE E. BALDWIN
SECRETARY

MARTHA LAYNE COLLINS
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FORT BOONE PLAZA
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

July 3, 1986

Mr. Richard D. Stonebraker
Emergency and Remedial Response Branch
U. S. Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30365

Dear Mr. Stonebraker:

The purpose of this letter is to comment on the proposed remedial action alternative for the Distler Brickyard site in West Point and Distler Farm site in southwestern Jefferson County, Kentucky. The State could approve of a remedial action alternative containing the following components:

Distler Brickyard

1. Excavation of contaminated soils to a depth where contaminant concentrations are at background levels (expected to be less than 7 feet depth). The excavated soil could be either transported off-site to a permitted hazardous waste disposal facility or treated on-site to render it non-hazardous. The resulting treated soil would then need to be de-listed under RCRA so that it could be left on-site. Excavated soils would be replaced by clean soils, and the resulting site regraded and revegetated.

2. Extraction and on-site treatment of contaminated groundwater. Groundwater would be cleaned to background levels and reinjected into the aquifer.

As previously communicated to your staff, it would not be acceptable to construct an on-site RCRA landfill at this site, nor is it necessary to cover the excavated soil areas with a RCRA cap as proposed in the draft Record of Decision which we received in June, 1986.

Distler Farm

1. Excavation of contaminated soils to a depth where contaminant concentrations are at background levels (expected to be less than 11 feet depth). The excavated soils could be either transported off-site to a

permitted hazardous waste disposal facility <u>or</u> treated on-site to render it non-hazardous. Excavated soil would be replaced by clean soils, and the resulting site regraded and revegetated.

2. <u>Extraction and off-site treatment of contaminated groundwater.</u> Groundwater would have to be cleaned to background levels under Kentucky requirements.

Kentucky presently has $627,000 in the Kentucky Hazardous Waste Management Fund which could be used for the State match on these two projects. While in kind services could mitigate some of the State match, Kentucky could not project a complete 10% match with the fund it now has set aside. Approximately $140,000 per year is generated by the Kentucky Hazardous Waste Management Fund.

Sincerely,

J. Alex Barber, Director
Divison of Waste Management

cc: Mike Helton
Pat Haight
Barry Burrus

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

Date: JUN 12 1986

Subject: Review of Aquatic Impacts on Streams Near the Distler Farm Site and the Distler Brickyard Site

From: Chief, Ground-Water Technology Unit

To: Nancy Redgate, Chief
KY, NC, TN Unit
Remedial Action Section

The attached reviews were conducted at the request of the Office of Ground-Water Protection (now the Ground-Water Technology and Management Section). These reviews assumed that contaminated ground water would discharge to the streams downgradient from the site. On close review of the available ground-water data, neither Stump Gap Creek downgradient of the Farm Site nor Bee Branch downgradient of the Brickyard Site is expected to receive discharge from the contaminated aquifer. Therefore, no impact on these surface waters is expected to occur as a result of ground-water discharge. However, ground-water data is limited and if high water-table conditions occur such that discharge to the streams occur, the expected affect is discussed in the attached memos.

The proposed selected alternatives which extract and treat the contaminated ground-water will eliminate the threat of impacts on the downgradient streams.

Gail Mitchell

Gail Mitchell

DATE: JUN 12 198[illegible]

SUBJECT: Selection of an Appropriate Remedial Action Alternative for the Distler Farm Site in Jefferson County, Kentucky and for the Distler Brickyard Site in Hardin County, Kentucky

Chief, Groundwater Technology Support Unit

TO: Nancy Redgate, Chief
Kentucky/North Carolina/Tennessee
Remedial Action Section

THRU: E. Stallings Howell, Chief
Groundwater Technology and Management Section

Jim Kutzman, Chief
Groundwater Protection Branch

The March, 1986, draft Feasibility Studies for the Distler Farm Site and the Distler Brickyard Site have been reviewed. Based on the information provided and evaluated in these reports and the support documents, a remedial action alternative can be selected for each site that should satisfactorily remediate the groundwater contamination problems.

Recommendations

Distler Farm Site:

To prevent offsite migration of contaminated groundwater through the fine-grained alluvial aquifer and to prevent or mitigate downward leakage into the sand and gravel water-supply aquifer, it is recommended that contaminated groundwater be extracted through a system of production/injection wells. This contaminated groundwater will be temporarily stored in on-site storage tanks and then transported to an off-site treatment/disposal facility such as the Louisville/Jefferson County Metro Sewer District treatment plant. Contaminated soils are to be excavated to background levels or to the water table and disposed of off-site. The excavated area is to be backfilled, graded and revegetated. (Alternative 6, Distler Farm Site Feasibility Study)

Distler Brickyard Site:

To prevent the plume of contamination in the sand and gravel aquifer from migrating farther from the site and ultimately to private domestic wells downgradient, a groundwater recovery, treatment and infiltration system is recommended. Recovered contaminated groundwater will, after treatment, be allowed to infiltrate back into the aquifer as an adjunct to precipitation in flushing contaminants from the soil column. The most contaminated soils are to be excavated and disposed of in an on-site landfill. The excavated area will be backfilled, covered with a cap that meets RCRA design standards, graded and revegetated. (Alternative 5, modified, Distler Brickyard Site Feasibility Study)

Background for Selection of Proposed Alternatives

Distler Farm Site

The selection of an appropriate remedial action alternative for the Farm Site was driven by two (2) important factors: (1) the site is within the ten year flood plain of the Ohio River and based on recent history is inundated more than once every ten (10) years; and (2) the sand and gravel aquifer underlying the site provides drinking water to residents living no more than 1000 feet downgradient of the site.

Groundwater Contamination

A "pool" of contaminated groundwater has been identified at the site. The available data indicates that this contaminated groundwater is restricted to the fine-grained alluvial aquifer. In the immediate vicinity of the site, this aquifer is not a drinking water supply aquifer, but it is directly connected to the underlying sand and gravel aquifer which supplies drinking water to residents living along the banks of the Ohio River, 1000 feet downgradient from the Farm site. The available data indicates that a vertical hydraulic gradient exists that will transport contaminants downward into the sand and gravel aquifer. Any contaminants that reach the sand and gravel aquifer are expected to migrate to these private domestic wells and also into the Ohio River.

A lateral hydraulic gradient in the fine-grained alluvial aquifer towards the southeast also exists. It appears that the water table of this aquifer does not intersect Stump Gap Creek and, therefore, should not effect this stream via groundwater discharge. However, the discharge area for this aquifer is unknown based on the available data and, therefore, the effects of continued migration of contaminants can not be fully evaluated.

Based on the potential for endangerment of a water supply aquifer, the groundwater extraction/injection remedial action proposed in Alternative 6 is recommended. As acknowledged in the Feasibility Study, a detailed hydrogeologic investigation including a calibrated groundwater computer model and leachability or "batch" tests will be needed to finalize an effective design for the extraction/injection system.

The Feasibility Study proposes to use the Preliminary Protective Concentration Limits (PPCL) which are based on the 10^{-6} Unit Cancer Risk as the groundwater remediation criteria (remedial action clean-up goals). Alternate groundwater clean-up goals are proposed and presented in the June 5, 1986, memo (attached) from Kenneth Orloff, Regional Toxicologist. These clean-up goals are based on existing and proposed drinking water standards.

After clean-up of the fine-grained alluvial aquifer to the drinking water standards, any leakage of contaminants into the underlying sand and gravel aquifer should result in concentrations far below the drinking water standard at any downgradient water supply well.

The extracted groundwater is to be treated and disposed of at an off-site treatment/disposal facility. As discussed in the May 16, 1986, memo to you from Stallings Howell, a waste treatability study may be necessary to assure that an appropriate facility is selected to treat and dispose of the extracted contaminated groundwater.

The Feasibility Study states that a permit from EPA will be needed for the injection wells. Wells that inject water free of hazardous constituents into an underground source of drinking water are considered to be Class V injection wells under the Underground Injection Control Program implemented by Region IV in Kentucky. These wells are authorized by rule and no permit for the injection wells will be required.

Soil Contamination

Significant levels of soil contamination were detected both at the surface and down to four (4) feet in depth. The most significant levels of contamination may occur at greater depths in the soil column (between 9 and 20 feet) where the waste materials were buried and subsequently released. No soil samples were collected from these depths to establish the level of contamination.

Because the site is located in the ten (10) year flood plain and frequently inundated, any capping alternative as proposed in the Feasibility Study (alternative 2, 3, 4 and 5) may not be effective over the long term in mitigating the transport of contaminants into the groundwater system. Neither a "RCRA Cap" nor a "CERCLA Cap" can prevent infiltration of water through the cap during periods when the cap is inundated. During flooding events infiltration would occur that would eventually move through the contaminated soils and transport contaminants towards the water table. In addition, the water table may fluctuate seasonally through contaminated soils releasing contaminants to the water table aquifer which are then available for transport with the groundwater system.

The emplacement of a cap may alter the groundwater hydraulic relationship between the fine-grained alluvium and the sand and gravel aquifer and slow the rate that contaminants are transported to the sand and gravel aquifer. But over the long term a release of contaminants into the sand and gravel aquifer would be expected that might endanger the health of those residents who obtain their drinking water from nearby, downgradient wells.

To protect the sand and gravel aquifer from contamination after the extraction/injection operation is completed, it is recommended that the sources of contamination (i.e., the contaminated soils) be removed and disposed of off-site in an appropriately designed landfill as proposed in Alternative 6. Removal of these soils from the site will assure no future threat to the the groundwater system at this site.

The soil removal remedial action will require additional soil sampling and "quick turn-around analysis" to establish the depths and lateral extent of soils to be removed. A detailed protocol for the soil removal operation will need to be established to assure that the remedial action is cost effective and environmentally sound.

Distler Brickyard Site

Groundwater contamination has been detected in the sand and gravel aquifer that supplies drinking water to residents of West Point, Kentucky, located approximately 2500 feet downgradient of the site. Contaminants present in the sand and gravel aquifer are projected to exceed the EPA existing and proposed drinking water standards at the private domestic supply wells and, therefore, will pose a health threat if not remediated. Also, the discharge area for this aquifer downgradient from this site is the Ohio River.

Groundwater Contamination

To prevent contaminants from reaching the private domestic supply wells downgradient from the site, it is recommended that groundwater be extracted from the aquifer with the use of pumping wells as in Alternative 5. The recovered groundwater is to be treated for contaminant removal at an on-site treatment plant then returned to the aquifer. The Feasibility Study recommends the use of injection wells to return the treated water to the aquifer to provide additional hydraulic head to drive the contaminated groundwater towards the recovery wells. Because the selected alternative provides for only partial removal of contaminated soils (to be discussed below), we are recommending a modification to the design proposed in the Feasibility Study. By returning treated groundwater to the aquifer through infiltration trenches or basins which overlie suspected contaminated soils that are to be left in place, additional leaching of contaminants will occur while the groundwater recovery system is in place. This will provide better long-term protection for the sand and gravel aquifer from contaminants leaching from the overlying fine-grained alluvium.

The Feasibility Study recommends the use of the Preliminary Protective Concentration Limits (PPCL) which are based on the Unit Cancer Risk (10^{-6}) as the remedial action clean-up goal for treated groundwater. The same alternate groundwater clean-up goals are recommended for the Brickyard Site as are proposed for the Farm Site. (See attached memo from Kenneth Orloff, Regional Toxicologist.) These clean-up goals are based on the proposed and existing drinking water standards. While we are proposing a consistent approach at both sites, the treatment process proposed in the Feasibility Study should be capable of reducing most contaminants in the groundwater (mostly volatile organics) to below detection limits through an air stripping process.

As acknowledged in the Feasibility Study, a detailed hydrogeologic investigation including a calibrated groundwater computer model will be necessary to design an effective recovery system. Additional downgradient monitor wells may be necessary to determine the downgradient extent of the plume which has not been established with existing data. The design of the recovery system should take into consideration the removal of a floating organic film that may exist at the water table underlying part of the site.

In the event that the final design includes injection wells, injection wells associated with a CERCLA groundwater clean-up effort are considered to be Class V wells under the Underground Injection Control Program implemented in Kentucky by Region IV. A permit would not be required.

Soil Contamination

It is recommended that to mitigate the potential for long term continued release of contaminants into the sand and gravel water-supply aquifer that the most contaminated soils be removed. These contaminated soils are not expected to occur at depths below seven (7) feet; however, this will need to be verfied by sampling and analysis during or preceding the soil removal operation.

Following the excavation of the most contaminated soils, a trench or basin will remain. It is recommended that prior to backfilling the excavated area and during the groundwater recovery/treatment operation that the treated groundwater be allowed to return to the aquifer by infiltration through these trenches or basins, if conditions will allow. This would provide for leaching of contaminants from soils that are to remain in place. The final Feasibility Study should evaluate this modification based on the available data. The permeability of the soils may be too low to allow for successful implementation of this recommendation.

Following the contaminated soil removal and after groundwater clean-up is completed the site is to be backfilled, covered with a cap that meets the RCRA design standards, graded and then revegetated. Part of the site to be capped is in the 100 year floodplain; therefore, the cap should be specially designed to bring the capped areas above the 100 year floodplain elevation. This should mitigate the potential for further release of contaminants to the sand and gravel aquifer over the long term.

The excavated soils are to be disposed of in an on-site landfill located above the 100 year flood plain and properly designed with liners, leachate collection, capped and monitored for groundwater contamination. This should assure adequate protection for the groundwater system at the site.

Discussion

The sand and gravel aquifer underlies the Distler Farm Site at approximately 30 to 40 feet below surface and occurs at 10 to 40 feet below surface under the Distler Brickyard Site. This aquifer is a current source of drinking water for residents on private domestic wells downgradient from both sites. In addition, residents of the City of West Point, Kentucky are supplied drinking water through wells that produce from the sand and gravel aquifer. These wells could potentially be impacted by contamination from the Brickyard Site if not remediated. Given the current use of this aquifer, it meets (at a minimum) the Class II criteria for classification under EPA's Groundwater Protection Strategy. The selected alternatives which provide for groundwater clean-up and long term protection of the aquifer by removal of contaminated soil source materials are consistent with the Groundwater Protection Strategy's guideline that Class II aquifers be cleaned-up to background levels or to the drinking water standards.

We are aware that the City of Louisville, Kentucky has proposed to provide the residents of West Point, Kentucky with an alternate source of drinking water supplied by the Ohio River (upgradient from both Distler Sites) by extending their distribution system to West Point. While we acknowledge that this proposal would meet the performance goal of providing long-term public health protection for the residents on the public water system, there are presently residents living downgradient of both sites that are not supplied by the existing public water system. These residents would not be protected by this proposed alternative. Also, any decision to allow the groundwater to remain contaminated would result in a discharge of contaminated groundwater to the Ohio River.

Both the Farm Site and Brickyard site could impact waters that are under the jurisdiction of ORSANCO (Ohio River Sanitation Commission). Any action taken by EPA with regard to the two sites should consider the possible impact on the surface waters and the need to avoid any controversy with ORSANCO regarding the clean-up of these sites.

Gail Mitchell

Gail Mitchell

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

Date: JUN 5 1986

Subject: Summary of Recommended ACLs at Distler Farm Site and Distler Brickyard Site

From: Toxicologist
Ground-Water Technology Unit

To: E. Stallings Howell, Chief
Ground-Water Technology and Management Section

The following recommended ACLs should be considered in conjunction with my two previous memos (May 16 and 28, 1986) to you on the above sites. These ACLs would be applicable to ground water surrounding the site if it were being used as a source of potable water.

Distler Farm Site

The following contaminents of concern from Table 1-3 of the FS were selected for possible ACL development.

Chemical	Recommended "ACL"(1)	Basis
1,1,1-Trichloroethane	200	p MCL
1,1-Dichloroethene	7	p MCL
trans-1,2-Dichloroethene	70	p RMCL
Toluene	2,000	p RMCL
Trichloroethene	5	p MCL
Vinyl chloride	1 (2)	p MCL
Chromium	50 (3)	MCL
Lead	50 (4)	MCL

p MCL - proposed Maximum Contaminant Level
p RMCL - proposed Recommended Maximum Contaminant Level

(1) water concentration in ug/l

(2) Although vinyl chloride may not have been an original contaminant at the site, it may have been formed by reductive dehalogenation of other chlorinated hydrocarbons by soil microrganisms.

(3) A revised, proposed RMCL of 120 ug/l has been announced.

(4) A revised, proposed RMCL of 20 ug/l has been announced.

Some of the chemicals in Table 1-3 of the FS were identified only in soil samples at the site (i.e., benzene, tetrachloroethene, and naphthalene). Therefore, no ALCs are offered for these compounds.

Two phthalates were detected at low concentrations in ground-water samples from the site (bis(2-ethylhexyl)phthalate: 2-8 ug/l and dibutylphthalate: 1-2 ug/l). These compounds have relatively large log Koc values and would be expected to bind to soil particles, thereby impeding their migration from the site. Furthermore, the low concentrations detected in ground water are far below the Ambient Water Quality Criteria (AWQC) for these compounds (15,000 ug/l and 34,000 ug/l, respectively). Therefore, no ACLs are offered for these compounds.

Isophorone was detected in a single ground-water sample at a low concentration (26 ug/l). Since this concentration is far below the AWQC (15,000 ug/l), no ACL is offered for isophorone.

Distler Brickyard Site

The following contaminants from Table 6-2 of the RI were selected for possible ACL development.

Chemical	Recommended "ACL"(1)	Basis
Benzene	5	p MCL
1,1,1-Trichloroethane	200	p MCL
1,1-Dichloroethene	7	p MCL
trans-1,2-Dichloroethene	70	p RMCL
Toluene	2,000	p RMCL
Trichloroethene	5	p MCL
2-Butanone	350 (2)	RfD
Arsenic	50	MCL
Chromium	50 (3)	MCL
Lead	50 (4)	MCL

p MCL - Proposed Maximum Contaminant Level
p RMCL - Proposed Recommended Maximum Contaminant Level
RfD - Verified Reference Dose

(1) Water concentration in ug/l.

(2) Calculated from EPA's verified Reference Dose (0.05 mg/kg/day) with the assumption that 20 percent of the intake is from drinking water.

(3) A revised, proposed RMCL of 120 ug/l has been announced.

(4) A revised, proposed RMCL of 20 ug/l has been announced.

Naphthalene and bis(2-ethylhexyl)phthalate would be expected to bind to soil particles which would impede their migration in ground water from the site. Furthermore, the low concentrations of bis(2-ethylhexyl)phthalate in water samples (2-260 ug/l) were far below the AWQC standard (15,000 ug/l). Therefore, no ACLs are offered for these compounds.

When the water samples were collected, they were not filtered prior to acidification. Therefore, the reported metal concentrations (arsenic, chromium, lead) may be anomalously high. ACLs are offered for these metals, but it should be recognized that the ACLs apply only to dissolved metal ion concentrations.

In developing the above ACLs, additive effects were not taken into consideration for the following reasons:

1. The ACLs were primarily based on drinking water regulations. The application of drinking water regulations to public water supplies does not require consideration of potential additive effects.
2. Scientific information on toxic interactions between chemicals is extremely limited. It would not be possible to scientifically document the an assumption of additivity of toxic effects for the chemicals in the tables above. Antagonism or synergism of toxic effects is also possible.
3. If additivity of toxic effects were assumed, then the ACL for a chemical would be dependent on the relative concentrations of other chemicals present. Since every well would have different proportions of chemicals, a specific ACL for each chemical at each well would be required. Furthermore, the relative proportions of chemicals would change with time. These considerations would make it impossible to offer specific and permanent ACLs.
4. As a related issue, it should be noted that most of the contaminants of concern are volatile organic chemicals (VOC) which can be removed by the same treatment technologies. Therefore, if treatment were instituted to reduce the concentration of one VOC, it would simultaneously reduce the concentrations of all the VOCs present. This would result in a reduction in the total VOC-mediated risk, as well as reducing the risk for an individual VOC.

Original signed by:

Kenneth G. Orloff

cc: Gail Mitchell

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

Date: MAY 16 1986

Subject: Distler Farm Site - Revised Draft Remedial Investigation (RI) and Feasibility Study (FS) Reports, March 1986

From: E. Stallings Howell, Chief
Office of Ground-Water Protection

To: Nancy Redgate, Project Officer
Emergency & Remedial Response Branch

As requested on May 6, 1986, we have conducted an expedited review of the subject reports. In general, we have found the reports to be technically well developed. They also appropriately identify deficiencies in the data base and data needs for the design of a remedial action.

Based upon our review, we recommend that the selected remedial alternative include excavation of all contaminated material. This recommendation will be based upon the site being within the 10-year flood plain (see comment number two on the FS report).

Also, the selected remedial alternative should either provide for clean-up of contaminated ground water to the levels specified in Kenneth Orloff's memorandum dated May 13, 1986 (attached) or provide for an alternative water supply to the residents in the undefined area of potential impact of both the Distler Farm and Brickyard sites. The mission of our Office is to protect ground water; therefore, we recommend that ground water be restored to these levels. However, we are cognizant of the requirement that alternatives be considered with respect to technical performance and ability to meet other cost and non-cost criteria.

Thus, we suggest that the following facts be considered in the final recommendation for remedial action:

1. The Louisville Water Company distribution system is approximately three miles northeast of the farm site and the source of water for this system is the Ohio River. Funds diverted from ground-water restoration at the farm and brickyard sites could support the construction of the extension of the service area to include the West Point community.

2. Tentatively identified compound contamination of three residential wells were reported in the RI report. Extension of the distribution system would provide a secondary benefit not specifically related to remedial action at either site.

3. An alternative surface water supply would satisfy the performance goal of reliably providing long-term protection and reducing potential risk to human health. Also, it would permanently protect the significant health-risk related exposure pathway (ingestion of contaminated ground water).

4. If ground water was not restored to an acceptable level, contaminated ground water could eventually enter Stump Gap Creek, Pond Creek, the Salt River, and the Ohio River. This could result in adverse aquatic and terrestrial ecological impacts on particularly the creeks. Also, recreational impacts could occur. Finally, the concern for potential dermal contact with contaminated surface and ground water would not be alleviated.

Attached, for your information, is additional comments on the reports. Please direct any questions concerning these comments to Lloyd Woosley of my staff at x7501.

E. Stallings Howell

E. Stallings Howell

Attachments

cc: Al Smith, WMD (with attachments)

Comments of the Office of Ground-Water Protection
on the Revised Draft Remedial Investigation and Feasibility
Study Reports, Dated March 1986, for the Distler Farm Site
Jefferson County, Kentucky
May 14, 1986

Feasibility Study Report (FSR)

1. Section 1.4, Objectives of Remedial Action, page 1-37 -

As stated, the State of Kentucky is considering the development of a ground-water classification system as part of its ground-water protection strategy. The final strategy is scheduled to be released later this year. However, the FSR must address the appropriate ground-water classification under the EPA Ground-Water Protection Strategy (40 CFR Part 300.68(e)(2)(v)). While our guidelines for implementing the classification system are now being considered by the Assistant Administrator, it may be several months before they are finalized. In the interim, we are attempting to incorporate the differential protection policy reflected in the classification system into regional actions. The following interim conclusions can be made based upon the information provided:

A. Ground water at the site does not appear to feed an ecologically vital area.

B. Ground-water supplies near the site are replaceable by either drilling deeper (assuming no interconnection with the contaminated or potentially contaminated alluvium aquifer) or extending the Louisville Water Company distribution line, which is now serving the community of Kosmosdale, located approximately three miles northeast of the site. The Louisville system obtains its raw water from the Ohio River.

C. The alluvium aquifer at the site is somewhat vulnerable to contamination.

Given this information, the alluvium aquifer could be classified as being either Class I or Class II. We concur that for the purposes of the FSR, a worse case "Class I" assumption is appropriate. This assumption is based solely upon the ground water being vulnerable to contamination.

2. Section 2.1, Surface Sealing/Capping, page 2-6 -

The "Environmental and Public Health Criteria" discussion should acknowledge that surface sealing/capping has another major limitation with respect to sites located in the flood plain. During a flood event or when the water table is seasonally high, the contaminated material would come in contact with ground water. While this occurrence may happen infrequently, the result could be the creation of a new volume of contaminated ground water. The level and significance of this contamination would be unknown due to the short exposure time and the characteristics and persistence of the contaminants at the time of contact.

This limitation as noted should be incorporated into the alternatives discussion in the FSR.

3. Section 4.4, Alternative 3, page 4-28 -

A. The Kentucky Ground-Water Section has recently implemented a water well regulatory program (KRS 223.400-223.460, 223.991). This program regulates all wells constructed for the removal of water for any purpose except agricultural. Extraction wells would be subject to the construction practices and standards found in 401 KAR 6:310. It is currently unclear whether monitoring wells are also subject to these regulations.

B. We question the ability of the Metro Sewer District (MSD), to accept the recovered contaminated ground-water (2,600 gpd, 240 dpy, 4 yr.) without the results of waste treatability studies. Depending upon the potential toxicity of the ground water, the MSD may require pre-treatment or controlled, slow release to their system. Either case could significantly alter current capital and O & M cost estimates. Further contact with the MSD is suggested to obtain more specific guidance on the systems' ability to adequately handle the quality and quantity of contaminated ground water.

Note that the duration of pumping extends beyond four years for alternatives number four (eight years), and five and six (13 years). This should also be discussed with the MSD.

Remedial Investigation Report (RIR)

1. Section 3.3.1, Regional Ground Water, page 3-75 -

The RIR acknowledges that the limestone underlying the site may have large solution channels yielding about 50 gallons per minute to wells penetrating these channels. However, based upon limited information, it appears that such solution activity does represent a threat to the integrity of the shale bedrock specifically at the site.

2. Section 3.3.4, Extent of Ground-Water Contamination, page 3-102 -

The limited ground-water quality data reveals some tentatively identified compound contamination of three residential wells. While a source-to-receptor relationship between the site and the wells cannot be inferred, the source of contamination could be septic systems or past chemical spills.

3. Section 3.3.5, Summary and Recommendations, page 3-147 -

We generally concur with the recommendations provided for further study of the site, however, revisions may be needed to more appropriately reflect the selected remedial action. Also, it is assumed that the samples collected during site borings will be analyzed for a select list of constituents.

4. Appendix F -

The title should read "Distler Farm Site".

DATE:

JECT "ACLs" for Remedial Activity at Distler Farm Site;
Jefferson County, KY

Toxicologist
Drinking Water Section

TO Stallings Howell, Chief
Office of Groundwater Protection

The RI/FS study at the Distler Farm Site identified groundwater contamination as the most significant route for human exposure to chemical contaminants from the site. Although groundwater contamination is presently confined to the site, potential off-site migration could lead to contamination of private and public drinking water wells. The chemical contaminants of concern were listed in Table 1-3 of the FS (page 1-38).

The above premises were accepted, without evaluation, and served as the basis for the following ACL recommendations. It will be assumed that ingestion of drinking water containing the chemicals is the sole route of exposure. Other routes of exposure, such as inhalation of VOCs during showering or dermal absorption during bathing, will not be considered since there are insufficient scientific data to quantitate these potential exposures.

The following ACL recommendations refer to chemical concentrations at the point of human exposure. If the point of compliance monitoring is at the dumpsite, it may be possible to ammend the ACLs by factoring in dilution of the chemicals as they migrate from the site, adsorbtion onto soil particles, biological and chemical degradation, etc.

The following recommended ACLs do not consider any potential effects on aquatic or terrestrial life forms exposed to contaminated groundwater.

Chemical	Recommended "ACL"(1)	Basis
Benzene	5	p MCL
1,1,1-Trichloroethane	200	p MCL
1,1-Dichloroethene	7	p MCL
trans-1,2-Dichloroethene	70	p RMCL
Toluene	2,000	p RMCL
Trichloroethene	5	p MCL
Tetrachloroethene	(see footnote 2)	
Vinyl chloride	1	p MCL
Naphthalene	no health-based goal available	
Dibutylphthalate	34,000(3)	AWQC
bis(2-ethylhexyl) phthalate	15,000(3)	AWQC
Isophorone	5,200	AWQC
Chromium	50(4)	MCL
Lead	50(5)	MCL

p MCL - proposed Maximum Contaminant Level
p RMCL - proposed Recommended Maximum Contaminant Level
AWQC - Ambient Water Quality Criteria

(1) water concentration in ug/l

(2) The draft proposed MCL for tetrachloroethene was 10 ug/l. A subsequent study by the National Toxicology Program provided additional animal carcinogenicity data on the compound. The public is being given time to comment on this study prior to the announcement of a proposed MCL.

(3) The AWQC recommended standard is based on non-carcinogenic toxic effects. Since the AWQC number was released (1980), a study by the National Toxicology Program identified bis(2-ethylhexyl) phthalate as an animal carcinogen. This finding may result in downward revision of the recommended standards for phthalates, but no revised figures are yet available.

(4) A revised, proposed RMCL of 120 ug/l has been announced.

(5) A revised, proposed RMCL of 20 ug/l has been announced.

Ken

Kenneth G. Orloff

TO: WILLIAM ANDERSON
PEC - HOUSTON

DATE: JULY 14, 1986

FROM: R. VAN TASSEL

RVT 7/14/86

COPIES: D. SENOVICH
A. McCLURE
W. D. TRIMBATH
A. BOMBERGER
A. FINKE

SUBJECT: INCINERATION ALTERNATIVES
DISTLER FARM AND BRICKYARD SITES

Enclosed are draft text, phone memos, and cost estimates for the incineration options for the two sites. These items are being sent to you as early as possible so you can respond to EPA-Region IV requirements.

The costs are estimated as follows:

Site	Costs *
Distler Brickyard	$ 10,700,000
Distler Farm	$ 36,200,000
Distler Farm and Distler Brickyard	$ 46,500,000

* Cost estimated for onsite construction/remediation.

The draft text should be reviewed and completed by your staff and then put in the format required for this response.

Also enclosed are copies of vendor's brochures for in situ volitilization processes. These processes incorporate accepted principles for removing hydrocarbon compounds from soils. However, widespread experience for these in situ processes are not available, and the equipment/procedures are considered to be in developmental stages.

RLV:vlp

Enclosures

DISTLER BRICKYARD SITE

SOILS INCINERATION ALTERNATIVE

Incineration and Onsite Disposal

Technical Discussion

An alternative consisting of onsite decontamination of the organic constituents in the near surface soils by an incineration process is discussed in this section. The excavation of 8,000 cubic yards of contaminated soils, to a depth of 7 feet, could be processed through a mobile incinerator, backfilled into the excavated cavity, covered with 2 feet of soil and revegetated.

Mobile incineration equipment could be mobilized to the site. Commercially produced units are available and consist of tractor-trailer mounted components identified as follows:

- Rotary kiln incinerator
- Incinerator feeding system
- After burner trailer
- Heat recovery trailer
- Quench and scrubber trailer
- Control room and laboratory

A supply of fuel, industrial electric power, and boiler grade water supply are required to support the incineration process. The fuel supply is required to augment the BTU value of the contaminated soil materials because of the low content of hydrocarbons in the soils, about
0.01 percent by weight. The incinerated soils, with heavy metals concentrations at about background levels, could be placed on site in the excavated cavities. Residue from the scrubber system may require disposal in a permitted offsite disposal or treatment facility. Waters used in the scrubbing and/or cooling processes might require treatment in accordance with the applicable discharge requirements.

The implementation of this alternative will require local, state and federal approvals for the construction and operation of the incinerator, onsite earthmoving activities, disposal of the incinerated soils, dispostion of the scrubber wastes, treatment and discharge of process and cooling waters, monitoring and maintenance of air quality, and transportation of waste materials off site. The agencies primarily involved in regulating these operations are discussed under "Institutional Issues".

Technical Considerations

The destruction of the organic constituents in waste materials by incineration is an accepted technology. In general, organic and hydrocarbon compounds can be safety destroyed in an incinerator that is appropriate for the waste stream and it is operated properly.

The rate of processing soils in a mobile incinerator may be on the order of 4-tons per hour and the equipment can be operated on a 24 hour basis. Wastes can be processed through the equipment about 75 percent of the time. The 8,000 cubic yards of soils to be incinerated are estimated to weigh about 10,800 tons. This volume of soil could be incinerated in about 150 days or 6 months. A waiting time of about 12 months for an incinerator and the time required to obtain all necessary approvals must also be considered for this alternative.

1.35 T/cy

DISTLER BRICKYARD SITE

SOILS INCINERATION ALTERNATIVE

Institutional Approvals

Some drummed waste materials on this site were removed in 1984 and the Waste Management Division of KY-DNREP considers this site a RCRA facility. Accordingly, operations and/or alterations at this facility should fulfill State RCRA requirements and approvals obtained from the Waste Management Division.

In addition, the Division of Water, of the KY-DNREP, may require compliance with KY-NPDES regulations for any process/cooling water discharges as well as approvals for grading and alterations to the surface runoff characteristics of the site. Any transportation of wastes from or to an offsite location should consider State Transportation Department requirements.

Approvals by the Air Pollution Control Division of the KY-DNREP will be required for the construction and operation of an incinerator within the state. In addition, approvals by the Air Pollution Control Division should be obtained for onsite construction and grading operations with respect to fugitive, particulate emissions requirements.

Construction, grading and operations within the flood plain will require approvals by the U.S. Army Corps of Engineers and compliance with the Clean Water Act. Other Federal regulations which should be considered in the design, construction and implementation of the remedial action include CERCLA, RCRA, Safe Drinking Water Act, and Clean Air Act of EPA and OSHA of the Department of Labor and Industry. Any offsite transportation of hazardous waste should comply with Federal DOT requirements.

At the local governmental level, county and local ordinances regulating construction, grading, and onsite operations should be fulfilled and appropriate approvals obtained.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

JUN 12 1986

Date:

Subject: Review of Aquatic Impacts on Streams Near the Distler Farm Site and the Distler Brickyard Site

From: Chief, Ground-Water Technology Unit

To: Nancy Redgate, Chief
KY, NC, TN Unit
Remedial Action Section

The attached reviews were conducted at the request of the Office of Ground-Water Protection (now the Ground-Water Technology and Management Section). These reviews assumed that contaminated ground water would discharge to the streams downgradient from the site. On close review of the available ground-water data, neither Stump Gap Creek downgradient of the Farm Site nor Bee Branch downgradient of the Brickyard Site is expected to receive discharge from the contaminated aquifer. Therefore, no impact on these surface waters is expected to occur as a result of ground-water discharge. However, ground-water data is limited and if high water-table conditions occur such that discharge to the streams occur, the expected affect is discussed in the attached memos.

The proposed selected alternatives which extract and treat the contaminated ground-water will eliminate the threat of impacts on the downgradient streams.

Gail Mitchell

Gail Mitchell

Region IV - Atlanta, Georgia 30365

DATE: June 9, 1986

SUBJECT: Distler Brickyard Site, Harden County, Kentucky

FROM: Chief
Wetlands Section

TO: Gail Mitchell, Unit Chief
Groundwater Technology Support Unit

Summary

The potential for adverse impacts to biological resources in surface waters from contaminants on the Distler Farm Site is low. This is due to limited biotic communities in Stump Gap Creek and Pond Creek and to the large dilution effect of the Ohio River. Stump Gap Creek is a small intermittent stream, and Pond Creek is severely degraded by industrial pollution. The Ohio River does contain significant biological resources.

At least four groundwater contaminants (toluene, arsenic, lead and chromium) are present at concentrations reported to be acutely toxic to aquatic life. In addition, phthalate esters are present at levels eight times greater than EPA's criterion for freshwater aquatic life.

Limited information indicated that the biological community of Bee Branch is not presently degraded. If contaminated groundwater were to contribute substantially to the stream's flow, significant degradation to stream biota would occur.

Contaminated groundwater reaching the Ohio River through the coarse-grained aquifer could detrimentally affect the macroinvertebrate community living on or in the sediments at the aquifer-river interface, but dilution should limit these effects to the discharge area. All contaminants reaching surface waters will be added to the "pool" of existing water column and sediment toxins and, ultimately, to the aquatic food chain of the Ohio River which contains a recreational fishery.

William L. Kruczynski

Surface Water Biological Resources

Bee Branch and two of its tributaries (unnamed) receive surface water runoff from the Brickyard Site. Bee Branch discharges to the Salt River a short distance upstream from its confluence with the Ohio River. A course grained aquifer (sand and gravel) underlying the site intersects the Ohio River bed and Bee Branch to the northwest and may be the primary avenue of contaminant migration.

Almost no information on the biological resources of the surface waters adjacent to the Brickyard Site is available. Information from the U.S. Fish and Wildlife Service, based on casual observations, indicates that Bee Branch does not appear to be degraded and contains a warm-water fishery. Aquatic biota in the intermittent tributaries to Bee Branch, primarily attached algae and benethic macroinvertebrates (insect larvae, crustaceans and worms), would be restricted to the wet season or to remnant pools during drier periods of the year. During backwater flooding from Bee Branch, the lower reaches of the tributaries would be utilized by fish as foraging or breeding areas.

The Ohio River contains both game and non game fisheries. Portions of the Brickyard Site lie below the 50-year floodplain. Floodwaters from the Ohio River will allow fish to forage and breed in the soils and vegetation on the site.

Contaminant Toxicity

Approximately 64 organic and inorganic contaminants have been found on the Brickyard Site, including 33 in the groundwater. At least four contaminants are present in the groundwater at concentrations reported as being acutely toxic to aquatic life. These include toluene (LC50-13 to 44 mg/l); arsenic (LC50-1.1 to 60 mg/l); chromuim (LC50-2 to 113 mg/l) and lead (LC50-0.33 to 75 mg/l). The groundwater also contains phthalate esters at levels eight times greater than EPA's Criterion for freshwater aquatic life (3 ug/l). Additive effects of groundwater contaminants present in sublethal levels individually can contribute to acute toxicity to aquatic life. Bioassays conducted on selected samples of the groundwater would be needed to better assess acute toxicity, especially additive toxic effects. Chronic exposure to low levels of toxic chemicals in the water column or in sediments can affect behavior, reproduction, and physiological processes of organisms and ultimately be lethal, especially during sensitive life cycle stages.

Potential Biological Effects

The primary route for movement of contaminants from the Distler Brickyard Site to surface waters is via groundwater to Bee Branch or to the Ohio River.

Minor routes involve the transportation of contaminated sediments by surface runoff to Bee Branch or its tributaries or by floodwaters from the Ohio River.

The projected rate of groundwater discharge to Bee Branch from the course-grained aquifer ranges from 190 to 24,700 ft^3/day. No flow data are available for Bee Branch. If, during dry periods, groundwater discharge constituted a significant portion of the stream's flow (i.e. greater than 10%) at least moderate impacts to stream biota are anticipated. These probably would be limited to sublethal chronic effects and/or avoidance reactions, though sensitive species in the community may be more severely affected. In addition, sediments and detrital matter would be contaminated and continue to affect the aquatic community during subsequent hydroperiods when surface water constitutes most of the stream's flow.

During Ohio River flood events, game and non-game fish will follow the floodwater onto the Distler Brickyard Site to forage and spawn in the vegetation and soil. Some potential exists for contaminants to be ingested by fish as they feed on invertebrates (insects, worms, etc.) or plant matter on the contaminated soil. Eggs or larval fish on the site would be more susceptible to toxicants than adult fish.

Contaminated groundwater reaching the Ohio River through the course-grained aquifer could detrimentally affect the macroinvertebrate community living on or in the sediments at the aquifer-river interface, but dilution should limit these effects to the discharge area.

All migration routes to surface waters will eventually carry contaminants, some persistant, into the Ohio River to be added to the existing "pool" of toxicants in the river. Accumulation and biomagnification of materials such as lead, naphthalene and pthalate esters may occur in a water body containing a recreational fishery.

Because of the large dilution effects of the Ohio River the potential for significant deleterious impacts to aquatic resources in the river is low. However, at least a moderate potential exists for significant adverse impacts to the biotic community of Bee Branch from groundwater contaminants.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region IV - Atlanta, Georgia 30365

DATE: June 9, 1986

SUBJECT: Distler Farm Site, Jefferson County, Kentucky

FROM: Chief
Wetlands Section

TO: Gail Mitchell, Unit Chief
Groundwater Technology Support Unit

Summary

The potential for adverse impacts to biological resources in surface waters from contaminants on the Distler Farm site is low. This is due to limited biotic communities in Stump Gap Creek and Pond Creek and to the large dilution effect of the Ohio River. Stump Gap Creek is a small intermittent stream, and Pond Creek is severely degraded by industrial pollution.

All but one of the groundwater contaminants found on the site are below levels reported to be acutely toxic to aquatic life, although at least four contaminants are present in concentrations which exceed EPA's Quality Criteria for aquatic biota. If contaminated groundwater from the fine-grained aquifer discharges to Stump Gap Creek, the small existing aquatic community in the stream could be severely degraded or destroyed, especially if groundwater comprises most or all of its flow. The aquatic community in the lower reach of Pond Creek, which is already limited to pollution tolerant species, would be exposed to additional toxins; however, since the projected groundwater discharge rate is low (2500 ft^3/day), impacts to the aquatic community will probably not be measurable.

Contaminated groundwater reaching the Ohio River through the coarse-grained aquifer could detrimentally affect the macroinvertebrate community living on or in the sediments at the aquifer-river interface; however, it is probable that dilution should limit these effects to the immediate discharge area. With either transport route, contaminants, some of which are persistent, will be added to the existing "pool" of toxins in the water column and sediments. Ultimately, these toxins will be incorporated in the aquatic food chain of the Ohio River which includes a sport fishery.

Wm. L. Kruczynski
William L. Kruczynski

Surface Water Biological Resources

Stump Gap Creek is an intermittent stream and tributary to Pond Creek. It receives all surface water from the site and is a discharge area for the fine-grained aquifer that presently contains contaminated groundwater. No biological information is available for this stream. Because it is intermittent, aquatic biota, primarily attached algae and benthic macroinvertebrates (insect larvae, worms and crustaceans), would be restricted to the wet season or to remnant pools during the drier periods of the year. During backwater flooding from Pond Creek, the lower reaches of Stump Gap Creek would be utilized by fish from Pond Creek as a foraging and/or breeding area.

Available information from the Kentucky Department for Environmental Protection indicates that Pond Creek is a perennial stream and tributary to the Salt River and supports a poor assemblage of aquatic organisms. The Creek drains a heavily industrialized section of Jefferson County. Three landfill sites and over 160 point source discharges are located in the watershed. Much of Pond Creek has been channelized or cleared, leaving little habitat for fish or macroinvertebrates. Toxic concentrations of heavy metals may already be present in the sediments. The water column contains higher than normal levels of chromium, lead, cadmium, zinc and mercury. A limited fishery exists and consists primarily of sunfish, roughfish and minnows. The macroinvertebrate community is composed primarily of pollution tolerant species. The crayfish, Orconectes jeffersoni, an endangered species, has been reported to be located along Pond Creek.

No information is available on the biotic community of the lower Salt River, although discharges of polluted water from Pond Creek have probably degraded aquatic resources to some degree.

The Ohio River contains both game and non-game fisheries. The Distler Farm site is within the 50-year flood plain of the Ohio River. During flood events, game and rough fish from the River will move onto the site to forage and breed in the vegetation and soil.

Contaminant Toxicity

No toxicity bioassays have been conducted on samples of the groundwater. At least one contaminant, iron, is present in the groundwater in concentrations reported in the literature as being acutely toxic to aquatic life. Iron has been reported to be acutely toxic to freshwater fish at concentrations of 0.9 to 2 mg/l (LC50) and to invertebrates at 0.32 mg/l. Cadmium, chromium, iron and phthalate esters are present at levels which exceed EPA's Quality Criteria for aquatic life (cadmium - 1.2 ug/l; chromium - 100 ug/l; iron - 1 mg/l; phthalate esters - 3 ug/l)

- Additive effects of these and other groundwater contaminants present in sublethal levels individually can contribute to acute toxicity to aquatic life. Bioassays conducted on selected samples of the groundwater would be needed to better assess acute toxicity, especially additive toxic effects. Chronic exposure to low levels of toxic chemicals in the water column or in sediments can affect behavior, reproduction, and physiological processes of organisms and ultimately be lethal, especially during sensitive life cycle stages.

Potential Biological Effects

The primary route for movement of contaminants from the Distler Farm site to surface waters is via groundwater to Stump Gap Creek and eventually Pond Creek, or to the Ohio River. Minor routes involve the transportation of contaminated sediments by surface runoff to Stump Gap Creek or by floodwaters from the Ohio River.

The projected rate of groundwater discharge from the fine-grained aquifer to Stump Gap Creek is 345 to 3520 ft^3/day. During dry periods, groundwater may constitute most or all of the flow of the small creek. Biota remaining in the creek could be subject to a mixture of toxicants which would degrade water quality and could destroy all aquatic life in the creek. Even at sublethal levels, organisms may exhibit an avoidance reaction and migrate out of the stream to avoid toxicants. In addition, sediments and detrital matter would be contaminated and would affect aquatic life during subsequent hydroperiods when surface water constitutes most of the creek's flow. Pond Creek's biological community, already degraded by pollution from upstream sources, would be subject to additional contaminants being discharged from Stump Gap Creek. However, because of the small discharge rate and the fact that the community is already comprised primarily of pollution tolerant organisms, little measurable effect would be expected to occur.

During Ohio River flood events, game and non-game fish will follow the floodwater onto the Distler Farm site to forage and spawn in the vegetation and soil. Some potential exists for contaminants to be ingested by the fish as they feed on invertebrates (insects, worms, etc.) or plant matter on the contaminated soils. Eggs or larval fish on the site would be more susceptible to toxicants than adult fish.

Contaminated groundwater reaching the Ohio River through the course-grained aquifer could detrimentally affect the macroinvertebrate community living on or in the sediments at the aquifer-river interface, but dilution should limit these effects to the discharge area.

All water routes will eventually carry contaminants, some persistent, into the Ohio River which would be added to the existing "pool" of toxicants in the River. Accumulation and biomagnification of materials such as lead, naphthalene and phthalate esters may occur in this water body. Since the River supports a recreational fishery, the potential exists to contaminate people.

In summary, because of the limited biological resources of Stump Gap Creek and Pond Creek and the large dilution effect of the Ohio River, the overall potential impact to surface water biota by this individual source of contaminants is expected to be low. However, this potential source may add to the cumulative effects of pollutants which are measurable and deleterious to aquatic life in the surface waters under consideration.