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EPA Superfund
Record of Decision:

NATIONAL ELECTRIC COIL CO./COOPER INDUSTRIES
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NATIONAL ELECTRIC COIL CO.,/ COOPER INDUSTRIES SUPERFUND SITE

RECORD OF DECISION

April 1996

<IMG SRC 0496266A>

United States Environmental Protection Agency
Region IV

TABLE OF CONTENTS

Section Page

TABLE OF CONTENTS

Section Page

LIST OF FIGURES

LIST OF TABLES AND APPENDICES

APPENDICES

<IMG SRC 0496266B>

RECORD OF DECISION

THE DECLARATION

SITE NAME AND LOCATION

National Electric Coil Co.,/Cooper Industries Site
Dayhoit, Harlan County, Kentucky

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the National Electric Coil Co./Cooper Industries Site, in Dayhoit, Harlan County, Kentucky, which was chosen in accordance with CERCLA, as amended, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site.

The Commonwealth of Kentucky concurs with the selected remedy.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

This remedial action employs the use of an extraction well/air stripper system in order to prevent further ground-water plume migration through the bedrock aquifer and the alluvial aquifer beneath the Site, and to continue ground-water restoration activities specified in the September 30, 1992 "Interim" Record of Decision. The aquifers beneath the Site contain volatile organic compound (VOC) contamination.

The major components of the selected remedy are as follows:

Extraction of contaminated ground water from the site's alluvial and bedrock aquifers;
Treatment of contaminated ground water using an air stripper tower;
Discharge of treated ground water to the Cumberland River under KPDES requirements; and
Catalytic oxidation of air stripper off-gases.

STATUTORY DETERMINATION

The selected remedy is the final response action to the"interim" remedial measures initiated in September 30, 1992, while the Remedial Investigation/Feasibility Study was being conducted. It is protective of human health and the environment, complies with Federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principle element.

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Record of Decision

National Electric Coil Co., Site

DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

1.1 Site Location

The National Electric Coil Co./Cooper Industries Superfund Site(NEC or Site) is located on Old U.S. Route 119 adjacent to the Cumberland River in the town of Dayhoit, Harlan County, Kentucky (Figure 1.1). The Site includes the 3.5 acre National Electric Services manufacturing facility(Figure 1.2), which is currently operating, and also encompasses the areal extent of contamination. The Site consists of a main plant building, two smaller buildings, and an asphalt paved parking lot with grass cover along the riverbank area.

1.2 Affected Population

The Dayhoit community, which is inhabited by approximately 350 people, is located immediately downriver of the Site. Approximately,40 families reside at the Holiday Mobile Home Park, which is located adjacent to and due south of the Site's southern boundary.

1.3 Topography

The NEC site is located in the flood plain of the Cumberland River in Harlan County, Kentucky. The Site is relatively flat except along the riverbank area, which slopes steeply down to the Cumberland River. The topography of the area near the Site consists of northeast-trending ridges of Pine Mountain and Cumberland Mountain and the bottom land associated with the Cumberland River and its tributaries.

1.4 Adjacent Land Uses

The facility property is bordered on the south by the Holiday Mobile Home Park, a residential community; on the north by a Kentucky Utility Company electrical substation; on the east by the Cumberland River; and on west by Old Highway 119. The property is fenced on all sides.

1.5 Natural Resources

Ground water in the bedrock aquifer is used for drinking water and industrial uses in Harlan communities, located in the Cumberland River valley, downgradient of the Site. Before discovery of the VOC ground-water contamination in February 1989 more than 140 wells in the Dayhoit area were utilized for domestic purposes.

Coal is mined extensively in the Harlan County area. The coal mining industry is the primary employer for the county.

1.6 Climatology

Temperature in this area averages at 56°F. Average annual rainfall is 50 inches, with net precipitation at 16 inches. The prevailing average wind direction was determined to be from the southwest to northeast.

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2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Operational History

From 1951 to 1987 the National Electric Coil Company, (NECC), operated under the ownership of McGraw Edison Company. The business involved rewinding electric motors, manufacturing coils, and rebuilding machinery used in the coal mining industry. Cooper Industries purchased McGraw Edison in 1985 and continued operations until August 1987 when the facility was sold to Treen Land Company.

Past practices at the facility involved the use of a trichloroethylene (TCE)-based solvent to remove oil and tar from the used motors, capacitors, transformers, and other equipment prior to their being rebuilt and/or refurbished. Before servicing, the equipment was, reportedly, lowered for cleaning into an approximately 1,000-gallon tank containing the TCE-based solvent. The tank was located within a below-grade concrete pit. Periodically this tank was drained for cleaning, and the contaminated liquid and waste matter was allowed to flow overland and/or through a drainage pipe to the Cumberland River. PCB laden oil was also allowed to drain from transformers and other electrical equipment on Site and/or flow through the drainage piping that led to the river. Sludges from the solvent tank, as well as debris (coal ash) containing high concentrations of heavy metals from a furnace operated on site, were disposed of along the river. These disposal practices continued until the mid-1970's and resulted in ground-water contamination. The local drinking water supply near the Site was found to be contaminated with TCE and related degradation compounds. Contamination of the Site's drainage channels, river embankment property, and facility grounds also occurred.

Currently the Site is being utilized by National Electric Service Company (NES) as an active facility for rewinding and rebuilding electric motors and hydraulic systems used for the mining of coal. Equipment brought to the facility for refurbishment is now cleaned with a soap-based cleaner instead of the solvent-based degreaser used by the NECC. The manufacturing facility, currently operating on the Site, employs less than 20 workers.

In February 1989, the Kentucky Department for Environmental Protection, Division of Water, sampled the community well at the adjacent Holiday Mobile Home park as well as other surrounding residential wells. Analyses of the approximately fifty (50) samples indicated the presence of VOCs at concentrations above Federal Maximum Contaminant Levels (MCLs), in twelve of the wells.

Beginning in March 1989, bottled water and water from temporary above-ground storage tanks were provided to residences impacted by the contaminated ground water. Residential ground-water users in areas either already contaminated or at risk of future contamination were connected to the Black Mountain Water District municipal water system in August 1989. Funding for construction of a water line extension was provided by Cooper Industries. There are reports that some residents do not utilize the public water system. Reasons residents gave for not using the public water system includes both perceived poor water quality and cost of services.

2.2 Enforcement Summary

In October 1990, EPA issued a Unilateral Administrative Order (Order) to Potentially Responsible Parties (PRPs), McGraw-Edison Company/Cooper Industries, Inc., Treen Land Company, and National Electric Service Company, to conduct an early action removal of contaminated soils located on site. Cooper Industries requested an Order to facilitate removal of contaminated soils at the Site and undertook the Site Removal Action activities with the approval of the current site property owner, National Electric Service Company. Approximately 5,100 tons of soil were excavated for off-site disposal during the Removal Action activities. The Removal Action was conducted under EPA supervision from October 1990 through October 1991. On March 19, 1992, EPA notified McGraw-Edison Co./Cooper Industries, Inc., of its determination that all activities outlined in the Order had been completed.

The National Electric Coil Co./Cooper Industries Site was proposed for inclusion on the National Priority List (NPL), as defined in Section 105 of CERCLA, as amended, 42U.S.C. § 9605, on July 29, 1991. It was finalized as an NPL site on October 14, 1992.

The Site RI/FS and associated Site studies were conducted under the Administrative Order by Consent that McGraw Edison/Cooper Industries, Inc., signed with the Agency in May 1992. The RI/FS and related Site studies were performed by Cooper Industries under the oversight of EPA. The RI/FS was finalized in January 1995.

In December 1992, EPA directed Cooper Industries to begin preliminary ground-water clean-up activities in accordance with the September 1992 "Interim" Record of Decision (ROD). The purpose of this cleanup work was to minimize the bedrock VOC plume migration until a final Site remedy was selected.

Start up of the preliminary ground-water clean-up activities began in July 1993 by utilizing an existing extraction well to recover contaminated ground water from the bedrock aquifer beneath NEC. The "interim" ROD required that the bedrock aquifer be pumped to recover VOC-contaminated ground water and that the extracted ground water be treated by means of an air-stripper tower. The treated ground water was then discharged into the Cumberland River. The ROD also specified that the VOC-laden air stream exiting the tower be passed through a granular activated carbon unit prior to being released to the atmosphere via an exhaust stack.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The NEC Proposed Plan (see Appendix A) for final remedial action was presented at the public meeting held on July 11, 1995 at the Harlan County Courthouse. The proposed plan described the final remedy and the process that EPA used to select that remedy. It was mailed to interested parties and other persons who have requested to be included on EPA's mailing list for the Site. The Proposed Plan was also made available to the public in the information repository maintained at the EPA Docket Room in Region IV, and at the Harlan County Public Library. Notice of availability of this document and notice of the public meeting was published in the Harlan Daily Enterprise on May 31, 1995.

At the Public Meeting, representatives from EPA presented the Preferred Remedy and the Remedial Investigation/Feasibility Study (RI/FS) findings on which EPA's decisions were based. A 60-day public comment period on the FS Report and EPA's preferred remedy was held from May 29, 1992 through July 27 1995. At the conclusion of the public comment period, EPA reviewed and considered all comments received from the community as part of the process of reaching a final decision on the most appropriate remedial alternative to address contamination found at the Site. A response to comments received during this period and to questions not answered at the public meeting is included in the Responsiveness Summary, which is part of this Record of Decision (see Appendix B). EPA's remedy selected in this ROD differs slightly from the remedy selected in the Proposed Plan. These minor changes are discussed more fully in Section 9.4 in this ROD.

4.0 SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY

EPA's remediation of the Site was initiated under response actions outlined in the September

30,1992, "Interim" ROD. The "Interim" Remedial Action (IRA) was limited to the extraction of VOC-contaminated ground water from the bedrock aquifer beneath the Site by a single extraction well. The bedrock aquifer that was addressed in the IRA is used as a drinking water source, and thus was of immediate concern, while the shallower aquifer beneath the Site is not used for drinking water and will be addressed in this final remedy. The purpose of the IRA was to pump the bedrock aquifer in order to restrict further contaminant-plume migration from the Site while Site characterization and final remedy selection were conducted.

This ROD is the final response action for the Site. It addresses the long-term remediation of Site ground-water contamination by expanding the IRA activities to address contaminated ground water located in the shallow aquifer and the upper zone of the bedrock aquifer in addition to the deeper zone of the bedrock aquifer. This response action is meant to mitigate current or future exposure to contaminated ground water by employing hydraulic-control methods to prevent migration of ground water from the Site. Ingestion of water extracted from these aquifers poses potential risk to human health because contaminant levels have been determined to exceed corresponding MCLs.

5.0 SUMMARY OF SITE CHARACTERIZATION

5.1 Geology

The Harlan County, Kentucky area is located in the Cumberland Mountain section of the Eastern Coalfields Region of Kentucky. It is underlain by rocks of the Mississippian and Pennsylvanian age that consist of sandstones, siltstones, shales, and minor coal and limestone.

The Site is located on the Cumberland Mountain overthrust block, south-southeast of the Pine Mountain overthrust fault and north-northwest of the Cumberland Mountain within an east-west trending synclinal trough. To the north, the bedrock dips three to five degrees to the southeast. To the south, the bedrock dips one degree or less to the north-northwest. There are northwest-southeast trending faults in the area that are associated with the Pine Mountain Overthrust Fault.

The soils underlying the Site contain fill material underlain by alluvial material and weathered rock. The fill material consists of light gray, yellow brown and brown silty sand to silty gravel. The alluvial material and weathered rock consist of red brown fine to medium sandy, clayey silt and red-brown and brown clayey silty fine to medium sand. Soil thicknesses in the Site borings ranged from 10 to 30 feet.

The upper bedrock unit in the area is the Cawood Sandstone Member of the Hance Formation. This sandstone unit grades laterally into siltstone and thin-bedded sandstone, and contains thin discontinuous coal seams. The base of the Cawood Sandstone occurs at 100 to 130 feet below the ground surface, and is underlain by a portion of the Hance Coal Zone that consists of four seams interbedded with sandstone, silt sandstone and shale. The principal coal seam is the Terry's Fork coal bed that occurs at the base of the Hance coal zone.

Soil borings from the Site encountered up to 8 feet of gravelly fill material underlain by gravelly silt, silty, sand, or clayey silt to a depth of about 20 to 50 feet. Bedrock consisted of interbedded sandstone, siltstone, shale and coal. The rocks are essentially flat lying beneath the Site, and distinct units occur which can be correlated between borings. From the top of rock to a depth of about 80 to 120 feet, the rocks are primarily dark gray shale interbedded with light gray fine sandstone. The shales contain carbonaceous layers and a few coal stringers. The underlying unit is more likely the shale unit between the Cawood Sandstone Member and the Hance Coal Formation. A distinct 2 to 2.5-foot-thick coal unit occurs at a depth of 80 to 120 feet. This unit is identified as the Hance Coal Formation. From a depth of about 80 to 120 feet to a depth of about 200 to 240 feet, the rocks are primarily light to dark gray carbonaccous shale with siltstone and minor sandstone. This shale unit is underlain by a 40 to 50-foot thick sequence of dark gray shale, carbonaceous shale, brown siltstone, light gray sandstone, and several units of black bituminous coal. Coal beds are generally 0.5 to 2 feet thick, but shale coal units may be up to 4 feet thick. This coal zone is underlain by interbedded dark gray shale and light gray fine to medium-grained sandstone to the termination depth of the borings. A generalized stratigraphic column of the upper 400 feet encountered in the Harlan vicinity is presented in Figures 5.1a, 5.1b, & 5.1c.

5. 2 Hydrogeology

NEC is underlain by two water-bearing units that are important to this response action: the alluvial aquifer that spans laterally across the Cumberland River valley and the aquifer that flows through the fractured bedrock formation beneath the Site. The primary surface water body is the Cumberland River.

5.2.1 Shallow Ground Water (Alluvium)

The uppermost alluvial deposits are 25 to 40-feet thick in the vicinity of the Site and consist of well to poorly sorted accumulations of sand, silt, and clay. The alluvium generally contains ground water under unconfined (water table) conditions, at depths averaging twenty feet below existing land surface. Recharge occurs by rainfall infiltration. Shallow ground-water flow is generally directed eastward toward the Cumberland River with respect to the facility.

Samples collected on-site from the alluvial aquifer indicate that the shallow aquifer is contaminated with metals and VOCs that are primarily TCE related. The maximum VOC concentrations of the significant contaminants, 1,2-Dichloroethene (DCE) (total) and TCE were 87:g/ and 2,700 :g/ , respectively. No PCBs was detected. Lead levels detected in shallow wells ranged from 29.1 :g/ to 259 :.g/ .

5.2.2 Bedrock Ground Water

The alluvium is underlain at a depth of approximately thirty feet by Pennsylvanian-age sedimentary bedrock. The consolidated units of interest include (in descending order):

> Cawood Sandstone - Sandstone grading laterally into siltstone and thin bedded sandstone with isolated coal seams.
>
> Hance Coal Formation - shale and siltstone underlain by coal seams interbedded with sandstone and shale.

Bedrock aquifer ground water located beneath and downgradient of the Site flows through the upper unit of the Hance Formation. Ground water in the bedrock generally occurs under confined conditions within the bedrock's secondary fractures and faults. The unit is recharged from places where it crops out, permitting rainfall infiltration from overlying hydrogeologic units in hydraulic connection. Production wells and residential wells in the area are generally cased through the shallow coal seams and are constructed (open borehole) in bedrock consisting of sandstone, siltstone/shale, and siltstone with increasing depth.

Pump tests conducted on study wells constructed here indicate that ground-water migration is fracture flow dominated and flows in a southwesterly direction downgradient of the Site. Study area bedrock wells range in depth from 58 to 339 feet below ground surface. Ground-water flow in the bedrock is not influenced by the directional flow of the Cumberland River. The potentiometric surface in the bedrock aquifer is about twenty-four feet below grade at the Site.

Because the alluvial water table is higher in elevation than the potentiometric surface of the bedrock unit, leakage from the overlying unit into the bedrock is possible.

The bedrock aquifer is contaminated with a VOC plume, comprised mainly of TCE and its degradation products, cis-1,2-DCE and vinyl chloride. The center of the plume is located at the southern boundary of the Site. Prior to start-up of the "interim " ground-water recovery system, TCE, vinyl chloride, and 1,2-DCE were detected in five, on-site and off-site, wells at levels that exceeded their respective MCL's. VOC contaminants were detected in private wells at an approximate distance of 2,000 feet downgradient of the Site during initial sampling events. The estimated extent of the VOC plume prior to start up of the ground-water recovery and treatment system is shown in Figure 5.2.

5.2.3 Surface Water

The Site is bounded on the east by the Cumberland River. The River flows from north to south and serves as a discharge point for surface water drainage leaving the Site. The Harlan County Municipal water intake is located upstream of the Site at the Poor Fork Branch.

5.3 Nature and Extent of Contamination

5.3.1 Removal Action

Overburden Soils

A Removal Action was conducted at NEC during the period October 1990 through March 1992 to address immediate threats to human health. The Removal included the Preliminary Site Assessment, sampling of Site and nearby residential ground-water wells, and delineation and excavation of VOC, PCB, and metal contaminated soils down to a depth of approximately eight feet.

Analytical results of the samples collected in conjunction with the Removal Action and other site assessment investigations showed Site soils to be contaminated with VOCs, PCBs, and metals. Contaminated soils and debris, totaling approximately 5,100 tons, were excavated for off-site disposal from five principle areas: (1) the rear of the property along the bank of the Cumberland River where fill material was located; (2) an outfall area, also located along the River, at the rear of the property where two drainage pipes leading from the plant discharged; (3) an isolated area along the south fence line and adjacent to the trailer park; (4) an isolated area where equipment and drums were stored; and (5) an area where two drainage lines leading from the plant were located. The action levels that dictated removal were (1) 10 mg/kg PCBs; (2) 10 mg/kg total VOCs; (3) 5 mg/ TCLP lead; and 5 mg/ TCLP chromium, and (4) 100 mg/kg total lead and chromium. The areas where soils were excavated are shown in Figure 5.3.

5.3.2 Remedial Investigation/Feasibility Study

An RI/FS is conducted at Superfund sites to determine the nature and extent of contamination at a site and to provide and evaluate appropriate alternatives for permanent site cleanup. The NEC RI/FS was conducted under a May 1992 Administrative Order by Consent between EPA and McGraw Edison/Cooper Industries, Inc. The field work began in October 1992, and included the following: (1) installation of additional ground-water monitoring wells; (2) soil sampling on site and across the fenceline on the mobile home park property; (3) sediment sampling; (4) resampling of select on-site and off-site ground-water wells; and (5) collection of benthic organisms and fish from the Cumberland River.

Hydrogeologic Investigation

The RI/FS hydrogeologic investigation included the following: (1) installation of three off-site monitoring well clusters consisting of two wells each, including rock coring, discrete interval ground-water sampling and packer testing; (2) installation of two on-site monitoring wells; (3) collection of ground-water samples from 27 bedrock wells, including on-site monitoring wells, newly installed off-site monitoring wells and off-site private wells; (4) measurement of water levels in 37 wells, including on-site monitoring wells, newly installed off-site monitoring wells, and off-site private wells; and (5) collection of ground-water samples from four shallow wells located at the NEC site.

The following conclusions regarding ground-water contamination have been made as the result of review of the RI data:

> The areas of ground-water contamination have been delineated as follows: (1) the shallow/alluvial aquifer (15 to 40 feet); (2) the intermediate zone of the bedrock aquifer (40 to 80 feet); and (3) the deeper zone of the bedrock aquifer (80 to125).
>
> Significant quantities of Site-related contaminants are found in ground water contained in the deep bedrock zone beneath and down gradient of the Site and in the shallow aquifer and intermediate bedrock zone located beneath the Site. The center of the plume in the deeper bedrock zone appears to be located at the southern boundary of the Site, and the plume contamination consists primarily of trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), and vinyl chloride.
>
> The former Holiday Trailer Court community well, at 356 feet, is the deepest off-site well from which contaminated ground-water samples have been collected. But the well is cased only through the overburden and is constructed in 200 feet of open borehole. More definitive discrete-interval ground-water sampling techniques indicated that the vertical extent of the VOC plume in the fractured bedrock extends to a depth of only 160 feet. The most concentrated zone of VOC contamination is identified at a depth approximately 50 to 75 feet below ground surface (bgs).
>
> The shallow aquifer and the upper zone of the bedrock aquifer are impacted primarily by TCE and 1,2-DCE,

On-site Soil Sampling

On-site soil samples were collected from subsurface areas where 1991 Removal Action confirmatory sampling indicated that contaminants remained at levels above "non-detect." The purpose of this sampling was to determine whether contaminants remained in subsurface areas in quantities that might leach into ground water. Six soil borings (total of 12 soil samples) were cored at the NEC site. From these borings subsurface soil samples were collected at depths ranging from four to 8 feet. Analysis of the samples indicates that neither VOCs nor inorganics, such as lead and chromium, remain in the subsurface at levels that would significantly impact ground water via leaching.

Off-site Soil Sampling

Off-site soil samples consisted of twenty surface (0 to 0.5 feet deep) and nine subsurface (2 to 3 feet deep) soil samples. These samples were taken from the Holiday Mobile Home Park located adjacent to the NEC facility. Off-site soil samples were collected from the Holiday Mobile Home Park to determine whether soils located there had been impacted by the contaminants originating at the NEC site. The area sampled at the mobile homepark stretched the length of the fenceline that separates the properties, and a distance from the fenceline, of 100 feet onto the trailer park property.

Only one of the twenty-nine samples collected marginally exceeded the 1,000 :/kg (part per billion) Superfund PCB action level. No VOCs were detected in the off-site soils, and only low levels of semivolatiles and pesticides were detected. Low levels of dioxins and furans were detected in surficial soil samples collected near the fence line at the mobile home park. Inorganic concentrations detected in the off-site soils were consistent with background or naturally occurring levels.

Sediment Sampling

Sediment samples were collected from nine locations within the Cumberland River. Sediments in the vicinity of and down gradient of NEC were collected to determine if the Cumberland River has been significantly impacted by releases from the site. Sampling stations were designated upstream, downstream, and adjacent to the Site.

Site-related contaminants such as TCE and 1,2-DCE were detected in the sediment samples collected near NEC Outfall 001, but not in samples collected further downstream. The migration of the contaminants, in the sediments, appears to be limited to the immediate vicinity of the outfall. PCBs and other semivolatiles were also located at the outfall, but they were also detected both upstream and downstream of the Site. This indicates that sources of these contaminants, other than NEC exist upstream of the Site. The presence of these contaminants in nearby river sediments is most likely due to general pollution of the river by a variety of unknown origins. The estimated risks among the three sampling stations indicate that the sediment obtained from the Cumberland River near-Site station and downstream stations differ less than one order of magnitude from that of sediment collected at the Cumberland River upstream station.

Aquatic Assessment

An aquatic assessment was conducted to determine the impact of contaminant releases on the Cumberland River. Benthic macroinvertebrate samples were collected from three locations (or stations), and predator and bottom-feeding fish tissue composites were collected from four locations.

PCBs were found in sediment samples at each of the sampling stations where fish were caught for analysis, including those caught at the sampling station approximately five miles upstream. PCBs were detected in the tissues of 8 of the 9 fish samples analyzed. The levels detected ranged from 140 :/kg to 950 pg/kg, which were below the United States Food and Drug Administration (USFDA) action level and State Fish Advisory Level of 2,000 :/kg. Further, a 1994 Commonwealth of Kentucky study, which was based on more than 150 samples taken from various Kentucky streams, indicates that PCB levels in fish averaged 370 :/kg (Appendix C). The qualitative benthicorganism study indicated that aquatic populations did not significantly differ among the upstream and downstream sampling stations.

Meteorological Study and Air Sampling

A meteorological (MET) station was installed at the Site in order to collect site-specific atmospheric data, such as wind speed and direction, temperature, relative humidity, and precipitation, for use in air dispersion models used to predict impacts from the air stripper emissions. Data used in conjunction with this ROD was collected from June 1993 to May 1994. The prevailing wind direction at the Site was from the southwest to the northeast at an average speed of 2.5 miles per hour.

Results from air sampling activities do not indicate any vinyl chloride, 1,2-DCE or TCE in ambient air at the NEC fence line or on the Holiday Mobile Home Park. Concentrations of vinyl chloride, 1,2-DCE, and TCE detected at the stack's emission point were below health-based action levels for inhalation.

5.3.3 Interim Remedial Action

The on-site ground-water recovery and treatment system was started in July 1993 with ground water being pumped from CMW-5-11 at a rate of approximately 100 gallons per minute (gpm). A baseline sampling event was conducted before start-up of the extraction well system to determine baseline VOC concentrations to record water levels prior to and after start-up of the pumping activities (Figure 5.3). The resultant potentiometric surface map for December 1993 (Figure 5.4) shows a reversal of the hydraulic gradient toward the pumping well from the area southwest of the Site. The monitoring program consisted of thirty-three residential, production, and monitoring wells, which were sampled during the RI to record ground-water quality and water levels.

Monitoring wells, screened at a shallower depth than the pumping well, indicated that the rocks beneath the Site acts as a semiconfined aquifer with leakage from the overlying unit. As a result, it appears that pumping from CMW-5-11 is not recovering a significant quantity of ground water from the shallower bedrock zone.

As the result of pumping from the on-site extraction well, ground-water levels in the valley have been drawn down as much as 6 feet at a distance of 3,500 feet downgradient of the pumping well, and the hydraulic gradient has been reversed to produce flow toward the pumping well throughout this distance (Figure 5.5). Prior to initiating the ground-water remediation, the VOC plume extended down gradient (southwest), in the deep bedrock aquifer to a distance of approximately 2,000 feet with highest area of concentration located near the Site's southern boundary. Subsequent sampling events indicate the "interim" ground-water system has halted the downgradient migration of the VOC plume, as evidenced by the absence of VOC's in off-site wells, in which Site-related chemicals were detected when sampled prior to system start up. This apparent reductiop in VOC levels and the lateral extent of the plume are probably due in part to other factors: (1) the bedrock aquifer downgradient of the Site is now under relatively static conditions since the Dayhoit community is no longer using their private wells (i.e., for pumping) which inadvertently draws the plume downgradient; and(2) natural attenuation and degradation of VOCS.

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6.0 SUMMARY OF SITE RISKS

6.1 Human Health Risks

During the Superfund process, EPA uses the baseline risk assessment (BRA) to evaluate whether a site, in its current state, poses risks that are significant enough to endanger human health and/or the environment. These risks can either be current or potential threats resulting from contaminants migrating in ground water or surface water, released to the air, leaching through the soil, remaining in the soil, or bioaccumulating in the food chain at the site. Risk to human health is defined as the likelihood that people living, working, or playing on or near the site may experience health problems as the result of their exposure to contaminants from the site. The environmental risk evaluation appraises actual or potential effects of a site on plants and animals. The NEC BRA was prepared in conjunction with the RI/FS and finalized in June 1995.

EPA bases its decision to conduct site clean-up on the risk to human health and the environment that might be expected if no clean-up action is taken at the site. This means that cleanup actions are taken only when it is determined that risks at the site exceed the cancer risk level of 10-4 (the incremental probability of an individual developing cancer over a 70-year lifetime is 1 in 10,000) or if noncarcinogenic hazard indices exceed a level of 1. Once either threshold has been exceeded, remedial action alternatives are designed to attain a risk level within EPA's acceptable risk range of 10-6 to 10-4 between 1 in 1,000,000 and 1 in 10,000) and a hazard index of 1.

6.1.1 Chemicals of Concern

As part of the BRA, environmental data from the RI were tabulated, showing the occurrence and distribution of chemicals in the various environmental media relevant to the risk assessment. The complete listing of detected chemicals in ground water is presented in Table 1 of the BRA, while the other media are presented in Tables 2 through 6. From this list of organic and inorganic substances detected at the Site, chemicals of potential concern (COPCs) were determined for each medium. COPCs were selected when the maximum chemical concentration detected in a medium exceeded the federal and state regulatory standards and criteria, EPA Region III risk-based concentrations, or site-specific background concentrations. The chemical concentrations detected in ground water were compared to federal Maximum Contaminant Levels (MCLs), Kentucky Drinking Water Regulations, and Region III risk-based concentrations for tap water and background. On-site subsurface, off-site surficial soil, and sediment concentrations were compared to background and Region III risk-based concentrations for residential soil. Detected concentrations of chemicals in surface water were compared to EPA Ambient Water Quality Criteria. Detected concentrations of chemicals in fish tissue were compared to Region III risk-based concentrations for fish.

After completion of the risk characterization portion of the BRA, the COPC listing was then pared down to chemicals of concern (COCs). COCs were limited to those COPCs that: (1) were detected in a pathway that exceeds a carcinogenic risk of 10-4or HI of 1; (2) were detected within that pathway at an individual concentration that exceeded a 10-6 carcinogenic risk and/or a HQ of 0.1; (3) exceeded a federal MCL; or (4) exceeded chemical concentrations detected in nearby non-Site impacted media.. The COCs for this site are presented in Table 6.1. The exposure point concentration (EPC) for each COC is included in Table 6-2a and 6-2b.

6.1.2 Exposure Assessment

An exposure assessment is conducted to estimate the type and magnitude of exposures to the COPCs present at or migrating from a site. It focuses on both current and future exposures to site contaminants. The major assumptions made in this exposure assessment for deriving intake equations used for this BRA are provided at the bottom of Table 6.2.

In this assessment, exposures to chemicals through ingestion, dermal contact, and inhalation of ground water, on-site subsurface soils, and off-site surface soils by residents and workers were evaluated; and ingestion of and contact with sediment and ingestion of fish by residents were considered possible exposure pathways. The site conceptual model is presented in Table 6.3.

Exposure to chemicals through the ground-water pathway is considered possible under both current and future use scenarios. The potential receptors are child and adult residents, and adult workers. The risks associated with the ingestion of ground water and inhalation of volatiles were evaluated. Even though on-site subsurface soils were not considered to be a current exposure medium, in the future, workers may be potentially exposed to chemicals through incidental ingestion, dermal contact, or inhalation of volatiles and particulates released from the soils as the result of excavation activities. Off-site surficial soils were considered to be a current exposure point for area residents and Site workers. Possible exposure routes considered included incidental ingestion, dermal contact, and inhalation of volatiles and particulates released from the soils. The Cumberland River was considered as a point of exposure for area residents who recreate in the river. Incidental ingestion of and dermal contact with river sediments were evaluated as potential exposure routes. The ingestion of fish from the river was also considered as a possible exposure route under a current use scenario.

Based on the selection of COCs and the exposure pathways analysis, it was not necessary to quantify risks for either on-site surficial soils or surface water in the BRA. On-site surficial soils were not considered to be either current or future exposure medium for receptors, because all identified Site soils (including subsurface soils) that exceeded EPA clean-up levels were excavated during the 1991 Removal Action. The excavations were then backfilled with clean soils brought from off site. However, on-site subsurface soil samples were collected during the RI to evaluate whether they contained VOCs in sufficient concentrations capable of producing ground-water contamination via leaching. Surface water was not evaluated for long-term risk because of the uncertainties associated with determining the origin of detected chemicals. However, EPA did review the downstream and upstream Cumberland River surface water data, which was collected to demonstrate the Site's compliance with Kentucky Pollution Discharge Elimination System (KPDES) regulations. In addition, no COPCs were selected for surface water, since the observed surface water contaminant concentrations were below federal water quality criteria and showed no significant difference in concentrations between the upstream and downstream locations.

Reasonable maximum exposure (RME) point concentrations were calculated for each medium according to EPA Region IV guidance using the lesser of the 95 percent upper confidence limit (UCL) on the arithmetic average for a lognormal distribution or the maximum detected value for the respective RI data. When a COPC was not detected in a particular sample, one-half the sample quantitation limit was used as proxy concentration. Once the RME point concentrations were calculated, human intakes were then calculated for each chemical and receptor. Estimates of human intake were expressed in terms of mass of chemical per unit body weight per time (mg/kg/day). Estimates of human intake for non-carcinogens were calculated differently from those associated with carcinogenic effects. For non-carcinogens, intake is averaged over the duration of exposure and is referred to as the average daily dose (ADD). For carcinogens, intake is averaged over the average lifespan of a person (70 years) and is referred to as the lifetime average daily dose (LADD). ADDs and LADDs were calculated using standard EPA assumptions and calculated exposure point concentrations (EPCs).

6.1.3 Toxicity Assessment

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

Cancer Slope Factors (CSFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic COCs. CSFs, which are expressed in units of (mg/kg-day)-1, are multiplied by the estimated intake of a potential carcinogen to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated for the CSF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. CSFs are derived from the results of human epidemiological studies and chronic animal bioassays, which include animal-to-human extrapolation and uncertainty factors (e.g., to account for the use of animal data to predict effect on human).

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to COCs exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans including sensitive individuals. Estimated intakes of COCs from environmental media (e.g., the amount of a contaminant of concern ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies, which include uncertainty factors to account for the use of animal data to predict effects on humans.

The CSF and RfD toxicity values used in determining the upperbound level of cancer risk and non-cancer hazard from exposure to a given level of contamination are included in Table 6.2. The major assumptions about exposure frequency and duration that were used to quantify the exposure assessment and toxicity values can also be found in this table.

6.1.4 Risk Characterization

In this step of the BRA, human intakes for each pathway of exposure are integrated with EPA reference toxicity values to characterize both the carcinogenic and noncarcinogenic risk posed by the Site. So, the results of the exposure assessment are combined with chemical-specific toxicity information to characterize potential risks. Carcinogenic risk is presented as a probability value (i.e., the chance of an individual contracting some form of cancer over a lifetime), while noncarcinogenic risk is expressed as the ratio of exposure over toxicity.

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess life-time cancer risk is calculated from the following equation:

Risk = Lifetime Average Daily Dose x Carcinogenic Slope Factor

where:

Risk = a unit-less probability (e.g., 2 x. 10-5) of an individual developing cancer;

LADD = intake level averaged over 70 years (mg/kg-day) or lifetime average daily dose; and

CSF = carcinogenic slope-factor, expressed as (mg/kg-day)-1.

Excess lifetime cancer risks are determined by multiplying the intake level by the CSF. These risks are probabilities that are generally expressed in scientific notation (e.g., 1 x 10-6). An excess lifetime cancer risk of 1 x 10-6 indicates that, as a plausible upper bound risk, an individual has a one in one million chance of developing cancer as a result-of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site. EPA prefers that remediation of Superfund sites achieve a residual cancer risk that is within the acceptable risk range of 10-6 (1 in 1,000,000) to 10-4 (1chance in 10,000).

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose derived for a similar exposure period. The ratio is derived by dividing the assumed daily exposure dose by the chronic RfD and is referred to as a Hazard Quotient (HQ). By adding the HQs for all COCs that effect the same target organ (e.g., liver) within a medium or across all media to which a given population may reasonably be exposed, the Hazard Indices (HI) can be generated. Calculation of a HI in excess of unity indicates that potential for adverse health effects. HI values above 1.0 indicate an unacceptable risk that increases in magnitude with higher numerical scores above 1.0. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The HI is calculated as follows:

Non-cancer HI= HQi = ADDi/RfDi

where

ADD = Average daily dose;

RfD = Reference dose; and

i = individual contaminant

ADD and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Summary of Carcinogenic Risk and Non-Carcinogenic Risk

Current and future risk scenarios were evaluated for the exposed populations identified at the Site, child and adult residents and adult workers. Under current and future land use scenarios, the risks associated with exposures to on-site subsurface soils, off-site surficial soils, and sediments were within EPA's acceptable risk range of 10-6 to 10-4 . Also, noncancer hazard indices for soils and sediments were determined to be less than EPA's limit of 1.0 for soils and sediments.

Current and future risks associated with VOCs in ground water were greater than 10-4 for the lifetime resident and adult worker. Hazard indices for both receptors, a lifetime resident and adult worker, also exceeded 1. 0. The bedrock aquifer is no longer used as a primary source of drinking water (since the impacted area was provided connection to municipal water services in 1989) so it is not considered to pose a current risk to residents or workers. However, in the future, more distant areas, not serviced by a municipal water supply, may be impacted by the VOC plume, if it is allowed to migrate.

Carcinogenic risk associated with the ingestion of fish was determined to also exceed 10-4 for current adult residents, due to the levels of PCBs detected in fish samples. However, PCBs will not be designated as a COC for fish because the levels detected in fish tissue for this investigation were comparable to background levels for fish found in the waters of Kentucky, as reported in a recent Kentucky Division of Water study. Further, the PCB levels detected were below the applicable US FDA level.

The complete summary of cancer and noncancer risks by exposure route is provided in Appendix D.

Table 6.2 summarizes the resultant risks and HQs for the evaluated exposure pathways that were determined to pose potential threat to human health. Each entry in the table represents the aggregate of the chemical specific risks and noncarcinogenic effects (i.e., HIs) detected in the given pathway. Ground water is the only media presented in this table because it alone was determined to pose unacceptable risk to humans. The "Upper Bound Sum of Cancer Risk and of the HI" entry represents the combined carcinogenic risks and/or the combined noncarcinogenic effects of the COCs posed by the ground-water pathways. The sum of risk from Site-related chemicals to the future on-site workers exposed to impacted ground water was calculated to be 1 x 10-4. The summed upper bound carcinogenic risk to the lifetime resident exposed to impacted ground water in the future was determined to be 9 x 10-4. Thus, the sum of carcinogenic risk posed by ground water to future on-site workers and lifetime residents exceed EPA's carcinogenic risk range.

The non-carciogenic risk resulting from exposure to Site-related chemicals was also evaluated. The HI for future child residents and adult residents who ingest VOC-contaminated drinking water from the bedrock aquifer was evaluated to be 3 and 1.3, respectively.

Risk Uncertainty

There is a generally recognized uncertainty in human risk values developed from experimental data. This is primarily due to the uncertainty of data extrapolation in the areas of (1) high to low dose exposure and (2) animal data to human experience. The site-specific uncertainty is mainly in the degree of accuracy of the exposure assumptions. Most of the assumptions used in this and any risk assessment have not been verified. For example, the degree of chemical absorption from the gut or through the skin or the amount of soil contact is not known with certainty. Generally accepted default values provided in Agency guidance were used here. However, it should be noted that little data or guidance is available on the dermal absorption of particulate-bound contaminants. In the risk assessment conducted for the Site, the dermal pathway yielded a significant contribution to the calculated direct exposure risks.

In the presence of such uncertainty, the Agency and the risk assessor or have the obligation to make conservative assumptions such that the chance is very small, approaching zero, for the actual health risk to be greater than that determined through the risk process. While the process is conservative, it must be based on realistic risk values. That balance was kept in mind in the development of exposure assumptions and pathways and in the interpretation of data and guidance for this baseline risk assessment.

6.2 Environmental Risks

An environmental risk assessment (ERA) was conducted for the Site and surrounding area, in order to evaluate off site impacts to the Cumberland River by means of potential migration of site-associated chemicals within surface water and sediment. This ERA quantitatively evaluated the sediment chemistry data and qualitatively evaluated aquatic macroinvertebrates and fish in terms of population diversity and quantities. This ERA also evaluated the possibility for chemicals detected in sediment to migrate into downstream aquatic environments. This evaluation was accomplished by comparing chemicals and their concentrations between station groups.

The Site is considered industrial due to its current and projected usage and the permanent structures that are in place there. This classification, and the presence of conditions where potential flora and fauna would be disturbed from the natural state, suggest an inability for the site to provide habitat and support wildlife. The industrialized state of the Site limits its usefulness to many potential receptors (i.e., small mammals and birds) that require undisturbed woodlands for seclusion or shelter. Receptor species are not expected to forage frequently on or inhabit this site, because of a general lack of a sufficient area for a suitable habitat. Thus, there was limited potential for occurrences of terrestrial or semi-aquatic wildlife on the Site.

The types of habitats, the dominant species of flora and fauna, and possible habitats for endangered and threatened species were identified in the RI. The wildlife community within the general area (Bledsoe, Harlan, Helton, and Wallins Creek counties, Kentucky), which was identified by the Kentucky Department of Fish and Wildlife Resources, included 95 known species of amphibians, fish, mammals, and reptiles. A review of literature completed by the Kentucky State Nature Preserves Commission indicated that no protected species or sensitive environments inhabit the approximate 2-mile radius that encompasses the Site.

Sediments were collected from nine stations located in the Cumberland River and grouped together as upstream, near-site, and downstream. The purpose of the station grouping was to assist in distinguishing among potential sources of chemicals off-site in the Cumberland River (i.e., hydrologically upgradient [upstream], immediately adjacent to the site [near-site], and downgradient [downstream] from the site). Sediment samples were analyzed for the complete Target Compound List/Target Analyte List (TCL/TAL) compounds. These sediment sample locations were grouped according to the geographical/hydrological position of each station in the river, relative to outfall 001, from which surface water and NEC floor drains once discharged.

The ERA indicated that predicted risks to aquatic receptors at near-site sediment stations were approximately two times higher than those predicted for upstream sediments. The results of the macroinvertebrate survey presented in the RI indicated that the community was non-impaired adjacent to the Site and slightly impaired downstream from the Site, relative to the upstream station. Upstream and downstream surface water sample results were also evaluated for this ERA. Contaminant concentrations were not significantly different between the two sets of samples.

RI fish tissue sampling activities were conducted during two periods from the sampling stations, August 1993 and November 1993, and were analyzed for lipid content, PCBs,.and CLP-TAL metals. The concentrations of Arochlor- 1260 (PCBs) detected in the fish tissue samples did not vary between sampling stations and were similar to levels reported for fish species collected at other locations in eastern Kentucky. The concentrations of inorganics detected in fish samples exhibited some variability, although most analytes were present at similar levels between species and stations.

6.3 Summary

Cancer risks associated with exposure to environmental media by human receptors were calculated for the current and future use scenarios. The carcinogenic and noncarcinogenic risks associated with exposures to on-site subsurface soils, off-site surficial soils, and sediments were within EPA's acceptable risk range of 10-6 to 10-4. However, risks associated with groundwater were greater than 1 x 10-4 for the lifetime resident and adult worker, which exceed EPA's carcinogenic risk range. Non-carcinogenic risks for ground water, only, were determined to exceed the HI threshold of 1 for both future child and future adult residents. Risks associated with the ingestion of fish, also, exceeded 1 x 10-4 for the current residential scenario.

TABLE 6.1
Chemicals of Concern
National Electric Coil Co.,/Cooper Industries Site

uture Use Residential Scenario (Child and Adult) for Ground water

COCs with Risks Exceeding 10-6	COCs with HQs Exceeding 0.1
1,1-Dichloroethene	1,2-Dichloroethene
1,1,2,2-Tetrachloroethane	
Trichloroethene	
Vinyl Chloride	

Notes:

1. Pathway risks for on-site subsurface soils, on-site surficial soils, and sediments were within the risk range of 10-4 to 10-6 and hazard indices did not exceed 1.0.

TABLE 6-2a
Summary of Cancer and Noncancer Risks by Exposure Route for Lifetime Resident
National Electric Coil/Cooper Industries Site

Chemical of Concern	CSF oral inhalation (mg/kg-day)-1	Cancer Weight of Evidence	RfD oral inhalation (mg/kg-day)	RME (:g/)	Cancer Risk Lifetime	HQ Adult Resident	HQ Child Resident	Source
Exposure Pathway: Ingestion of VOC Contaminated Private Well Water Recovered from the Bedrock Aquifer								
1,1-DCE	6.0E-01	C	9E-03	2.6	2E-05	0.008	0.02	1
1,2, DCE	-	D	9E-03	250	-	0.8	2	2
1,1,2,2,-Tetra-chloroethane	2.0E-01	C	-	2.0	6E-06	-	-	1,2
TCE	1.1 0E-02	-	6E-03	108	2E-05	0.5	1	3
Vinyl Chloride	1.9E+00	A	-	20	6E-04	-	-	2
Exposure Pathway: Inhalation of VOCs During Showering and Non-showering Use (water obtained from bedrock aquifer)								
1,1-DCE	2.0E-01	C	-	2.6	1E-05	-	-	1
1,2 DCE	-	D	-	250	-	-	-	2
1,1.2,2,-Tetra-chloroethane	2.0E-01	C	-	2.0	9E-06	-	-	1,2
TCE	6.0E-03	-	-	108	2E-05	-	-	3
Vinyl Chloride	3.0E-01	A	-	20	2E-04	-	-	2

Upper Bound Sum of Cancer Risk for Ground-water Ingestion & Inhalation of VOCs:
Future Lifetime Resident (Child and Adult) = 9E-04

Upper Bound Sum of Hazard Indices for VOCs
Future Child Residents = 3; Future Adult Residents = 1.3.

Notes:

RfD Reference Dose
HQ Hazard Quotient
-- Not Applicable/Not Available
CSF Cancer Slope F
RME Reasonable Maximum Exposure

Sources:

1. EPA, 1994 Integrated Risk Information System
2. EPA ,1993 Health Effects Assessment Summary Tables
3. EPA 1993 Superfund Health Risk Technical Support Center

Cancer Risk Formula:

Ingestion ; Showering and Non-showering Inhalation

$$\text{Risk} = \frac{EPC \times EF \times ED \times SF_o \times IR_w}{BW \times AT \times 365\text{days/yr}} ; \frac{[EPC \times NIEE + EPC \times IR] \times [EF \times ED \times SF_o]}{BW \times AT \times 365\text{ days/yr}}$$

Non-carcinogenic Risk (Hazard Index) Formula:

Ingestion ; Showering and Non showering Inhalation

$$HI = \frac{EPC \times EF \times D \times IR}{RfD \times BW \times AT \times 365\text{d/yr}} ; \frac{EPC \times EF \times ED \times NIEE + EPC \times EF \times ED \times IR}{RfD \times BW \times AT \times 365\text{days/yr}}$$

Where:

BW Body Weight = 70 kg adult, 15 kg child, AT = Averaging Time =70 years;
EF Exposure Frequency = 350 days/year, ED Exposure Duration =30 years adult, 6 years child
CSF 1,0 Inhalation or Oral Cancer Slope Factor, EPC Exposure Point Concentration (in air);
IR 1 Daily Indoor Inhalation Rate = 15 m 3/day,
RfD 0,1 Oral or Inhalation Reference Dose; NIEE Non-ingestion equivalent exposure rate
IR w Daily Water Ingestion Rate = 2 L/day adult, I L/day child

Cancer Weight of Evidence Classification:

A Human Carcinogen
C Possible Human Carcinogen
D Not Classifiable as a Carcinogen

TABLE 6-2b
Summary of Cancer and Noncancer Risks by Exposure Route for Adult Worker
National Electric Coil/Cooper Industries Site

Chemical of Concern	CSF oral inhalation (mg/Kg-day)-1	Cancer Weight of Evidence	RfD oral inhalation (mg/kg-day)	RME (:g/)	Cancer Risk Lifetime Worker	HQ Adult	Source
Exposure Pathway: Ingestion of Contaminated Private Well Water Recovered from the Bedrock Aquifer							
1, 1 -DCE	6.0E-01	C	9E-03	2.6	5E-06	0.003	1
1,2 DCE	-	D	9E-03	250	-	0.3	2
1,1,2,2,-Tetrachloroethane	2.0E-01	C	-	2.0	1E-06	-	1,2
TCE	1.1E-02	-	6E-03	108	4E-06	0.2	3
Vinyl Chloride	1.9E+00	A	-	20	1E-04	-	2
Exposure Pathway: Inhalation of VOCs During Showering (water obtained from bedrock aquifer)							
1,1-DCE	2.0E-01	C	-	2.6	2E-06	-	1
1,2 DCE	-	D	-	250	-	-	2
1,1,2,2,-Tetrachloroethane	2.0E-01	C	-	2.0	1E-06	-	1,2
TCE	6.0E-03	-	-	108	2E-06	-	3
Vinyl Chloride	3.0E-01	A	-	20	2E-05	-	2

Upper Bound Sum of Cancer Risk for Ground-water Ingestion & Inhalation of VOCs:
Future Adult Worker = 1E-04

Upper Bound Sum of Hazard Indices for Ingestion and Inhalation of VOCS
Future Adult Worker = 0.5

Notes:

RfD Reference Dose
-- Not Applicable/Not Available
RME Reasonable Maximum Exposure

HQ Hazard Quotient
CSF Cancer Slope Factor

Sources:

1. EPA, 1994. Integrated Risk Information System
2. EPA, 1993. Health Effects Assessment Summary Tables
3. EPA, 1993 Superfund Health Risk Technical Support Center

Cancer Risk Formula:

Ingestion

$$\text{Risk} = \frac{EPC \times EF \times ED \times SF0 \times IRw}{BW \times AT \times 365\ \text{days/yr}};$$

Inhalation During Showering

$$\frac{EPCxEFxEDxSF \times NIEE}{BW \times AT \times 365\ \text{days/yr}}$$

Non-Carcinogenic Risk (Hazard Index) Formula:

Ingestion

$$HI = \frac{EPCxEFxED+IR}{RfD \times BW \times AT \times 365\ \text{days/yr}}$$

Inhalation During Showering

$$\frac{EPCxEFxEDxNIEE\ EPCxEFxEDxIR}{RfD \times BW \times AT \times 365\ \text{days/yr}}$$

Where:

BW Body Weight = 70 kg adult, 15 kg child, AT = Averaging Time =70 years;
EF Exposure Frequency = 250 days/year, ED Exposure Duration = 25 years adult worker,
CSF1.0 Inhalation or Oral Cancer Slope Factor, EPC Exposure Point Concentration (in air),
RfD0,1 Oral or Inhalation Reference - Dose; NIEE Non-ingestion equivalent exposure rate
IRw Dai1y Water Ingestion Rate = 1 L/day

Cancer Weight of Evidence Classification:

A Human Carcinogen
C Possible Human Carcinogen
D Not Classifiable as a Carcinogen

TABLE 6.3
Site Conceptual Model
National Electric Coil/Cooper Industries Site

SOURCE	PRIMARY RELEASE/ TRANSPORT MECHANISMS	AFFECTED MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	RECEPTOR
ONSITE WASTE AND SOILS	NA	Subsurface Soil	On-site	Ingestion Dermal Contact	Workers
		Surficial Soil	Off-site	Ingestion Dermal Contact	Residents
	Leaching	Groundwater	On-site	Ingestion Inhalation of VOCs	Workers
			Off-site	Ingestion	
Residents					
				Inhalation of VOCs	
	Surface Runoff	Sediments	Off-site	Ingestion Dermal Contact	Residents
		Fish	Off-site	Ingestion	Residents
	Dust Generation	Subsurface Soil to air	On-site	Inhalation	Workers
		Surficial Soil to Air	Off-site	Inhalation	Residents

7.0 DESCRIPTION OF ALTERNATIVES

A feasibility study is conducted at Superfund sites to develop and evaluate remedial alternatives. For the NEC ROD, remedial alternatives were assembled from applicable technology process options and were then evaluated for effectiveness, implementability, and cost. The alternatives meeting these criteria were then evaluated and compared to the nine criteria required by the NCP. In addition to the remedial alternatives, the NCP requires that a no-action alternative be considered at every site in order to serve as a point of comparison for other alternatives.

7.1 Ground-Water Recovery Alternatives

Remedial Alternative 1: No Action
Capital Cost: $0
Present Worth: $0
Annual O&M Cost: $0
Time to Construct: None

The no action alternative requires no remediation or institutional constraints and would leave the ground water in place. No further sampling and analysis of ground water would occur under the no action alternative. The no action alternative has been developed as a baseline remedial action for the Site to serve as a comparison for the other alternatives.

Remedial Alternative 2: Ground-Water Monitoring
Capital Cost: $12,500
Annual O&M Cost: $137,500
Present Worth: $1,725,000
Time to Construct: One Year

Alternative 2 consists of a quarterly ground-water sampling program in which an estimated twenty-four (24) monitoring wells and private wells would be sampled to monitor the VOC plume. Ground-water samples would be collected and analyzed for the volatile organics on the TCL using CLP methods.

Approximately 15 wells would be used to monitor ground water in the deeper bedrock zone at depths ranging from approximately 86 feet to 337 feet. The five existing shallow/alluvial on-site wells and the two intermediate bedrock wells would also be sampled. At least two additional upper bedrock zone wells (approximately 60 feet deep) would be installed on Site to provide increased coverage in this zone of the bedrock.

Remedial Alternative 3A: Ground-Water Recovery Using Extraction Wells with Pumps - Shallow, Intermediate and Deep Zones
Capital Cost: $136,900
Annual O&M Cost: $77,000 per year
Present Worth: $1,101,000
Time to Construct: Two Years

Alternative 3A consists of recovering impacted ground water using a series of extraction wells installed in the shallow/alluvial aquifer and the upper and deeper zones of the bedrock aquifer. The estimated total ground-water recovery rate for the shallow aquifer and the upper and deeper zones of the bedrock aquifer is approximately 200 gpm, although the actual recovery rate may be more or less than 200 gpm. Ground water recovered from the three zones would be transferred to an on-site treatment system. The treated ground water would then be discharged to the Cumberland River in accordance with KPDES requirements.

This alternative would utilize the existing on-site recovery well, CMW-5-11, or possibly employ a new recovery well, installed on-site near the center of the VOC plume (near the southern boundary of the Site). The new extraction well would pump at a rate of 100 to 125 gpm to recover impacted ground water in the deeper bedrock. The use of off-site recovery wells for deeper bedrock ground-water recovery is not anticipated since the on-going extraction activities indicate that on-site pumping is effective. The need for off-site wells would be addressed during remedial design.

Additional recovery wells would be required to effectively capture the VOC plume in the shallow aquifer and the upper bedrock zone. Approximately four recovery wells would be needed to extract impacted ground water from the upper bedrock zone at an approximate recovery rate per well of 10 to 20 gpm. An estimated 6 wells would be required in the shallow aquifer, operating at a rate per well up to 5 gpm. The actual number of wells required, anticipated recovery rates, and the potential use of vacuum enhanced recovery wells in the shallow zone would be determined during remedial design.

Existing monitoring wells and private wells would be used to monitor the effectiveness of the ground-water recovery system. Additional monitoring wells may be required in the upper bedrock zone to monitor the effectiveness of the recovery system associated with this area. It is assumed that the ground-water monitoring program required for this alternative would be similar to that described in Alternative 2 except that sampling would be conducted on a semiannual rather than quarterly basis.

Remedial Alternative 3B: Ground-Water Recovery Using Extraction Wells with Pumps-Intermediate and Deep Zones and Wellpoint Recovery System- Shallow Zone
Capital Cost: $122,800
Annual O&M Cost: $96,2000 per year
Present Worth: $1,272,000
Time to Construct: Two Years

Alternative 3B consists of a ground-water recovery system identical to the one described in Alternative 3A for extraction within the upper and deeper zones of the aquifer. However, ground-water recovery within the shallow aquifer would be accomplished using a wellpoint recovery system.

The wellpoint system would consist of a series of closely spaced wells installed in the alluvial zone, along a line perpendicular to the direction of shallow ground-water flow. The wellpoints would be connected to a header pipe or manifold pumped by a central vacuum pump. The wellpoints would be installed at a depth of approximately 30 feet and spaced at 25 to 50 feet apart so that the zones of influence overlap slightly.

The total ground-water recovery rate from the wellpoint system is anticipated to be 25 gpm. The ground water recovered by the wellpoint system would be discharged into an equalization tank along with the ground water collected by extraction wells from the intermediate and deep zones of the aquifer. The estimated total ground-water recovery rate for the shallow aquifer and the upper and deeper bedrock zones is approximately 200 gpm, although the actual recovery rate may be more or less than 200 gpm. Ground water recovered from the three zones would be transferred to an on-site treatment system. The treated ground water would then be discharged to the Cumberland River in accordance with KPDES requirements.

Ground-water monitoring would be conducted as part of this alternative to evaluate the effectiveness of the recovery systems. It is assumed that the ground-water monitoring program required for this alternative would be similar to that described in Alternative 3A.

Remedial Alternative 3C: Ground-Water Recovery Using Extraction Wells with Pumps-Intermediate and Deep Zones and Interceptor Trench - Shallow Zone
Capital Cost: $495,7000
Annual O&M Cost: $74,400 per year
Present Worth: $1,419,000
Time to Construct: Two Years

Alternative 3C consists of a ground-water recovery system identical to the one described in Alternative 3A for extraction within the upper and deeper zones of the bedrock aquifer. However, ground-water recovery within the alluvial aquifer would be accomplished using an interceptor trench.
The interceptor trench would be constructed on-site near the riverbank area and perpendicular to the direction of shallow ground-water flow. The interceptor trench would be installed to the depth of bedrock, approximately 25 to 40 feet below ground surface.

The interceptor trench would be constructed by excavating existing soils to bedrock and installing a perforated collection pipe at the bottom of the excavation. The bottom portion of the excavation would then be backfilled with gravel or comparable granular fill material. A vertical impermeable barrier would be installed on the downgradient side of the trench to prevent the lateral migration through the trench and to minimize the infiltration of ground water from the down-gradient direction. The bottom surface of the trench would be sloped toward a sump equipped with a submersible pump. Ground water that collects in the trench would be removed by a submersible sump pump and discharged into an equalization tank at the treatment system.

The estimated total flow rate from the interceptor trench would be approximately 25 gpm. As in Alternatives 3A and 3B, ground water recovered from the three zones would be transferred to an on-site treatment unit at a comparable total recovery rate. The treated ground water would then be discharged to the Cumberland River in accordance with KPDES permit requirements.

It is assumed that the ground-water monitoring program required for this alternative would be similar to that described in Alternative 3A.

7.2 Ground-Water Treatment Alternatives

The following alternatives are designed to be combined with one of the ground-water recovery alternatives previously presented as Alternatives 3A, 3B, and 3C to provide a complete ground-water remediation system:

Remedial Alternative 4A: Ground-Water Treatment by Air Stripping with Activated Carbon Off-Gas Treatment
Capital Cost: $183,800
Annual O&M Cost: $169,500 per year
Present Worth: $2,287,000
Time to Construct: Two Years

Alternative 4A employs a ground-water treatment system consisting of an air stripping tower and a granular activated carbon (GAC) off-gas treatment unit. Alternative 4A would be combined with one of the previously described ground-water recovery alternatives (Alternative 3A, 3B, or 3C) to provide a complete ground-water remediation system.

As part of the on-going ground-water extraction activities, an air stripping tower and GAC off-gas treatment unit are currently in operation at the Site. It appears that the existing air stripper is sufficiently designed to effectively treat the anticipated increased flow of 200 gpm. Although, the existing system may suffice for the final remedy, this alternative evaluation assumes that a new air stripping system and GAC unit would be constructed.

The treatment system would be designed to remove VOCs from recovered ground water using the mass transfer process of air stripping. The components of the ground-water treatment system would include an equalization tank, packed-column air stripper, vapor-phase GAC treatment unit and off-gas exhaust stack. Associated treatment system components would consist of air blowers, a transfer pump, duct heating unit, and process piping and controls.

Ground water recovered from the shallow aquifer and the upper and deeper zones of the bedrock aquifer would be transferred to an equalization tank, from which it would then be pumped to the top of the air stripper at an estimated flow rate of approximately 200 gpm. The ground water would flow by gravity through the packing material while air is simultaneously blown countercurrently and upward through the packing from the bottom of the air stripper. The aeration of tile water would cause VOCs to volatilize into the air stream. Air and volatiles would then exit the air stripper through an exhaust line at the top of the tower. The air mixture would be heated to remove moisture and then transferred to the GAC treatment unit. Volatile organics in the air stream would adsorb to the activated carbon. The treated air would then be recirculated through the unit or discharged to the atmosphere through a stack.

Treated ground water would flow from the packed section of the air stripper into an accumulation sump located at the bottom of the air stripper. Treated ground water would be discharged by gravity to the Cumberland River through an existing multiport diffuser pipe that extends approximately 36 feet into the river. Discharge of the treated ground water would be in accordance with KPDES discharge limitations and monitoring requirements.

The vapor-phase GAC treatment unit would consist of a vessel filled with granular activated carbon. The unit would include a duct heater to prevent condensation in the GAC unit. Depending on the size of the GAC unit and the volume of air discharged from the stripping tower, the discharge line from the GAC unit may include a recirculation blower loop to prevent channeling in the GAC unit.

The treated off-gas from the GAC unit would be discharged to the atmosphere through an exhaust stack. The height of the stack would be determined based on air modeling to ensure that any VOCs discharged to the atmosphere are sufficiently dispersed and that ambient air standards are maintained. Spent carbon would be returned to the vendor for regeneration, and the carbon unit would be refilled with regenerated or new carbon.

The air stripper liquid effluent would be sampled to demonstrate compliance with KPDES discharge limitations. The liquid influent to the air stripper will also be sampled routinely to evaluate the removal efficiency of the unit. Sampling of the off-gas discharge stack would also be conducted to demonstrate compliance with the USEPA emission standards.

Remedial Alternative 4B: Ground-Water Treatment by Air Stripping with Catalytic Oxidation Off-Gas Treatment
Capital Cost: $328,800
Annual O&M Cost: $187,900 per year
Present Worth: $2,660,000
Time to Construct: Two Years

Alternative 4B consists of the air stripping process described for Alternative 4A along with a catalytic oxidation treatment unit to remove VOCs from the air stripper off-gas. The primary components of the catalytic oxidation unit are a heat exchanger, a burner, and a catalytic reactor.

The VOC-laden off-gas from the stripping tower would be transferred to the tube side of a heat exchanger via a blower. The off-gas would be heated up to 700°F in order to prevent condensation of water vapor and to reduce heating requirements in the burner. This high temperature off-gas would then be transferred to the catalytic reactor. As the hot off-gas contacts the catalyst within the unit, an exothermic (heat releasing) reaction would occur and would oxidize VOCs in the air stream to carbon dioxide, water vapor, and inorganic acids. The treated hot air stream discharged from the catalytic reactor would discharge to the shell side of the heat exchanger and would preheat the incoming, untreated air stripper off-gas. Once the treated air passes through the shell side of the heat exchanger, the air would be discharged to the atmosphere through an exhaust stack. The height of the stack would be determined based on air modeling to ensure that any VOCs discharged to the atmosphere are sufficiently dispersed and that ambient air standards are maintained.

Remedial Alternative 4C: Ground-Water Treatment by Air Stripping with Resin Adsorption Off-Gas Treatment

Capital Cost: $325,500
Annual O&M Cost: $176,200 per year
Present Worth: $2,512,000
Time to Construct: Two Years

Alternative 4C consists of the air stripping process described for Alternative 4A along with a resin adsorption treatment unit to remove VOCs from the air stripper off gas. The resin adsorption process consists of a VOC adsorption unit that contains an adsorptive polymeric resin, a regenerative loop to provide on-site regeneration of the resin, and a VOC desorption unit to condense VOCs removed during the regeneration process. Recovered VOCs are ultimately transported off site for disposal. The process includes two adsorption units or beds to permit continuous operation. One bed is operated in the adsorption mode while the other bed is regenerated.

Treatment by resin adsorption would be performed by contacting the VOC-laden off gas with the resin beds. The VOCs in the off gas would adsorb to the polymeric resin and the treated off gas would be discharged to the atmosphere through an exhaust stack. The height of the stack would be determined by air modeling to ensure that any VOCs discharged to the atmosphere are sufficiently dispersed and that ambient air standards are maintained.

Once the resin is saturated with VOCs, the air stripping tower off gas would be diverted to the other resin bed and the saturated bed would be regenerated. The regeneration process consists of drawing a vacuum on the resin bed and increasing the temperature of the resin using electric heaters located inside the bed. The combination of the vacuum and increased temperature causes VOCs adsorbed to the resin to vaporize. The vaporized VOCs then are purged from the vessel using nitrogen as the carrier gas. The recovered vapor stream is transferred to a condenser and chiller to remove the VOCs. The recovered VOCs would be stored temporarily on-site and routinely transported off- site for disposal at an approved facility. The regenerated bed would be cooled and placed back into operation once the other resin bed is saturated and ready for regeneration.

Remedial Alternative 5: Ground-Water Treatment by Ultraviolet Oxidation

Capital Cost: $280,000
Annual O&M Cost: $267,000 per year
Present Worth: $3,593,000
Time to Construct: Two Years

Alternative 5 consists of ground-water treatment utilizing ultraviolet (UV) oxidation. UV oxidation treatment uses UV radiation, ozone, and hydrogen peroxide to oxidize (chemically decompose) VOCs in the aqueous phase to carbon dioxide, water, and chlorine ions. The system consists of a UV oxidation reactor, an air compressor/ozone generator unit, a hydrogen peroxide feed system, and a catalytic ozone decomposition unit.

Ground water recovered from the shallow, intermediate, and deep zones would be treated in the UV oxidation unit. Since both suspended solids and metal ions in the ground water may reduce the efficiency of the UV oxidation system, removal of these metals may be required prior to UV oxidation treatment. Filtration may be utilized to reduce the suspended solids and metal ions concentrations in the ground-water stream. If filtration (as demonstrated during treatability studies) did not satisfactorily reduce these concentrations, chemical precipitation would be required as a pretreatment process to UV oxidation.

Recovered ground water would be transferred to an equalization storage tank and then to the UV oxidation reactor. Hydrogen peroxide would be mixed with the ground water as it flows through the influent line to the reactor. Once the ground water and hydrogen peroxide mixture were introduced to the UV oxidation reactor, the mixture would be exposed to UV radiation and ozone. The UV radiation would be provided by several UV lamps installed throughout the reactor. Ozone would be generated on site and introduced to the reactor by a series of spargers designed to uniformly diffuse ozone from the base of the reactor into the liquid mixture. The ground water and hydrogen peroxide mixture would be transferred to the UV oxidation reactor at a specified rate to achieve the hydraulic retention time necessary for VOC destruction.

Ozone that is not transferred to the liquid mixture would be present in the reactor off gas. The ozone would be destroyed in the catalytic ozone decomposition unit, and the off gas would be discharged to the atmosphere through a stack. The ozone decomposition unit would utilize a nickel-based proprietary catalyst to reduce the ozone in the off gas to oxygen.

Remedial Alternative 6: Ground-Water Treatment by Activated Carbon Adsorption
Capital Cost: $108,800
Annual O&M Cost: $518,800 per year
Present Worth: $6,547,000
Time to Construct: Two Years

Alternative 6 consists of ground-water treatment using liquid-phase granular activated carbon (GAC). Liquid-phase GAC adsorption is a physical treatment process that involves contacting the impacted liquid stream with activated carbon.

The GAC system would consist of an equalization tank, two GAC units arranged in series, and associated pumps, piping and control systems. Organic compounds in the liquid that have an attraction for the activated carbon adsorb to the surface of the GAC and are removed from the liquid phase. When all of the active sites on the GAC surface are filled, adsorption of the organics will no longer occur, and the compounds begin to "break through" and appear in the liquid effluent stream. At this point the saturated carbon must then be replaced and either disposed or regenerated to remove the adsorbed organic compounds, and thereby restore the active sites for adsorption.

As with UV oxidation, the performance of liquid-phase GAC adsorption may be impacted by the presence of suspended solids or metal ions in the recovered ground water. It is anticipated that filtration of the ground water recovered from the shallow zone will reduce suspended solids and metal ion concentrations to levels that will not inhibit the performance of the GAC unit.

Recovered ground water would be transferred to an equalization tank and then to the first GAC unit. The GAC unit would consist of a steel vessel filled with activated carbon and equipped with a liquid distribution pipe. As the ground water flows through the GAC unit, VOCs in the ground water would adsorb to the surface of the activated carbon. The liquid effluent from the first GAC unit would then be transferred to the second GAC unit to remove any residual organics in the liquid stream.

Two GAC units arranged in series would be used to permit monitoring for breakthrough while maintaining the level of VOC removal necessary to comply with KPDES discharge limitations. Sampling ports would be located in the influent line to the first GAC unit, in the line between the two GAC units, and in the effluent line from the secondary or polishing GAC unit.

Samples would be collected at these locations on a regular basis to determine when breakthrough of the first GAC unit has occurred. Once breakthrough occurs, the first GAC unit would be replaced with a unit that contains regenerated carbon. The secondary GAC unit would then be plumbed to receive untreated ground water from the equalization tank, and the regenerated GAC unit would be plumbed to function as the secondary or polishing GAC unit. This rotating procedure would be used to ensure that compliance with KPDES discharge standards is maintained.

The GAC units would be designed to treat a liquid flow rate of approximately 200 gpm. Based on preliminary design calculations, each GAC unit would contain approximately 10,000 pounds of activated carbon. It is estimated that breakthrough of the first GAC unit in the treatment series would occur after approximately seven days of continuous use.

In addition to monitoring the GAC units for breakthrough, monitoring of the treated effluent would also be required to demonstrate compliance with KPDES discharge limitations. Since no air emissions would be generated by the GAC treatment system, air monitoring would not be required.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

USEPA Region IV selected Alternative 4B, combined with 3(A, B, or C) as its Preferred Alternative. This section profiles the Preferred Alternative against the nine criteria, noting how it compares to the other alternatives that were evaluated.

THE ANALYSIS

Threshold Criteria

8.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Ground-water recovery Alternative 3(A, B, or C) combined with treatment Alternatives 4(A, B, and C), 5, or 6 is more protective of human health and the environment relative to that of the other alternatives considered because these alternatives significantly reduce contaminant levels in the recovered water, thereby mitigating subsequent exposure to contaminants. They each capture or destroy VOCs dissolved in the recovered ground water or after VOC transfer to air.

'The "No Action" Alternative (Alternative 1) and Alternative 2 are not protective because neither reduces potential exposures to site ground water. Therefore, neither alternative will be considered further in this analysis as an option for the site.

8.2 Compliance with ARARS

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and state environmental statutes or provides a basis for invoking a waiver.

The ground-water extraction system described in Alternative 3(A, B, and C) and treatment systems described in Alternatives 4 (A, B, and C), 5, and 6 would primarily be subject to the state regulations that involve ground-water withdrawal and the discharge of treated water to the Cumberland River under KPDES. Each of these alternatives would comply with the state's ground-water withdrawal and KPDES requirements. The alternatives would also comply with applicable flood plain design and hazardous materials transportation requirements. All of the ground-water extraction alternatives 3(A, B, and C) should eventually achieve compliance with ground-water ARARs.

Air emissions generated by Alternatives 4 (A, B, and C) would not be subject to Clean Air Act regulations because the annual contaminant emissions rates would not exceed 250 tons per year. Instead, these alternatives are more appropriately evaluated in terms of the residual risk they may pose, over time, in the "Long-Term Effectiveness and Permanence" analysis.

Primary Balancing Criteria

8.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refer to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk and the adequacy and reliability of controls.

Alternatives 4 (A, B, and C), 5, and 6 would be combined with one of the ground-water recovery Alternatives 3(A, B, or C) that will both remove contaminants from impacted ground water and retard the migration of the VOC plume, thereby permanently eliminating the potential for the recovered contaminants to threaten human health and the environment. All of the ground-water extraction alternatives (3A, 3B, and 3C) should eventually provide a permanent remedy for ground water, although Alternative 3C may recover a significant amount of water from the adjacent river.

Alternatives 4 (A, B, and C) involve the use of air strippers in which VOC contaminants are transferred from a water medium to that of an air medium that must be treated in a further step. Each alternative would employ air pollution control (APC) devices to capture the airborne pollutants. Alternatives 4 (A, B, and C) would comply with health-based air emission levels set by EPA and developed from site-specific meteorological data. Thus, compliance with health-based stack emission levels would ensure that no significant long-term health risk would be posed by these alternatives to nearby residents. Similarly, APC devices would be required if Alternative 5 were selected. Under this alternative an ozone off gas would be produced that would require treatment prior to release to the atmosphere. No APC devices would be required for Alternative 6 since off gas would not be generated.

8.4 Reduction of Toxicity, Mobility or Volume through Treatment

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

Each of the Alternatives, 3 (A, B, and C), 4 (A, B, and C), 5,and 6 is a proven technology with demonstrated field application. They are capable of permanently removing VOCs from ground-water down to levels that meet KPDES discharge limits. However, each of the alternatives, except Alternative 6, produces a pollutant air stream that must be treated in a further step prior to release to the atmosphere.

Alternatives 4 (A, B, and C) utilize air stripping techniques that remove approximately 99% of VOCs from the recovered ground water. The air pollution control units associated with each alternative remove approximately 65%, 95%, and 95% of the VOCs, respectively, from the air stream prior its stack release. Alternative 6 also removes VOCs at a rate of approximately 90% until saturation occurs. Alternative 5 permanently destroys VOCs in the liquid stream through oxidation. Alternative 4B permanently destroys VOCs in the air stream through oxidation.

8.5 Short-Term Effectiveness

Short-term effectiveness refers to the period of time needed to complete the remedy and any adverse impacts on human health and the environment that may be posed during the construction and implementation of the remedy.

Construction activities associated with Alternatives 3(A, B, and C), 4 (A, B, and C), 5, and 6 will be limited to the Site. As a result, there should be no adverse effects to the community from implementing these alternatives. Short-term effects to on-site workers involved in the construction should be minimal. However, health and safety procedures will be implemented during the construction as a precaution. The time required for implementation of these alternatives is expected to be less than one year.

8.6 Implementability

Treatment equipment associated with Alternatives 4 (A, B, and C), 5, and 6 is available from multiple vendors for use at the Site, with many components available as self-contained, skid-mounted units. The existing multiport diffuser piping can be used to discharge treated ground water to the Cumberland River.

Use of Alternative 4B would require that a significant volume of natural gas or propane will be brought to the Site routinely to fuel the catalytic oxidation system. Gas lines do not currently extend to the Site.

Alternative 5 would require daily inspections of the system, sampling, and maintenance to monitor operations and, thus, is more labor intensive than the other alternatives. Further, the specialized labor necessary to perform these tasks may not be available on daily basis in the area.

Use of Alternatives 4C and 5 would require that a heated shelter be erected to protect the systems during extended periods of below-freezing temperatures or heavy precipitation. Alternative 6 would be subject to weekly system shut downs as the saturated carbon in the GAC unit was being replaced with regenerated carbon.

Ground-water recovery equipment specified in Alternatives 3(A, B, and C) would be readily available for use at the Site.

8.7 Cost

A comparison of the estimated present worth costs associated with the five ground-water treatment alternatives indicates that Alternative 4A ($2,287,000) will be the least expensive, followed by Alternatives 4C ($2,512,000), 4B ($2,660,000), and 5 ($3,593,000). Alternative 6 represents the most expensive ground-water treatment alternative ($6,547,000).

Capital costs will be highest for Alternative 4B ($328,000) and lowest for Alternative 6 ($108,800). Annual O&M costs will be highest for Alternative 6 ($518,800) and lowest for Alternative A ($169,500).

A comparison of costs associated with the three ground water extraction alternatives indicates that Alternative 3A is the least expensive ($1,101,000), followed by Alternative 3B ($1,272,000) and Alternative 3C ($1,419,000). Capital costs will be much higher for Alternative 3C ($495,700) compared to Alternatives 3A and 3B ($136,900 and $122,800, respectively). Annual O&M costs will be approximately equal for Alternative 3A and Alternative 3C, and will be higher for Alternative 3B.

MODIFYING CRITERIA

8.8 State Acceptance

The Commonwealth of Kentucky has worked closely with the Agency throughout the remedy selection phase through review and comment of PRP prepared site sampling and decision documents and collaboration on preparation of the remedial investigation. The Commonwealth has reviewed the Proposed Plan and ROD and concurs with the selected remedy. A copy of the Commonwealth's letter of concurrence is provided in Appendix E.

8.9 Community Acceptance

Verbal comments received at the July 11, 1995 Proposed Plan public meeting and comments submitted to EPA during the public comment period on the Proposed Plan, indicate that the community consists of varied view points on its acceptance of EPA's preferred remedial alternative. Several community residents have expressed support for the approach advocated by EPA both during the Public Meeting and throughout the operation of the IRA. Still, a significant number of verbal and written comments received by EPA prior to, during, and after the Public Meeting and public comment period indicated that a segment of the Community disagrees with EPA's preferred remedial alternative and other actions conducted at this site. The formalized comments forwarded and/or expressed verbally to EPA, in general, do not favor Alternative 4B because of the perceived unacceptable risk posed by air emissions associated with this technology.

9.0 SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public and state comments, EPA Region IV has selected Alternative 4B combined with Alternative 3 (A or B) as the remedy for the National Electric Coil Co./Cooper Industries Site. This response action will involve ground-water remediation and will address contaminated ground water located in the fractured bedrock and alluvial (shallow) aquifer beneath the Site. Alternatives 3A and 3B, both, involve employing on-site recovery wells to recover bedrock ground water, but differ in the method used to recover ground water from the alluvial aquifer. The total present worth of 4B is estimated at $2,287,000. It will be combined with ground-water recovery alternative 3A or 3B, which is estimated at $ 1,101,000 and S 1,272,000 respectively.

The major components of the ground-water remediation to be implemented involve the following: (1) recovery of contaminated ground water from the impacted alluvial and bedrock aquifers beneath and adjacent to the Site; (2) treatment of the recovered water with air stripping; (3) catalytic oxidation of the VOC-laden off gas; and (4) discharge of the treated water to the Cumberland River.

The air stripping process is the most effective, compared to other technologies, at removal of dissolved VOCs from a water stream, and it consistently achieves up to 99% removal rates. The resultant VOC-laden air stream will require additional treatment. Catalytic oxidation will be employed as an air pollution control method to reduce VOCs in the air stream to levels below that of EPA's risk-based stack emission rate limits. Catalytic oxidation effectively and reliably operates at an efficiency rate of approximately 95%. The remaining trace VOCs will be released to atmosphere from a stack. The treated water stream leaving the air stripper system will be released to the Cumberland River in compliance with applicable KPDES limits. This final response action will be effective in reducing the toxicity, mobility, and volume of VOC contaminants extracted from the alluvial and bedrock aquifers by air stripping dissolved VOCs in the ground water and by capturing the resulting airborne VOCs through emission control measures.

The goal of this remedial action is to restore the ground water to its beneficial use, which is, at this site, a drinking water aquifer. Based on information obtained during the RI/FS, and the analysis of all remedial alternatives, EPA and the Commonwealth of Kentucky believe that the Selected Remedy may be able to achieve this goal. Ground water contamination may be especially persistent in the immediate vicinity of the contaminants' source, where concentrations are relatively high. The ability to achieve cleanup goals at all points throughout the area of attainment, or plume, cannot be determined until the extraction system has been implemented, modified as necessary, and plume response monitored over time. If the Selected Remedy cannot meet the specified remediattion goals, at any or all of the monitoring points during implementation, the contingency measures and goals described in this section may replace the Selected Remedy and goals for these portions of the plume. Such contingency measures will, at a minimum, prevent further migration of the plume by means of ground-water extraction and treatment technologies. These measures are considered to be protective of human health and the environment, and are technically practicable under the corresponding circumstances.

The Selected Remedy will operate for an estimated period of 30 years, during which time the system's performance will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

(a) at individual wells where cleanup goals have been attained, pumping may be discontinued;

(b) alternating pumping at wells to eliminate stagnation points;

(c) pulse pumping to allow aquifer equilibration and encourage adsorbed contaminants to partition into ground water; and

(d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

To ensure that cleanup goals continue to be maintained, the aquifer will be monitored at those wells where pumping has ceased every five years following discontinuation of ground water extraction.

9.1 Major Components of the Ground-Water Extraction and Treatment System

Contaminated ground water shall be recovered, using multiple extraction wells completed in the upper and deeper zones of the bedrock aquifer. The exact location and quantity of extraction wells will be determined during the design of the ground-water recovery system. The recovery method that will be utilized to extract ground-water from the alluvial aquifer will also be determined during remedial design.

Recovered ground water shall be treated using an on-site packed column and an air stripping unit fitted with a catalytic oxidation pollution control device. The treated air stream will exit the stack at an appropriate height in which dispersion of the remaining trace VOC's can be maximized. Site-specific meteorological data will be used to derive an appropriate stack height.

9.2 Performance Standards

This response action controls risks posed by direct contact with ground water and minimizes migration of contaminants in ground water. This objective will be accomplished by ground-water extraction and treatment of the recovered water.

9.2.1 Ground-Water Extraction Standards

Ground water will be extracted from the surficial aquifer at an estimated rate of 25 gpm. Ground water will be extracted from the upper zone of the bedrock aquifer at an estimated rate of 50 gpm and from the deeper bedrock zone at an estimated rate of 125 gpm. The combined ground-water recovery rate for the three is estimated to be approximately 200 gpm. However, the actual recovery rate may be greater than or less than 200 gpm.

9.2.2 Ground-Water Treatment Standards

The performance standard for each COC in the ground water shall be the MCL for that chemical (the federal ARAR for public drinking water supplies under the Safe Drinking Water Act) or a risk-based level if there is no MCL. Ground-water recovery shall continue until the performance standards presented in Table 9.1 are attained at the wells designated by EPA as monitoring wells. These wells shall be monitored. biannually, to demonstrate compliance with the ground-water performance standards and to record water levels.

9.2.3 Stack Emission Rates and Ambient Air Standards

The Agency has developed temporary health-based vinyl chloride, TCE, and cis-1,2-DCE emission limits for this response action, using a dispersion factor based on one year of site specific atmospheric data. Five years of site specific atmospheric data shall be collected in order to derive a final dispersion factor. The emissions performance standards may need to be changed at that time to reflect the magnitude of change in the updated dispersion factor.

The emission limits presented in Table 9.2 shall serve as performance standards for this ROD. The point of compliance for these emission levels shall be the stack pipe exit point from which emissions are released to the atmosphere. Ambient air monitoring shall also be performed at the Holiday Trailer Park located next to the Site facility. The fence line separating the Site from the Holiday Trailer Park property shall serve as the point of compliance.

The air stripper tower will be fitted with a catalytic oxidation unit to control VOC vapors exiting the stack Air emissions from the stripper will be monitored on a monthly basis, using TO-14 canister sampling procedures, unless otherwise directed by EPA. Comparable air sampling methodologies may be substituted or monitoring frequency may be altered at the discretion of EPA.

9.2.4 Treated Ground Water Discharge Standards

Treated ground water, exiting the tower, will be discharged to the Cumberland River in compliance with the applicable KPDES requirements. KPDES discharge limits will serve as performance standards for this ROD and are presented in Table 9.3.

9.2.5 Compliance Monitoring

Stack air emissions, ground level ambient concentrations, and treated ground water exiting the air stripper tower system shall be monitored at this site in order to demonstrate compliance with performance standards. After demonstration of compliance with these performance standards set forth in Table 9.1, Table 9.2, and Table 9.3, ground water shall be monitored for at least five additional years. If monitoring indicates that the ground-water performance standards are being exceeded at any time after pumping has been discontinued, extraction and treatment of the ground water will recommence until the performance standards are once again achieved.

9.3 ARAR's

9.3.1 Applicable Requirements

Applicable requirements are those substantive requirements that specifically address the situation at a CERCLA site.

401 KAR 63:022 is applicable to this response action because it regulates facilities which emit the toxic air pollutants, specifically cis- 1,2-Dichloroethene.

40 CFR §264.18(b), Floodplain Management, mandates that hazardous waste treatment, storage or disposal facilities located within a 100-year floodplain must be designed, constructed, operated and maintained to avoid washout. This regulation is applicable because the Site is located within the 100-year floodplain of the Cumberland River.

40 CFR 6.302, Fish & Wildlife Coordination Act, requires adequate protection of fish and wildlife if any stream or other body of water is modified. Additionally, actions in floodplains are required to avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values.

Kentucky Pollutant Discharge Elimination System (401 KAR 5, specifically Parts 031, 065, and 075), Kentucky Water Quality Regulations are applicable to this response action because it regulates the point-source discharge of treated ground water to the Cumberland River by setting discharge limitations and monitoring requirements. This response action shall abide by the substantive requirements of these regulations set by the Commonwealth of Kentucky, which has been authorized to implement the National Pollutant Discharge Elimination System program under authority of the Clean Water Act (CWA) §402. Section 402 of the CWA incorporates sections 301, 302, 306, and 307.

Resource Conservation Recovery Act (RCRA) (42 U.S.C. §§ 6921-39 (§§ 3001-19); 40 CFR Parts 260-270) regulates the treatment, storage, and disposal of hazardous waste from generation through ultimate disposal. RCRA applicable requirements may include LDR and waste generator requirements set forth at 40 CFR Part 268.7 and Part 262. Any offsite facility receiving the hazardous waste for disposal will meet the requirements set forth in 268.41. Certain RCRA regulations are applicable, specifically, LDRs. Solid wastes resulting from the treatment of F001 ground water may be generated and shall be handled as FOO1 listed RCRA solid waste until decontaminated. Applicable manifest and generator requirements will also be met. Because the Commonwealth of Kentucky may be authorized for some or all of the RCRA provisions, the applicable regulations are hereby incorporated by reference.

KRS 151.140 is applicable to this response action because it regulates the withdrawal of water from public waters within the Commonwealth of Kentucky. This response action will comply with all substantive requirements of this regulation.

9.3.2 Relevant & Appropriate Requirements

Relevant and appropriate requirements are environmental protection requirements that are both relevant in terms of addressing problems or situations sufficiently similar to the circumstances of the proposed response action and appropriate in terms of being well suited to the conditions of the particular site.

The Safe Drinking Water Act of 1974 (42 USC Secs. 300f-300j-11), as amended in 1986, is relevant and appropriate for water that is used, or is to be used for drinking. MCLs for the following contaminants will are ARARs for this response action: 1,1-Dichloroethene; cis, trans-1,2- dichloroethene; 1,1,2,2-tetrachloroethane; trichloroethene; and vinyl chloride.

9.3.3 To Be Considereds (TBCs)

To Be Considereds (TBCs) are non-promulgated advisories or guidance issued by Federal or State government that are not legally binding and do not have the status of potential ARARs. However, as described below, in many circumstances, TBCs will be considered along with ARARs as part of the site risk assessment an may be used in determining the necessary level of cleanup for protection of health or the environment.

Estimation of Air Impacts for Air Stripping of Contaminated Water (EPA-450/1-91-002) Air/Superfund National Technical Guidance Series May 1991. This guidance outlines the procedure under which air emission limits for this response action were derived.

9.4 Documentation of Significant Changes

There has been one change made to the Selected Remedy since the Proposed Plan was released for public comment in May 1995. It identified Alternative 3A combined with Alternative 4B, pump and treat of the alluvial and bedrock aquifers through air stripping with catalytic oxidation used as an air pollution control method. Alternative 3A specified that extraction wells with pumps would be utilized to recover contaminated water from the alluvial and bedrock aquifers. However, EPA has determined that low volume recovery wells, or well points, presented in Alternative 3B may be more suitable for recovery of ground water from the alluvial aquifer. Well points have a smaller diameter and withdraw ground water at a much slower rate than extraction wells. Because they have smaller capture zones than extraction wells, well points would be less likely to pull water from the adjacent Cumberland River and may provide a more efficient means of extracting contaminated alluvial ground water. Alternative 3B, like Alternative 3A, requires that ground water be recovered from the bedrock aquifer by means of extraction wells and on1y differs from 3A in that it specifies that well points be used, instead of larger extraction wells, to recover alluvial ground water. Final determination of the use of extraction wells or the smaller well points will made during the remedial design phase.

Table 9.1
Summary of Ground-Water Performance Standards

Ground-water Contaminants	Remediation Levels	Frequency: of Detection	Range of Detected Levels (:g/)	
			Minimum	Maximum
VOLATILE ORGANICS				
1, 1-Dichloroethene	7 :g/	5/83	1	29
cis, trans-1,2-Dichloroethene	70(cis)/100(trans):g/ [a]	21/83 (total)	2	13,000
1, 1,2,2-Tetrachloroethane	10 :g/ [b]	1/83	2	55
Trichloroethene	5 :g/ [a]	14/83	3	14,000
Vinyl Chloride	2 :g/ [a]	13/83	7	600

Basis of Remediation Goal

[a] Federal MCL

[b] The 1,1,2,2-Tetrachloroethane practical quantitation limit; equals a risk level of 5.9 x 10-5 for the lifetime residential scenario (there is no Federal or Kentucky MCL).

Table 9.2
Emission Rate and Ambient Air Performance Standards

Air Contaminant	Action Levels	
	Emission Rate (1b/hr) / (g/sec) / (ppbv) / (:g/m3)	Ambient Air (:g/m3)
cis- 1,2-Dichloroethene	98.6 / 12.4 / 5,850,000/23,600,000[a]	5[d]
Trichloroethene	0.45 / 0.06 / 19,600/107,500[b]	5[e]
Vinyl Chloride	0.009 / 0.001 / 837/2,174[c]	5[f]

BASIS: Assumes 20 degrees Centigrade, stack height of 18.3 meters, and air flow rate of 1115 acfm

a Emission rate based on 401 KAR 63:022. An inhalation unit risk factor has not been derived for cis-1,2-DCE, therefore a health based emission rate could not be derived
b Emission rate derived from 10-6 risk level and 70-year inhalation unit risk factor of 1.7/1,000,000 (m3/ug)
c Emission rate derived from 10-6 risk level and 70-year inhalation unit risk factor o f 8.4/1,000,000 (m3/ug)
d The cis-1,2-DCE practical quantitation limit (PQL); this level equals 0.6% of the allowable ambient air level, based the occupational permissible exposure limit (PEL) divided by 1000
e The TCE PQL; equals a risk level of 8.5e-06, based on EPA's unit risk of 1.7e-06 :g/m3
f The vinyl chloride PQL, equals a risk level of 4.2e-04, based on EPA's unit risk of 8.4e-05 :g/m3

Table 9.3
Summary of KPDES Effluent Limitations[a]

EFFLUENT PARAMETER	DISCHARGE LIMITATIONS kg/day (lbs/day) Monthly Average	Daily Maximum	Other Units (specify) Monthly Average	Daily Maximum
Flow (MGD)	N/A	N/A	0. 18 MGD	0.18 MGD
Trichloroethylene	N/A	N/A	0.172 mg/	Report
1,1-Dichloroethylene	N/A	N/A	0.0021 mg/	Report
Vinyl Chloride	N/A	N/A	0. 128 mg/	Report
PCBs[1]	N/A	N/A	0.0043:g/	Report
cis-1,2-Dichloroethylene	N/A	N/A	0.07 mg/	Report
Benzene	N/A	N/A	0.833 mg/	Report
Lead (T.R.)	N/A	N/A	0.072 mg/	0.082 mg/
Zinc (T.R.)	N/A	N/A	0. 117 mg/	0.117 mg/
Chromium (Hexavalent)	N/A	N/A	0.016 mg/	0.016 mg/
Copper (T.R.)	N/A	N/A	0.018 mg/	0.018 mg/
Methylene Chloride	N/A	N/A	0.011 mg/	Report
Tetrachloroethylene	N/A	N/A	0.555 mg/	Report

[a] The discharge limits contained in this table are those currently in effect by the Kentucky Division of Water. The permit with which these discharge limits shall comply is subject to modification and public comment, so these discharge limits and parameters may be amended. If the amended KPDES requirements vary from those listed in this table, the discharge limits or parameters are hereby incorporated by reference and will replace those listed above.

10.0 STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to select remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA established several other statutory requirements and preferences. These specify that when complete, the selected remedial action for a site must comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws unless a statutory waiver is granted. The selected remedy must also be cost-effective and utilize permanent treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that permanently and significantly reduce the volume, toxicity, or mobility or hazardous wastes. The following sections discuss how the selected remedy for contaminated ground water at the National Electric Coil/Cooper Industries Site meets these statutory requirements.

10.1 Protection of Human Health and the Environment

The Selected Remedy protects human health and the environment from future exposure to contaminated ground water by pumping the impacted ground water aquifers and treating the recovered water by air stripping and catalytic oxidation prior to its discharge to the Cumberland River. The future risk associated with this pathway is 9x10-4 for lifetime residents and 1x10-4 for adult workers. By treating the ground water and discharging it to the River, the cancer risks from exposure will be reduced to less than 1 x 10-6, which is within the EPA acceptable risk range. There are no short term threats associated with the Selected Remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

10.2 Compliance with ARARs

The Selected Remedy attains all of the requirements that have been identified as applicable or relevant and appropriate to actions that will occur as the result of implementation of the selected remedial action. The following are major applicable or relevant and appropriate requirements (ARARs), risk-based levels and other "to be considered" (TBCs) being met for the specific components of the remedial action.

Chemical-Specific ARARs are health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or contaminants. These ARARs set protective cleanup levels for the contaminants of concern in the designated media or indicate an acceptable level of discharge into a particular medium during a remedial activity.

401 KAR 63:022 (regulates the emission of 1,2-DCE to atmosphere)

Safe Drinking Water Act MCLs (40 CFR Part 141)

Location Specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in specific locations.

40 CFR §264.18 (b), Floodplain Management

40 CFR 6.302, Fish & Wildlife Coordination Act.

Action Specific ARARs are performance, design, or other similar action-specific requirements that impacts particular remedial activities. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. These requirements do not determine the remedial alternative, but, they do indicate how a selected alternative must be achieved.

Kentucky Pollutant Discharge Elimination System (401 KAR 5, specifically Parts 031, 065, which has been authorized to implement the National Pollutant Discharge Elimination System program under authority of the Clean Water Act (CWA) § 402. Section 402 of the CWA incorporates sections 301, 302, 306, and 307.

KRS 151.140; withdrawal of water from public waters within the Commonwealth of Kentucky.

To Be Considered (TBCs) are non-promulgated advisories or guidance issued by Federal or State government that are not legally binding and do not have the status of potential ARARs. However, as described below, in many circumstances TBCs will be considered along with ARARs as part of the site risk assessment an may be used in determining the necessary level of cleanup for protection of health or the environment.

Estimation of Air Impacts for Air Stripping of Contaminated Water (EPA-450/1-91-002)

10.3 Cost-Effectiveness

EPA believes this remedy will eliminate the risks to human health at an estimated cost of $3,932,000, therefore the Selected Remedy provides an overall effectiveness proportionate to its costs, such that it represents a reasonable value for the money that will be spent. The Selected Remedy ensures a higher degree of certainty of effectiveness than the other alternatives because the technology employed is known to be effective for organic-contaminated wastewaters.

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

EPA believes the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Site. The Selected Remedy is composed of several proven technologies that can efficiently and reliably extract impacted ground water, remove VOCs from the water, and significantly reduce potential human exposure to contaminants released to air.

10.5 Preference for Treatment as a Principal Element

By treating the contaminated ground water by air stripping, the Selected Remedy addresses one of the principle threats posed by the Site through the use of treatment technologies. By utilizing treatment as a significant portion of the remedy, the statutory preference for remedies that employ treatment as a principle element is satisfied.

APPENDIX A
Proposed Plan

<IMG SRC 0496266N>
<IMG SRC 0496266O>

The U.S. Environmental Protection Agency (EPA), in cooperation with the Commonwealth of Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC), has recently completed a comprehensive Superfund environmental study, known as a Remedial Investigation/Feasibility Study (RIFS), at the National Electric Coil Co./Cooper Industries Superfund Site (Site) in Dayhoit, Harlan County, Kentucky. A summary of the findings of the RI/FS are included in this fact sheet, which is referred to as a proposed plan. Its purpose is, in part, to fulfill the public participation requirements delineated in section 117 (a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (SARA). Further, this proposed plan also identifies EPA'S preferred alternative for final site remediation and summarizes the key findings of the RI/FS on which EPA has based its decision.

The purpose of the RI is to collect the data necessary to adequately determine the nature and extent of site-related contamination for the purpose of remedy selection. An essential component of the RI is the baseline risk assessment which is conducted to determine whether site contaminants of concern pose a current or future risk to human health and the environment and also to determine whether site cleanup is necessary. The final component of the environmental study is the feasibility study (FS). Its primary objective is to ensure that appropriate remedial alternatives are evaluated that protect human health and the environment from current and future site related contamination.

The complete RI/FS and related site documents are contained in the Site information repository at the Harlan County Public Library. The public should visit the repository for a more detailed review of the site file and to view additional information not presented herein .

EPA encourages the public to submit written comments on all the alternatives presented in this proposed plan. Comments submitted by the public may influence EPA's preferred alternative presented later in this proposed plan. The final remedial action plan, as presented in the Record of Decision (ROD), could differ from the preferred alternative presented in this proposed plan; depending upon new information or comments received during the Public Comment Period.

SITE BACKGROUND

The Site is located on Old U.S. Route 119 in Dayhoit, Harlan County, Kentucky. The Site is adjacent to the Cumberland River and includes the 3.5 acre National Electric Services (NES) manufacturing facility and also encompasses the areal locations to which hazardous constituents originating at the Site might have migrated. The facility property is bordered on the south by the Holiday Mobile Home Park.

From 1951 to 1987-the National Electric Coil Co. (NEC) operated under the ownership of McGraw Edison. The business involved rewinding electric motors and rebuilding hydraulic systems and machinery for the coal mining industry. Cooper Industries purchased the facility in 1985 and continued operations until 1987 when it was sold to Treen Land Company.

Past practices in the plant involved the use of a trichloroethylene (TCE)-based solvent to remove oil and tar from the used motors, capacitors, transformers, and other equipment prior to their being refurbished. NEC disposed of the spent solvents, used to degrease the equipment, directly into the Cumberland River and/or by dumping process debris along the river bank located at the rear of the property. Contamination of the Site's drainage channels and river embankment occurred.

Prior to servicing, the equipment was lowered for cleaning into an approximately 1,000-gallon steel degreasing tank which rested in a below-grade concrete pit containing a TCE-based solvent. Periodically this tank was drained for cleaning, and the contained liquid and waste matter was allowed to flow overland and/or through a drainage pipe to the Cumberland River. PCB laden oil was also allowed to drain from transformers on site and/or to flow through the drainage piping that lead to the river bank. Sludges from the degreaser tank, as well as debris containing high concentrations of heavy metals from a furnace operated on site, were disposed of along the river. These disposal practices continued until the late 1970's and resulted in ground water contamination of the local drinking water supply near the site with the contaminant, TCE and its by products.

Currently the Site is an active facility for rewinding and rebuilding electric motors and hydraulic systems which are used for the mining of coal. Equipment brought to the facility for refurbishment is now cleaned with a soap-based cleaner instead of the solvent based one used by NEC. Approximately 20 workers are currently employed at the NES facility.

SCOPE AND ROLE of RESPONSE ACTION

In February 1989, the Kentucky Department of Environmental Protection, Division of Water, conducted a routine sampling of community wells at the adjacent Holiday Mobile Home Park as well as other residential wells in Dayhoit. Analyses of approximately fifty (50) ground-water samples collected indicated the presence of VOCs in twelve of the wells.

A number of actions have been conducted by EPA and the Commonwealth of Kentucky since February of 1989 to remove the threat of direct contact by members of the community to site contaminants. First, residential ground-water users were immediately provided alternate water supply via bottled water and tanked water prior to the installation of municipal water lines to the affected areas. Connection was provided to the municipal water supply located within the areas impacted by ground-water contamination starting in Aug 1989.

Initial site cleanup began during the Removal Action activities conducted from October 1990 to October 1991. More than 5,100 lbs of contaminated soils were identified and dug up for off-site disposal in a permitted landfill. Concurrently, a Preliminary Site Assessment was conducted for the purpose of collecting data necessary to include the site on the National Priorities List (NPL).

Sampling of on-site and nearby residential ground-water wells and the NEC facility and adjacent property indicated the presence of the following three primary groups of hazardous substances at the site: (1) volatile organic compounds (VOCs), namely trichloroethene, trichloroethane, 1,2-dichloroethene, vinyl chloride, toluene, and ethylbenzene; (2) polychlorinated biphenyls (PCBs); and (3) metals, namely, lead and chromium. The Site was included on the NPL, as defined in Section 9605 of CERCLA, as amended, 42 U.S.C. §9605, in October 1992.

In December 1992, EPA directed Cooper Industries to begin preliminary ground-water clean-up activities in accordance with the September 1992 "Interim" ROD. The purpose of this cleanup work was to minimize the bedrock VOC plume migration until a final site remedy is selected.

Start up of the preliminary ground-water clean-up activities began in July 1993. An existing site extraction well was utilized to recover contaminated water from the bedrock aquifer. The recovered ground-water, containing trichloroethene-based solvents (degreasers), has been treated by means of an air-stripper tower in order to separate the VOCs from the ground water. The treated water leaving the air stripper has been discharged into the Cumberland River in accordance with state surface water discharge standards The organic laden air stream exiting the tower is passed through a granular activated carbon unit prior to being released to atmosphere.

To date more than 99,000,000 gallons of water have been treated.

This proposed plan contains an outline of the final clean up actions that EPA and the Commonwealth of Kentucky anticipate conducting at the site. The ground-water clean-up activities will be expanded to address contaminated ground water located in the shallow aquifer and in the intermediate and deep zones of the bedrock aquifer, where the recent site investigation indicates significant contaminants are located.

FINDINGS OF THE REMEDIAL INVESTIGATION

The RI field activities consisted of on-site and off-site soil sampling activities, an ecological investigation, sediment sampling, meteorological studies, and a hydrogeologic investigation. Much of the hydrogeologic investigation was conducted as part of the Interim Remedial Action (IRA). The RI and IRA field work included the following tasks:

Hydrogeologic Investigation: included the (1) installation of three off-site monitoring well clusters consisting of two wells each, including rock coring, discrete interval ground-water sampling and packer testing; (2) installation of two on-site monitoring wells; (3) collection of ground-water samples from 27 bedrock wells, including on-site monitoring wells, newly installed off-site monitoring wells and off-site private wells (4) measurement of water levels in 37 wells, including on-site monitoring wells, newly installed off-site monitoring wells, and off-site private wells; and (5) collection of ground-water samples from four shallow wells located at the NEC site. The areas of ground-water contamination have been delineated as follows: (1) the shallow/alluvial aquifer (15 to 40 feet); (2) the intermediate aquifer (40 to 80 feet); and (3) deep/bed rock aquifer (80 to 125).

RI results indicate that site-related contaminants are found in significant quantities in ground water found in the deep bedrock zone beneath and down gradient of the site and in the shallow aquifer and intermediate bedrock zone located beneath the site. These contaminants consist primarity of trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), and vinyl chloride.

- Prior to initiating the ground- water remediation, the VOC plume extended, down gradient (southwest), in the deep bedrock aquifer to a distance of approximately 2,000 feet with highest area of concentration located near the site's southern boundary.

- The vertical extent of the VOC plume extends to a depth of approximately 160 feet with the most concentrated zone identified at a depth approximately 50 to 75 feet below ground surface (bgs).

- The shallow and intermediate aquifers are impacted by TCE and 1,2-DCE.

- The interim system is controlling the plume migration through extraction of the VOC plume.

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On-site Soil Investigation:
Consisted of the six soil borings (total of 12 soil samples) cored at the NEC site for physical and chemical characterizations of the on-site subsurface.

On-site soil samples were collected from subsurface areas where 1991 Removal Action confirmatory sampling indicated that contaminants remained at levels above "non-detect." The purpose of this sampling was to determine whether contaminants remained in subsurface areas in quantities that might leach to ground water. The soil samples were collected at depths ranging from 4 to 8 feet.

- Analysis of the samples indicates that neither VOCs nor inorganics, such as lead and chromium, remains in the subsurface in levels that would significantly impact ground water via contaminant leaching.

Off-site Soil Investigation: Consisted of the collection of 20 surface (0 to 0.5 feet deep) and 9 subsurface (2 to 3 feet deep) soil samples at the Holiday Mobile Home Park located adjacent to the NEC facility.

Off-site soil samples were collected from the Holiday Mobile Home Park to determine whether soils located there had been impacted by the contaminants originating at the NEC site. The area sampled at the mobile home park stretched the length of the fenceline that separates the properties, at maximum distance from the fenceline of 100 feet onto the trailer park property.

- Only one of the twenty-nine samples collected marginally exceeded the 1,000 ug/kg PCB action level.

- No VOCs were detected in the off-site soils, and only low levels of semivolatiles and pesticides were detected.

- Low levels of dioxins and furans were detected in surficial soil samples collected near the fenceline at the mobile home park.

- Inorganic concentrations detected in the off-site soils were consistent with background or naturally occurring levels.

Sediment Sampling:
Consisted of the collection of sediment samples from nine locations in the Cumberland River Sediments in the vicinity of and down gradient of NEC were collected to determine if the Cumberland River has been significantly impacted by releases from the site. Sampling stations were designated upstream, downstream, and adjacent to the site.

- Site-related contaminants such as TCE and 1,2-DCE were detected in the sediment samples collected near NEC Outfall 001, but not in samplings collected further downstream. The migration of these contaminants, in sediments, appears to be limited to the immediate vicinity of the outfall.

- PCBs and other semivolatiles were also located at the outfall. But they were also detected in both upstream and downstream locations. This indicates that other sources of these contaminants exist upstream of the site in addition to NEC. Thus, the presence of these contaminants in nearby river sediments is most likely due to general pollution of the river by a variety of unknown origins.

- The magnitudes of estimated risks among the three sampling stations suggest that the Cumberland River near-Site and downstream pose essentially the same magnitude of risk as that of sediment in the Cumberland River upstream station.

Aquatic Assessment:
(1) Collection of benthic macro-invertebrate samples from three locations in the Cumberland River, and (2) collection of predator and bottom-feeding fish tissue composites from four locations in the Cumberland River.

- PCBs were found at each sampling stations where fish were caught for analysis, including those caught at the sampling station approximately five miles upstream.

- PCB levels were detected in 8 of the 9 fish samples analyzed ranged from 140 ug/kg to 950 ug/kg, which were below the United States Food and Drug Administration (USFDA) action level and State Fish Advisory Level of 2,000 ug/kg.

Meteorological Studies and Air Sampling:
Installation and operation of a meteorological monitoring tower at the NEC site for the collection of site specific atmospheric data.

The meteorological data provided site specific data necessary for development of an air dispersion model.

- Results from air sampling activities do not indicate the presence of vinyl chloride, 1,2-DCE or TCE in ambient air at the NEC fenceline or at the Holiday Mobile Home Park.

- Concentrations of vinyl chloride, 1,2-DCE, and TCE detected at the air stripper exhaust were well below the USEPA emission standards established for the IRA.

TASK ASSESSMENT

A baseline risk assessment is a structured methodology used by EPA during the Superfund process to evaluate whether a site, in its current state, poses risks to human health and the environment that are significant enough to endanger human health and the environment. Risk to human health is defined as the likelihood, that people living, working, or playing on or near the site may experience health problems as the a result of their exposure to contaminants from the site. The environmental risk evaluation appraises actual or potential effects of a site on plants and animals.

A bases its decision to conduct the clean-up on the risk to human health and the environment that might be expected if no cleanup action is taken at the site. This means that cleanup actions are taken only when it is determined that risks at the site exceed the cancer risk level of 10 -4 (1 chance in 10,000 of developing cancer over a 70-year lifetime) or if noncarcinogenic hazard indices exceed a level of 1. Once this threshold has been exceeded, remedial action alternatives are designed to attain a risk level within EPA's acceptable risk range of 10 -6 to 10 -4 (between 1 in 1,000,000 and 1 in 10,000) and a hazard index of 1.

Exposures to ground water, on-site subsurface soils, off-site surface soils, river sediment, and fish residents or workers were considered possible exposure pathways for human receptors under the current and future use scenarios. Neither on-site surficial soils nor surface water were evaluated.

On-site surficial soils were not evaluated in the risk assessment because all identified site soils (including subsurface soils) that exceeded EPA clean-up levels were excavated during the 1991 Removal Action. The excavations were then backfilled with clean soils brought from off site. However on-site subsurface soil samples were collected during the RI to evaluate whether they contained VOCs in sufficient concentrations capable of producing ground-water contamination.

Surface water was not evaluated for carcinogenic risk; however, EPA did review the downstream and upstream Cumberland River surface water data, collected by NEC to demonstrate its compliance with the Kentucky Pollution Discharge Elimination System (KPDES). The observed surface water, contaminant concentrations were below federal water quality criteria and showed no significant difference in concentrations between the upstream and downstream locations.

Cancer risks associated with exposure to environmental media by human receptors were calculated for the current and future use scenarios. Table 1 presents a summary of these calculated risks associated with exposure of a receptor to contaminated media. The risks associated with exposures to on-site subsurface soils, off-site surficial soils, and sediments were within EPA's acceptable risk range of 10 -6 to 10 -4. However, risks associated with ground water were greater than 1 x 10 -4 for the lifetime resident and adult worker. Risks associated with the ingestion of fish slightly exceeded 1 x 10 -4.

THE FEASIBILITY STUDY:

Developing and Evaluating Cleanup Alternatives

The Feasibility Study (FS) was conducted to identify, develop, and evaluate appropriate remedial alternatives for minimizing risks to public health and the environment caused by contaminated ground water at the Site.

Each of the ten alternatives evaluated in this proposed plan was analyzed against the nine criteria presented in Table 2. Alternatives 1 and 2 did not meet the threshold criteria (protection of human health and the environment and compliance with ARARs), so they were eliminated from further analysis and consideration. Neither the "No Action" Alternative (Alternative 1) nor Alternative 2 is protective because they do not reduce potential exposures to site ground water.

Table 1
Summary of Baseline Risk Assessment

ENVIRONMENTAL MEDIA	CANCER RISK LEVEL
Ground water	1 x 10 2
On-site Surface Soils	NE**
On-site Subsurface	7 x 10-5
Off-site Surficial	1 x 10-5
Sediment (Cumberland River)	4 x 10-7
Fish	4 x 10*
Surface Water	NE**

*Shading indicates that the acceptance risk level has been exceeded

** Not evaluated

EVALUATION OF ALTERNATIVES

GROUND-WATER RECOVERY ALTERNATIVES

Remedial Alternative 1:
No Action
Capital Cost: $0
Present Worth: $0
Annual O&M Cost: $0
Time to Construct: None

The no action alternative requires no remediation or institution of constraints and would leave the ground water in place. No further sampling and analysis of ground water would occur under the no action alternative. The no action alternative has been developed as a baseline remedial action for the site to serve as a comparison for the other alternatives.

Remedial Alternative 2:
Ground-Water Monitoring
Capital Cost: $12,500
Annual O&M Cost: $137,500
Present Worth: $1,725,000
Time to Construct: One Year

Alternative 2 consists of a quarterly ground-water sampling program in which an estimated twenty-four (24) monitoring wells and private wells would be sampled to monitor the VOC plume. Ground-water samples would be collected and analyzed for the volatile organics on the TCL using CLP methods.

Approximately 15 wells would be used to monitor ground water in the deeper bedrock zone at depths ranging from approximately 86 feet to 337 feet. The five existing shallow/alluvial on-site wells and the two intermediate bedrock wells would also be sampled. At least two additional intermediate bedrock wells (approximately 60 feet deep) would be installed on site to provide increased coverage in the intermediate bedrock zone.

REMEDIAL ALTERNATIVE 3A:
Ground-Water Recovery using Extraction Wells with Pumps - Shallow, Intermediate and Deep Zones
Capital Cost: $136,900
Annual O&M Cost: $77,000 per year
Present Worth: $1,101,000
Time to Construct: Two Years

Alternative 3A consists of recovering impacted ground water using a series of extraction wells installed in the shallow/alluvial aquifer and the intermediate and deep zones of the bedrock aquifer. The estimated total ground-water recovery rate for the shallow, intermediate and deep zones is approximately 200 gpm. Ground water recovered from the three zones would be transferred to an on-site treatment system. The treated ground water would then be discharged to the Cumberland River in accordance with KPDES requirements.

This alternative would utilize the existing on-site recovery well, CMW-5-11, or possibly employ a new recovery well, installed on-site near the center of the VOC plume (near the southern boundary of the site). The new extraction well would pump at a rate of 100 to 125 gpm to recover impacted ground water in the deeper bedrock. The use of off-site recovery wells for deeper bedrock ground-water recovery is not anticipated since the on-going extraction activities indicate that on-site pumping is effective. The need for off-site wells would be addressed during remedial design.

Additional recovery wells would be required in order to effectively capture the VOC plume in the intermediate and shallow zones. Approximately four recovery wells would be needed to extract impacted ground water from the intermediate zone at an approximate recovery rate per well of 10 to 20 gpm. An estimated 6 wells would be required in the shallow zone, operating at a rate per well of approximately 2 to 5 gpm. The potential use of vacuum enhanced recovery wells in the shallow zone would be evaluated during remedial design.

Existing monitoring wells and private wells would be used to monitor the effectiveness of the ground-water recovery system. Additional monitoring wells may be required in the intermediate zone to monitor the effectiveness of the recovery system associated with this area. It is assumed that the ground-water monitoring program required for this alternative would be similar to that described in Alternative 2 except that sampling would be conducted on a semiannual rather than quarterly basis.

REMEDIAL ALTERNATIVE 3B:
Ground-Water Recovery Using Extraction Wells with Pumps-Intermediate and Deep Zones and Wellpoint Recovery System - Shallow Zone
Capital Cost: $122,800
Annual O&M Cost: $96,2000 per year
Present Worth: $1,272,000
Time to Construct: Two Years

Alternative 3B consists of a ground-water recovery system identical to the one described in Alternative 3A for extraction within the intermediate and deep zones of the aquifer. However, ground-water recovery within the shallow zone of the aquifer would be accomplished using a wellpoint recovery system.

A wellpoint system would consist of a series of closely spaced wells installed in the shallow alluvial zone, along a line perpendicular to the direction of shallow ground-water flow. The wellpoints would be connected to a header pipe or manifold pumped by a central vacuum pump. The wellpoints would be installed at a depth of approximately 30 feet and spaced at 25 to 50 feet apart so that the zones of influence overlap slightly.

The total ground-water recovery rate from the wellpoint system is anticipated to be 25 gpm. The ground water recovered by the wellpoint system will be discharged into an equalization tank along with the around water collected by extraction wells from the intermediate and deep zones of the aquifer. The estimated total ground-water recovery rate for the shallow, intermediate and deep zones is approximately 200 gpm. Ground water recovered from the three zones would be transferred to an on-site treatment system. The treated ground water would then be discharged to the Cumberland River in accordance with KPDES requirements.

Ground-water monitoring would be conducted as part of this alternative to evaluate the effectiveness of the recovery systems. It is assumed that the ground-water monitoring program required for this alternative would be similar to that described in Alternative 3A.

REMEDIAL ALTERNATIVE 3C:
Ground-Water Recovery using Extraction Wells with Pumps-Intermediate and Deep Zones and Interceptor Trench - Shallow Zone
Capital Cost: $495,7000
Annual O&M Cost: $74,400 per year
Present Worth: $1,419,000
Time to Construct: Two Years

Alternative 3C consists of a ground-water recovery system identical to the one described in Alternative 3A for extraction within the intermediate and deep zones the aquifer. However, ground-water recovery within the shallow zone of the aquifer would be accomplished using an interceptor trench.

Interceptor trench would be constructed on-site near the riverbank area and perpendicular to the direction of shallow ground-water flow. The interceptor trench would extend approximately 400 feet along the western down gradient boundary of the site and would be installed to the depth of bedrock, approximately 25 to 40 feet below ground surface.

The interceptor trench would be constructed by excavating existing soils to bedrock and installing a perforated collection pipe at the bottom of the excavation. The bottom portion of the excavation would then be backfilled with gravel or comparable granular fill material. A vertical impermeable barrier would be installed on the down-gradient side of the trench to prevent the lateral migration through the trench and to minimize the infiltration of ground water from the down-gradient direction. The bottom surface of the trench would be sloped toward a sump equipped with a submersible pump. Ground water that collects in the trench would be removed by a submersible sump pump and discharged into an equalization tank at the treatment system.

The estimated total flow rate from the interceptor trench is approximately 25 gpm. As in Alternatives 3A and 3B, ground water recovered from the three zones would be transferred to an on-site treatment unit at a comparable total recovery rate. The treated ground water would then be discharged to the Cumberland River in accordance with KPDES permit requirements.

It is assumed that the ground-water monitoring program required for this alternative would be similar to that described in Alternative 3A.

GROUND-WATER TREATMENT ALTERNATIVES

The following alternatives are designed to be combined with one of the ground-water recovery alternatives previously presented as Alternatives 3A, 3B, and 3C to provide a complete ground-water remediation system:

REMEDIAL ALTERNATIVE 4A:
Ground-Water Treatment by Air Stripping with Activated Carbon Off-Gas Treatment

Capital Cost: $183,800
Annual O&M Cost: $169,500 per year
Present Worth: $2,287,000
Time to Construct: Two Years

Alternative 4A employs a ground-water treatment system consisting of an air stripping tower and a granular activated carbon (GAC) off-gas treatment unit. Alternative 4A will be combined with one of the previously described ground-water recovery alternatives (Alternative 3A, 3B, or 3C) to provide a complete ground-water remediation system.

As part of the on-going ground-water extraction activated an air stripping tower and GAC off-gas treatment are currently in operation at the site. It appears that the existing air stripper is sufficiently designed to effectively treat the anticipated increased flow of 200 gpm. Although the existing system may suffice for the final remedy, this alternative evaluation assumes that a new air stripping system and GAC unit would be constructed in order to maintain an objective comparison of the costs and implementation factors.

The treatment system would be designed to remove VOCs from recovered ground water using the mass transfer process of air stripping. The components of the ground-water treatment system would include an equalization tank, packed-column air stripper, vaporphase GAC treatment unit and off-gas exhaust stack. Associated treatment system components would consist of air blowers, a transfer pump, duct heating unit, and process piping and controls.

Ground water recovered from the shallow, intermediate, and deep zones would be transferred to an equalization tank, from which it would then be pumped on top of the air stripper at a flow rate of approximately 200 gpm. The ground water would flow by gravity through the packing material while air is simultaneously blown countercurrently and upward through the packing from the bottom of the air stripper. The aeration of the water causes VOCs to volatilize into the air stream. Air and volatiles then exit the air stripper through an exhaust line at the top of the tower. The air mixture would be heated to remove moisture and then transferred to the GAC treatment unit. Volatile organics in the air stream adsorb to the activated carbon. The treated air would then be recirculated through the unit or discharged to the atmosphere through a stack.

Treated ground water would flow from the packed section of the air stripper into an accumulation sump located at the bottom of the air stripper. Treated ground water would be discharged by gravity to the Cumberland River through an existing multiport diffuser pipe that extends approximately 36 feet into the river. Discharge of the treated ground water would in accordance with KPDES discharge limitations and monitoring requirements.

The vapor-phase OAC treatment unit would consist of a vessel filled with granular activated carbon. The unit would include a duct heater to prevent condensation in the GAC unit. Depending on the size of the GAC unit and the volume of air discharged from the stripping tower, the discharge line from the GAC unit may include a recirculation blower loop to prevent channeling in the GAC unit.

The treated off-gas from the GAC unit would be discharged to the atmosphere through an exhaust stack. The height of the stack would be determined based on air modeling to ensure that any VOCs discharged to the atmosphere are sufficiently dispersed and that ambient air standards are maintained. Spent carbon would be returned to the vendor for regeneration, and the carbon unit would be refilled with regenerated or new carbon.

The air stripper liquid effluent would be sampled to demonstrate compliance with KPDES discharge limitations. The liquid influent to the air stripper will also be sampled routinely to evaluate the removal efficiency of the unit. Sampling of the off-gas discharge stack will also be conducted to demonstrate compliance with the USEPA emission standards.

REMEDIAL ALTERNATIVE 4B:
Ground-Water Treatment by Air Stripping with Catalytic Oxidation Off-Gas Treatment
Capital Cost: $328,800
Annual O&M Cost: $187,900 per year
Present Worth: $2,660,000
Time to Construct: Two Years

Alternative 4B consists of the air stripping process described for Alternative 4A along with a catalytic oxidation treatment unit to remove VOCs from the air stripper off-gas. The primary components of the catalytic oxidation unit are a heat exchanger, a burner, and a catalytic reactor.

The VOC-laden off-gas from the stripping tower would be transferred to the tube side of a heat exchanger via a blower. The off-gas would be heated to prevent condensation of water vapor and to reduce heating requirements in the burner. The preheated off-gas would be transferred to the burner unit where natural gas or propane would be used to increase the temperature of the off-gas to approximately 700ºF. This high temperature off-gas would then be transferred to the catalytic reactor. As the high-temperature off-gas contacts the catalyst within the unit, an exothermic (heat releasing) reaction occurs which oxidizes VOCs in the air stream to carbon dioxide, water vapor, and inorganic acids. The treated hot air stream discharged from the catalytic reactor discharges to the shell side of the heat exchanger and is used to preheat the incoming, untreated air stripper off-gas. Once the treated air passes through the shell side of the heat exchanger, the air would be discharged to the atmosphere through an exhaust stack. The height of the stack would be determined based on air modeling to ensure that any VOCs discharged to the atmosphere are sufficiently dispersed and that ambient air standards are maintained.

REMEDIAL ALTERNATIVE 4C:
Ground-Water Treatment by Air Stripping with Resin Adsorption Off-Gas Treatment

Capital Cost: $325,500
Annual O&M Cost: $176,200 per year
Present Worth: $2,512,000
Time to Construct: Two Years

Alternative 4C consists of the air stripping process described for Alternative 4A along with a resin adsorption treatment uni, to remove VOCs from the air stripper off gas. The resin adsorption process consists of a VOC adsorption unit that contains an adsorptive polymeric resin, a regenerative loop to provide on-site regeneration of the resin, and a VOC desorption unit to condense VOCs removed during the regeneration process. Recovered VOCs are ultimately transported off site for disposal. The process includes two adsorption units or beds to permit continuous operation. One bed is operated in the adsorption mode while the other bed is regenerated.

Treatment by resin adsorption would be performed by transferring the VOC-laden off gas from the air-stripping tower to one of the resin beds. The VOCs in the off gas adsorb to the polymeric resin, and the treated off gas is discharged to the atmosphere through an exhaust stack. The height of the stack would be determined by air modeling to ensure that any VOCs discharged to the atmosphere are sufficiently dispersed and that ambient air standards are maintained.

Once the resin is saturated with VOCs, the air stripping tower off gas would be diverted to the other resin bed and the saturated bed would be regenerated. The regeneration process consists of drawing a vacuum on the resin bed and increasing the temperature of the resin using electric heaters located inside the bed. The combination of the vacuum and increased temperature causes VOCs adsorbed to the resin to vaporize. The vaporized VOCs then are purged from the vessel using hydrogen as the carrier gas. The recovered vapor steam is transferred to a condenser and chiller to remove the VOCs. The recovered VOCs would be stored temporarily on-site and routinely transported off-site for disposal at an approved facility. The regenerated bed would be cooled and placed back into operation once the other resin bed is saturated and ready for regeneration.

REMEDIAL ALTERNATIVE 5:
Ground-Water Treatment by Ultraviolet Oxidation

Capital Cost: $280,000
Annual O&M Cost: $267,000 per year
Present Worth: $3,593,000
Time to Construct: Two Years

Alternative 5 consists of ground-water treatment utilizing ultraviolet (UV) oxidation. UV oxidation treatment uses UV radiation, ozone, and hydrogen peroxide to oxidize (chemically decompose) VOCs in the aqueous phase to carbon dioxide, water, and chlorine ions. The system consists of a UV oxidation reactor, an air compressor/ozone generator unit, a hydrogen peroxide feed system, and a catalytic ozone decomposition unit

Ground water recovered from the shallow, intermediate, and deep zones would be treated in the UV oxidation unit. Since both suspended solids and metal ions in the ground water may reduce the efficiency of the UV oxidation system, removal of these metals may be required prior to UV oxidation treatment. Filtration may be utilized to reduce the suspended solids and metal ions concentrations in the ground-water stream. If filtration (as demonstrated during treatability studies) did not satisfactorily reduce these concentrations, chemical precipitation would be required as a pretreatment process to UV oxidation.

Recovered ground water would be transferred to an equalization storage tank and then to the UV oxidation reactor. Hydrogen peroxide would be mixed with the ground water as it flows through the influent line to the reactor. Once the ground water and hydrogen peroxide mixture are introduced to the UV oxidation reactor, the mixture would be exposed to UV radiation and ozone. The UV radiation would be provided by several UV lamps installed throughout the reactor. Ozone would be generated on site and introduced to the reactor by a series of spargers designed to uniformly diffuse ozone from the base of the reactor into the liquid mixture. The ground water and hydrogen peroxide mixture would be transferred to the UV oxidation reactor at a specified rate to achieve the hydraulic retention time necessary for VOC destruction.

Ozone that is not transferred to the liquid mixture would be present in the reactor off gas. The ozone would be destroyed in the catalytic ozone decomposition unit, and the off gas would be discharged to the atmosphere through a stack. The ozone decomposition unit would utilize a nickel-based proprietary catalyst to reduce the ozone in the off gas to oxygen.

REMEDIAL ALTERNATIVE 6:
Ground-Water Treatment by Activated Carbon Adsorption
Capital Cost: $108,800
Annual O&M Cost: $518,800 per year
Present Worth: $6,547,000
Time to Construct: Two Years

Alternative 6 consists of ground-water treatment using liquid-phase granular activated carbon (GAC.). Liquid-phase GAC adsorption is a physical treatment process that involves contacting the impacted liquid stream with activated carbon.

The GAC system would consist of an equalization tank, two GAC units arranged in series, and associated pumps, piping and control systems. Organic compounds in the liquid that have an attraction for the activated carbon adsorb to the surface of the GAC and are removed from the liquid phase. When all of the active sites on the GAC surface are filled, adsorption of the organics will no longer occur, and the compounds begin to "break through" and appear in the liquid effluent stream. At this point the saturated carbon must then be replaced and either disposed or regenerated to remove the adsorbed organics compounds, and thereby restore the active sites for adsorption.

As with UV oxidation, the performance of liquid-phase GAC adsorption may be impacted by the presence of suspended solids or metal ions in the recovered ground water. It is anticipated that filtration of the ground water recovered from the shallow zone will reduce suspended solids and metal ion concentrations to levels that will not inhibit the performance of the GAC unit.

Recovered ground water would be transferred to an equalization tank and then to the first GAC unit. The GAC unit would consist of a steel vessel filled with activated carbon and equipped with a liquid distribution pipe. As the ground water flows through the GAC unit, VOCs in the ground water would adsorb to the surface of the activated carbon. The liquid effluent from the first GAC unit would then be transferred to the second GAC unit to remove any residual organics in the liquid stream.

Two GAC units arranged in series would be used to permit monitoring for breakthrough while maintaining the level of VOC removal necessary to comply with KPDES discharge limitations. Sampling ports would be located in the influent line to the first GAC unit, the line between the two GAC units, and in the effluent line from the secondary or polishing GAC unit.

Table 2

EPA CRITERIA FOR EVALUAT1NG CLEANUP ALTERNATIVES

Overall protection of public health and environment: Degree to which each alternative eliminates, reduces, or controls threats to public health and environment through treatment, engineering methods, or institutional controls.

Compliance with State and Federal Requirements: Degree to which each alternative meets environmental regulations determined to be applicable or relevant and appropriate to site conditions.

Short-Term Effectiveness: Length of time needed to implement each alternative and the risks posed to workers and nearby residents during implementation.

Long-Term Effectiveness: Ability to maintain reliable protection after implementation.

Reduction of Mobility, Toxicity, and Volume: Degree to which alternative reduces (1) ability of contaminants to move through the environment, (2) harmful nature of contaminants, and (3) amount of contamination.

Implementability: Technical feasibility (difficulty of constructing, operating or maintaining) and administrative ease (e.g., amount of coordination with other government agencies or relocation of residents) of implementing remedy, including availability of goods or services.

Cost: Benefits of alternative weighed against cost.

State Acceptance: EPA requests State comments on the Proposed Plan and concurrence on final remedy selection.

Community Acceptance: EPA holds a public comment period to get input from the affected community and considers and responds to all comments received prior to the final selection of a remedial (long-term cleanup) action.

Samples would be collected at these locations on a regular basis to determine when breakthrough of the first GAC unit has occurred. Once breakthrough occurs, the first GAC unit would be replaced with a unit that contains regenerated carbon. The secondary GAC unit would then be plumbed to receive untreated ground water from the equalization tank, and the regenerated GAC unit would be plumbed to function as the secondary or polishing GAC unit. This rotating procedure would be used to ensure that compliance with KPDES discharge standards is maintained.

The GAC units would be designed to treat a liquid flow rate of approximately 200 gpm. Based on preliminary design calculations, each GAC unit would contain approximately 10,000 pounds of activated carbon It is estimated that breakthrough of the first GAC unit in the treatment ries would occur after approximately seven days of continuous use. This breakthrough time is based on the combined adsorption of 1,2-dichloroethene, trichloroethene, and vinyl chloride at the estimated recovered ground-water concentrations previously observed on-site.

In addition to monitoring the GAC units for breakthrough, monitoring of the treated effluent would also be required to demonstrate compliance with KPDES discharge limitations. Since no air emissions would be generated by the GAC treatment system, air monitoring would not be required.

EPA'S PREFERRED ALTERNATIVE

The preferred alternative of EPA Region IV is Alternative 3A combined with Alternative 4B. This combination remedial alternative involves the following: (1) Extraction of contaminated ground water from the impacted shallow, intermediate, and deep aquifers beneath and adjacent to the site; (2) treatment of the recovered water with air stripping; (3) catalytic oxidation of the VOC-laden off gas; and (4) discharge of the treated water to the Cumberland River.

EPA prefers this alternative because it utilizes several proven technologies that can efficiently and reliably extract impacted ground water, remove VOCs from the water, and significantly reduce potential human exposures to contaminants released to air. The air stripping process is the most effective, compared to other technologies, at the removal of VOCs from a water stream and consistently achieves up to 99% removal rates. The air stream produced during the air stripping process will be VOC-laden and will requires additional treatment. Use of the catalytic oxidizer will effectively and reliably remove VOCs in the air stream at an estimated rate of 95%, by means of oxidation, below levels that meet EPA's stack emission rate limits. The remaining trace VOCs would be released to the atmosphere from the stack at a height at which maximum dispersion would occur. The stack height would be based on meteorological data collected at the site. The VOC-free water stream leaving the air stripper system would be released to the Cumberland River in compliance with applicable KPDES limits.

This alternative is more protective of human health and the environment relative to that of the other alternatives considered, primarily, based on the manner in which contaminant releases to the atmosphere are managed. The catalytic oxidizer presented in Alternative 4B will effectively and reliably remove contaminants from the air stream, thereby ensuring that EPA's health based stack emission levels are more easily achieved.

EVALUATION OF ALTERNATIVES

USEPA Region IV has selected Alternative 3A combined with that of Alternative 4B as its Preferred Alternative. This section profiles the preferred alternative against the nine criteria, noting how it compares to the other Alternatives that were evaluated.

THE ANALYSIS

Threshold Criteria

Overall Protection of Human Health and the Environment The "No Action" Alternative (Alternative 1) and Alternative 2 are not protective because neither reduces potential exposures to site ground water. Therefore, neither alternative will be considered further in this analysis as an option for the site.

The other alternatives will be retained for evaluation in combination as a pump and treat system. A well designed pump and treat system, consisting of extraction wells and ground-water and exhaust treatment units, limits the potential spread of contaminant from the site. The ground-water recovery technology (presented as 3 A, B, or C) judged most effective will be combined with the ground-water treatment technology (presented as 4A, 4B, 4C, 5, or 6), similarly deemed most effective, to develop a remedial action that best protects human health and the environment from current and future exposure to site-related contaminants.

Compliance with ARARS

The ground-water extraction and treatment systems described in Alternatives 4 (A, B, and C), 5, and 6 would primarily be subject to the state regulations that involve ground-water withdrawal and the discharge of treated water to the Cumberland River under KPDES. Each of these alternatives would comply with the state's ground-water withdrawal and KPDES requirements. The alternatives would also comply with applicable flood plain design and hazardous materials transportation requirements. All of the ground-water extraction alternatives (3A, 3B, and 3C) should eventually achieve compliance with ground-water ARARs.

Air emissions generated by Alternatives 4 (A, B, and C) would not be subject to Clean Air Act regulations because the annual contaminant emissions rates would not exceed 250 tons per year. Instead, these alternatives are more appropriately evaluated in terms of the residual risk they may pose, over time, in the "Long-Term Effectiveness and Permanence" analysis.

Primary Balancing Criteria

Long-Term Effectiveness and Permanence

Alternatives 4 (A, B, & C), 5, and 6 involve ground-water recovery measures that will both remove contaminants from impacted ground water and retard the migration of the VOC plume, thereby permanently eliminating the potential for the recovered contaminants to threaten human health and the environment. All of the ground-water extraction alternatives (3A, 3B, & 3C) should eventually provide a permanent remedy for ground water.

Alternatives 4 (A, B, & C) involve the use of air strippers in which VOC contaminants are transferred from a water stream to that of an air stream that must be treated in a further step. Each alternative would employ air pollution control (APC) devices to capture the airborne pollutants. Alternatives 4 (A, B, & C) would comply with health-based air emission levels set by EPA and developed from site-specific meteorological data. Thus, compliance with health-based stack emission levels would ensure that no significant long-term health risk would be posed by these alternatives to nearby residents. Similarly, APC devices would be required if Alternative 5 were selected. Under this alternative an ozone off gas would be produced that would require treatment prior to release to the atmosphere.

Reduction of Toxicity, Mobility or Volume through Treatment

Each of the Alternatives, 4 (A, B, and C), 5, and 6 is a proven technology with demonstrated field application. They are capable of permanently removing VOCs from ground-water down to levels that meet KPDES discharge limits. However, each of the alternatives, except Alternative 6, produces a pollutant air stream that must be treated in a further step prior to release to the atmosphere.

Alternatives 4 (A, B, & C) utilize air stripping techniques that remove approximately 99% of VOCs from the recovered ground water. The air pollution control units associated with each alternative removes approximately 65%, 95%, and 95% of the VOCs, respectively, from the air stream prior its stack release. Alternative 6 also removes VOCs at a rate of approximately 90% until saturation occurs. Alternatives 4B and 5 permanently destroy the VOCs in the air stream through oxidation.

Short-Term Effectiveness

Construction activities associated with Alternatives 3(A, B, & C), 4 (A, B, & C), 5, and 6 will be limited to the Site. As a result, there should be no adverse effects to the community from implementing this alternative. Short-term effects to on-site workers involved in the construction should be minimal. However, health and safety procedures will be implemented during the construction as a precaution. The time required for implementation of its alternative is expected to be less than one year.

Implementability

Alternatives 4 (A, B, & C), 5, and 6 are all available for use at the Site as self-contained, skid-mounted units from multiple vendors. Existing multiport diffuser piping can be used to discharge treated ground water to the Cumberland River.

Use of Alternative 4B would require that a significant volume of natural gas or propane will be brought to the Site routinely to fuel the catalytic oxidation system. Gas lines do not currently extend to the Site.

Alternative 5 would require daily inspections of the system, sampling, and maintenance to monitor operations and, thus, is more labor intensive than the other alternatives. Further, the specialized labor necessary to perform these tasks may not be available on daily basis in the area, Use of Alternatives 4C and 5 will require that a heated shelter be erected to protect the systems during extended periods of below-freezing temperatures or heavy precipitation. Alternative 6 would be subject to weekly system shut downs as the saturated carbon in the GAC unit was being replaced with regenerated carbon.

Cost

A comparison of the estimated present worth costs associated with the five ground-water treatment alternatives indicates that Alternative 4A ($2,287,000) will be the least expensive, followed by Alternatives 4C ($2,512,000), 4B ($2,660,000), and 5 ($3,593,000). Alternative 6 represents the most expensive ground-water treatment alternative ($ 6,547,000).

Capital costs will be highest for Alternative 4B ($ 328,000) and lowest for Alternative 6 ($108,800). Annual O&M costs will be highest for Alternative 6 ($ 518,800) and lowest for Alternative 4A ($169,500).

A comparison of costs associated with the three ground water extraction alternatives indicates that Alternative 3A is the least expensive ($1,101,000), followed by Alternative 3B ($1,272,000) and Alternative 3C ($1,419,000). Capital costs will be much higher for Alternative 3C ($495,700) compared to Alternatives 3A and 3B ($136,900 and $122,800, respectively). Annual O&M costs will be approximately equal for Alternative 3A and Alternative 3C, and will be higher for Alternative 3B.

MODIFYING CRITERIA

State Acceptance

EPA is currently seeking State concurrence with this proposed remedial action.

Community Acceptance

Community acceptance of EPA's preferred remedial alternative will be evaluated after the public comment period and will be described in the Record of Decision. The public is asked to comment on the proposed Remedial Action during the Public Comment Period, which is from May 29, 1995 through July 27, 1995.

THE NEXT STEP

Opening of the public comment period on the FS and Proposed plan is the next step in selecting a final remedial action for the National Electric Coil Co./Cooper Industries Superfund Site. The comment period provides an opportunity for local residents to submit comments to EPA on all the remedial alternatives considered for the Site.

Following the public comment period, EPA will finalize the ROD, which will detail the remedial action chosen for the Site and include EPA's responses to comments received during the public comment period. After the ROD is signed, a design plan for implementing the remedial action will be prepared. Once the design is complete, construction of the remedial action can begin. A site review will be conducted every five years at this Site since is anticipated that VOCs in ground water will remain above health based levels for the foreseeable future. This review will evaluate the long-term effectiveness of the ground-water clean-up activities, in terms of contaminant removal, and will make recommendations regarding its continued use.

EPA encourages the public to submit written comments on all the alternatives presented in this Proposed Plan. Based on new information or public comment, EPA, in consultation with the Commonwealth of Kentucky, may later modify the preferred alternative or select another remedial action presented in this Proposed Plan and the Feasibility Study Report. The public, therefore, is encouraged to review and comment on all of the alternatives identified in this Proposed Plan. The FS Report should be consulted for more information on these alternatives.

FOR MORE INFORMATION

The following EPA and KNREPC representatives may be contacted for additional information about the National Electric Coil/Cooper Industries Superfund Site.

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GLOSSARY

Air Stripping: A process that uses physical separation to clean up contaminated ground water by contacting clean air and contaminated water to transfer the volatile contaminants from the water to air stream. The VOC laden air strewn may be further treated before its release into the atmosphere.

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

Applicable or Relevant and Appropriate Requirements (ARARs): This term refers to the Federal and State requirements that a remedy the EPA selects must attain. These requirements may vary from site to site.

Aquifer: A geologic formation that contains sufficient permeability to yield significant quantities of ground water to wells and springs.

Baseline Risk Assessment: Analysis of the potential human health effects and ecological effects (both current and future) caused by hazardous substance releases from a site if no cleanup were undertaken at the site. The BRA provides the basis for determining whether or not remedial action is necessary at a site.

Carcinogen: Any substance that causes cancer.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act. This law created a special tax that goes into a trust fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites.

1,2-Dichloroethene (DCE): A volatile organic compound that is known to be toxic when absorbed by skin. DCE is used as a solvent and is also a natural degradation product from TCE.

Monitoring Wells: Special wells drilled onsite where groundwater can be sampled at selected depths and studied to determine such things as the direction of groundwater flow and the types and amounts of contaminants present.

Parts Per Billion (ppb or :g/L: A unit of measurement used to describe levels of contamination. For example, one gallon of a liquid in one billion gallons of water is equal to one part per billion.

Parts Per Million (ppm or mg/L): A unit of measurement used to describe levels of contamination. For example, one gallon of a liquid in one million gallons of water is equal to one part per billion.

Plume: A body of contaminated ground water flowing from a specific source. Its movement is influenced by such factors as local ground-water flow patterns and the density of contaminants.

Potentially Responsible Party: Parties, including owner, who may have contributed to the contamination at a Superfund site and may be liable for costs of response actions. Parties are considered PRPs until they admit liability or a court makes a determination of liability. PRPs may agree to participate in site cleanup activity without admitting liability.

Preferred Alternative: EPA's selected best alternative, based on information collected to date, to address contamination at a site.

Proposed Plan: A fact sheet summarizing EPA's preferred cleanup strategy for a Superfund site, the rationale for the preference, and a review of the alternatives developed in the RI/FS process.

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

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

Remedial Alternatives: A list of the most technologically feasible alternatives for a cleanup strategy.

Remedial Design (RD): An engineering phase that follows the record of decision when technical drawings and specifications are developed for the subsequent remedial action at a Superfund site.

Remedial Investigation (RI): A Remedial Investigation (RI) examines the nature and extent of contamination problems at a site.

Remediation: Cleanup

Superfund: A term commonly used to describe the Federal program established by CERCLA.

Superfund Amendments and Reauthorization Act (SARA): Amendments to CERCLA enacted on October 17, 1986.

Trichloroethylene (TCE): A volatile organic compound commonly used as a solvent and degreaser. TCE can be absorbed by humans through inhalation and ingestion, and is associated with kidney and liver damage.

Vinyl Chloride: A volatile organic compound that may be produced from naturally degrading TCE. Studies have shown that vinyl chloride causes liver cancer.

Volatile Organic Compounds (VOCs): Organic compounds, such as TCE, vinyl chloride, benzene, and toluene that are characterized by being highly mobile in ground water and that readily volatilize when contacted with air.

MAILING LIST
ADDITIONS/CORRECTIONS

If you did not receive this fact sheet in the mail, you are not on the EPA's Mailing list for the National Electric Coil Co., Superfund site. If you would like your name added to the list, please fill out this form, detach and mail to:

Derek Matory
Remedial Project Manager
U.S. EPA Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Name

Address

Telephone

Affiliation

COMMENT FORM
USE THIS SPACE TO WRITE YOUR COMMENTS

Tear Out Sheet to Complete

Your input on the recommended cleanup plan for the National Electric Coil Co., Superfund site is important to EPA. Comments provided by the public are valuable in helping EPA select a cleanup remedy for the site.

You may use the space below to write your comments, then fold and mail. Comments must be post-marked by July 27, 1995. If you have questions about the comment period, please contact Derek Matory at the number listed on page 14.

Name

Address

City

State Zip

Phone

APPENDIX B
Responsiveness Summary

GROUND-WATER ISSUES

Public Comment (1) When the air stripping unit became operational in 1993, this was done through the interim action record of decision. That report and previous documents stated that the shallow aquifer was not contaminated or connected to the deep bedrock aquifer. Therefore groundwater treatment would be implemented only to address pollution in the deep bedrock aquifer. Also as citizens requested many times to the EPA to conduct well testing of shallow wells, your agency told us there was no need to do this that these wells were not connected to the deep aquifer which was the aquifer of concern. Now in your agencies most recent reports the proposed plan for Final Remedial Action, it stated that the shallow aquifer is contaminated and is connected to the deep bedrock aquifer. Also, residents spoke out in the public hearing about well water levels dropping. These are wells that are not being monitored by EPA or Cooper contractors.

EPA Response: At the time when the "Interim " Action ROD was prepared, the Agency had not conducted its RI/FS and thus had not formally sampled the site for full characterization and was not at that time prepared to draw conclusions regarding the extent of contamination. In response to this comment, the "Interim" ROD was thoroughly reviewed for specific statements that may have been made regarding this issue, but no mention of hydraulic connection between the shallow aquifer and the bedrock aquifer was found.

The zone referred to in the RI Report and the ROD as the shallow aquifer was sampled during the RI. The results of this sampling are presented in Table 4-9. This data and other water level data obtained during pumping activities served as a basis for the conclusion drawn in the RI that the shallow aquifer and bedrock aquifer are hydraulically connected.

Further, EPA and the State have expressed concern regarding the impact of the extraction well on nearby residential wells that are completed in the bedrock aquifer, since the start of the ground-water remediation efforts. Thus, in order to monitor the Site extraction well impacts, the extraction well's withdrawal rate and the resultant discharge limits have been and continue to be monitored by the State under its permitting authorities.

Though the particular community was not specified, nor the date of the public hearing, the commentor mentioned that during a public hearing several residents stated that water levels in their wells were dropping. In response, on two separate occasions, in December 1993 and in Februaty 1994, the state of Kentucky Division of Water conducted well inspections in the White Star Hollow area to investigate complaints made. The State's investigation concluded that none qf the residences' water quality or quantity problems were related to NEC site contamination, but rather resulted from either their wells' close proximity to abandoned coal mining properties or from inadequately sized water pumps or other equipment-related reasons.

Public Comment (2) One well (Don White) has gone dry. I am also requesting that the state of Kentucky investigate this. This very well could be a violation of the current Kentucky well water withdrawal permit.

EPA Response: This request has been relayed to the State.

Public Comment (3) Even after State water department's statement at June 26, 1995 meeting that water table was very unusual, federal EPA refused to do more well testing outside of their allegedly contaminated plume.

EPA Response: The Agency believes the thirty-three (33) wells that are currently being monitored in conjunction with the ground-water/air stripper system thoroughly encompasses the lateral extent of the VOC-impacted ground water. The wells are currently being sampled twice a year in order to assess how well the plume is being contained and to record water level measurements for future engineering and design purposes. The contaminant plume appears to now extend approximately 2500 feet to just beyond the bridge that connects State Highway 119 with Dayhoit. It is not evident beyond that approximate lateral distance.

In addition to those wells approved by EPA and the State to monitor the impacted water, the State has sampled other wells that are clearly outside the ground-water plume's boundaries in order to respond to the concern of residents who live in surrounding communities. Many of the additional wells sampled, as a service to the community, were determined to come under the following categories: the wells were located upgradient of the impacted site ground-water; the wells are completed at elevations above that of the impacted water; and the wells are located in communities hydrogeologically remote from the site and the contaminated water beneath it.

Specifically, wells located in the White Star Hollow (Ewing Creek), Fresh Meadows, Tremont and Watts Creek have been investigated by EPA and/or the State as a service to concerned residents. Wells located within the Tremont area were sampled by the State in January 1992. None of the water samples collected from the Tremont, White Star Hollow, or Fresh Meadows urea wells showed detectable levels of chlorinated solvents.

The State also conducted additional sampling at seventeen (17) wells and one cistern located in the White Star Hollow and Fresh Meadows communities (in August 1994); six (6) wells in Watts Creek during the air stripper shut-down period (in October 1994); and two (2) additional wells in Watts Creek (in October 1995). Analysis of the ground-water samples showed no correlation to the NEC site contamination.

Public Comment (4) By conducting dye tracing the extent of pollution will be determined and any wells that are being affected by the pumping and treating of the air stripper will be identified.

We previously submitted documentation from Dr. Ralph Ewers in 1992 and 1993 in a request to State and Federal EPA which plainly stated that dye tracing needed to be done. This as all of our other requests have been ignored.

EPA Response: The VOCs spilled at the Site provide tangible evidence of the path that VOCs have traveled and indicate the route the dyes would travel if they were introduced into the aquifer. Dye-trace studies are better suited for characterization of complicated aquifers where ground-water flow patterns are not well defined This is not the case with this bedrock aquifer. The extensive sampling and pump testing conducted have adequately determined the extent of ground-water contamination. Dye-traces would be an unnecessary expense and would mostly provide redundant information.

Public Comment (5) We are requesting that dye tracing be conducted by an independent company to determine the extent of ground-water pollution in Dayhoit and surrounding communities. This request is based on discrepancies in reports that have been submitted by Cooper Contractors and the Federal Environmental Protection Agency.

EPA Response: Please refer to EPA's response to Comment #4.

Public Comment (6) In the proposed and final Interim Action ROD prepared by Cooper's contractors and approved by the Federal EPA, this report stated the shallow aquifer was not connected to the deep bedrock aquifer and was not contaminated. Now the RI Report (1995) done by Cooper contractors and approved by the EPA, states the shallow aquifer is contaminated and is connected to the deep aquifer.

The purpose of pointing this out is Number 1 the discrepancies in the approved reports. Number 2 is the fact that we have asked since 1989 that shallow wells in the community be tested and the EPA told us they were not connected and not contaminated and did not need to be tested, but the most resent reports confirm our suspicions that we have had all along. Nobody would listen to us the citizens, so what the EPA previously denied about the aquifers, current reports state otherwise, and reconfirms our original concerns that the EPA refused to act upon.

EPA Response: No statements regarding the interconnection of the shallow aquifer to that of the bedrock aquifer were made in the 1992 Interim Action ROD. The Agency made no conclusions regarding characterization of the site until finalization of the RI/FS. Please refer to Comment #1.

Public Comment (7) In your Record of Decision dated 9-30-92 Responsive Summary Public Comment (6), discussion of my (Ms. Teri Howard) well where chloroform was found. The answer was my well was contaminated by chlorination, I had the well installed myself and it was never chlorinated. But chloroform was found on site in the well testing, why is it so inconceivable that it was not connected to the chloroform found on site.

EPA Response: Water levels recorded for nearby wells indicate that the Howard well is hydrogeologically upgradient of the site-impacted groundwater plume. In other words, the general direction of bedrock ground water in the vicinity of the Howard well follows the topography and flows downhill. Ground water does not flow from the Site toward the Howard well.

The February 1989 ground-water sample indicated the presence of chloroform at 3 :g/ . As was promised in the July 1992 meeting, EPA added this well to its list of wells that were to be sampled in conjunction with the RI. The subsequent sample, collected in December 1992, did not detect chloroform or any other volatile organic compound.

As initially stated in the 1992 Responsiveness Summary, the presence of chloroform in the water sample may have resulted from either chemicals introduced during the ground-water sample's chemical analysis (a laboratory contaminant) or possibly may have resulted from chlorination of this well or that of an upgradient neighbor.

ADDITIONAL SAMPLING

Public Comment (8) After years of burning PCB laden transformer oil in an oil burning furnace, dioxin and dioxin furan by products would have to be in the fly ash from the stack but again dioxin and their by products were never addressed. Using the meteorological data you could have determined where the deposits would have been, and testing should have been done to protect human health and the environment.

EPA Response: The Agency believes the primary means of migration by PCBs and its related products occurred via surface-water transportation rather than through fly ash deposition. RI surface soil sampling focused on the common border shared by the site and the trailer park. Twenty-nine (29) samples were collected on the trailer park side of the fence at 5 feet, 25 feet, and 100 feet from the fence line at 75 feet intervals.

The sampling results, located in RI Table 4-27 and Table 4-28, indicated that these contaminants were detected below levels currently known to cause adverse health effects in humans. The maximum levels detected in off-site surface soils for total PCBs and dioxins/furans were 1053 :g/kg total PCBs and 0.00023, :g/kg 2,3,7,8-TCDD, respectively. The corresponding Federal action levels for these contaminants are 1000 :g/kg and l :g/kg, respectively. A single soil sample marginally exceeded the Federal residential PCB action level. It was collected within five feet of the fence and in close proximity to the location where a limited soil removal was previously conducted This finding is consistent with reports that PCB contaminated oils were applied along the fence line to kill weeds. The analytical results of the PCB analyses for the remaining twenty-eight (28) soil samples ranged from "non-detect" to 212 :g/kg.

Public Comment (9). Additional sampling of on-site soils along the fence line should be undertaken. From a reading of the baseline risk assessment, it appears that the surficial soil sampling was conducted some 5 feet or more from the fence line. To the extent that waste oils containing PCBs were used for weed control at the fence line, sampling should have been conducted much more closely to the fence, rather than (at a) five-foot distance.

EPA Response: The decision was made to conduct soil sampling at a distance of 5 feet from the fence line in order determine whether significant surface water transportation of PCBs from prior site disposal practices or weed control applications along the fence had occurred

PAST INVESTIGATIONS/PAST SPILLS

Public Comment (10) When the 5100 tons of soil and debris were removed from the site after the EPA had been asked over and over to test for dioxin furans; they did not.

EPA Response: The 1991 NEC soil excavations were conducted by EPA as an emergency removal of soils that posed a threat in terms of direct contact and further ground-water contamination. The emphasis at the time was to address the soils that posed an immediate threat to human health. Therefore, the early environmental sampling, on which the soil excavation plan was based, was designed to achieve this goal, rather than to establish a detailed characterization of the site. Further, dioxin/furan analyses are not conducted in removal actions in the absence of compelling reasons.

Public Comment (11) Adequate testing was never done for dioxin, dioxin furans. Past practices of burning PCB laden transformer oil which produces dioxin was never addressed. The meteorological data could and should have been used to determine where they fly ash was deposited.

EPA Response: Off-site soils were analyzed for dioxin/furans tip to a distance of 100 feet onto the Trader Park property. No evidence of contaminated fly ash deposition was apparent. The furnace stack that operated at the Site was not fitted with a blower. Thus, particulates exiting the stack via air transport would not be expelled long distances from the site, but would be expected to primarily deposit on the site or inclose proximity to the stack. The absence of evenly distributed contaminants in the off-site soils that border the Site indicates that no appreciable air deposition occurred.

Public Comment (12) Considering work practices and past exposures further testing after finding dioxin/furans and their by products should have been done, instead of sending to risk assessment and quitting. According to EPA studies dioxin and their by products are migratory. Is it actually safe to say that after 30 plus years of illegal work practices these products did not migrate from the plant site? You don't actually know how much was on site you never tested.

EPA Response: Please refer to EPA Responses to Public Comments #8, #10, and #11.

Public Comment (13) Also in public comment you were told about the cleanup of 1987 (by Cooper Industries) and made aware of the fact that the waste was disposed of in various places. These places should have been tested for VOCs and heavy metals.

EPA Response: The cleanup that you mentioned occurred before site ground-water contamination was discovered by the Kentucky Division of Water in February 1989 and EPA's subsequent involvement in late 1989. At that time, EPA obtained information from local residents on potentially related waste-disposal sites. This information led to EPA's investigation and subsequent removal action at the Putnam Landfill (i. e., Harlan County Drum Site) and its referral of the Airport Landfill to the State for possible site assessment. EPA currently is not aware of any other Site-related disposal sites, but would welcome any additional information that can lead to the discovery of additional hazardous waste sites.

Public Comment (14) The history of what happened at this site has never been fully investigated. The purpose of requesting soil sampling for metal, PCB's and dioxins is because we know and it has been very well documented by the residents and former workers of the past practices at this plant. One which was outdoor burning of different materials and substances which are known to contain cancer causing chemicals. These chemicals were carried through the air and deposited into the soils on and offsite. How can you say the extent has been determined when you all do not know the full scope of activities of past practices at this site.

EPA Response: The Superfund law specifies that EPA's involvement with NPL sites be limited to the following: (1) site investigations are conducted to determine the extent of contamination that originated at the site; (2) determine the risk level associated with the identified site-related contamination; and (3) conduct cleanup and/or containment or stabilization of site-related contamination determined to pose unacceptable current or future risk to human health and the environment. The Superfund law does not direct EPA to investigate risk associated with past chemical contamination or the associated health effects. These issues of past health effects are addressed by the Agency of Toxic Substances and Disease Registry.

Please refer to Public Comment #11 for response to other issues raised in this comment.

Public Comment (15) We want off-site soil tested for metals, PCB's and dioxins. We want to know the complete routes of exposure.

EPA Response: The results of the NEC remedial investigation soil samples indicate that soil located at the Site and at adjacent off-site locations have been sufficiently characterized by soil samples collected for the RI. EPA's review of this data shows that site soils and soils located on the adjacent mobile home park do not contain site contaminants, such as dioxins, furans, PCBs, and lead, in levels that are considered harmful to humans and/or the environment.

Off-site soil samples were collected on the trailer park property from the area located just outside the Site's south fence line that runs along the common property boundary shared by the Site and the trailer park. Samples were collected from this area at 5 feet, 25 feet, and 100 feet from the fence line on parallel lines and a spacing interval of 75 feet. This sampling pattern was employed because EPA believes that contamination of trailer park property soils could only have occurred as the result of surface water drainage from the Site. Therefore, the area sampled, which is located between the previously contaminated site soils and the interior of the trailer park, would be expected to exhibit contaminant levels equal to or greater than those located at more distant locations within the trailer park property.

Analyses for pesticides, PCBs, semivolatiles, and metals were run on the twenty-nine trailer park soil samples that were collected. The results of the sampling show that off-site soils have not been contaminated by surface water drainage or other releases from the Site. The maximum levels detected for total PCBs and dioxins/furans were 1053 :g/kg total PCBs and 0.00023 :g/kg 2,3,7,8-TCDD, respectively. The corresponding Federal residential soil action levels for these contaminants are 1000 :g/kg and 1 :g/kg, respectively. The single trailer park soil sample, in which PCBs were detected at a level that marginally exceeds the residential

PCB action level, was collected within five feet of the fence and in close proximity to the location where a limited soil removal for PCBs was previously conducted within the fenced facility property. This finding is consistent with reports that PCB contaminated soils were poured along the fence line to kill weeds. The analytical results of the PCB analyses for the remaining twenty-eight soil samples ranged from "non-detect" to 212,:g/kg , which were below the PCB action level cited above.

AIR EMISSIONS ISSUES

Public Comment (16) With the pump and treat (system) emitting VOCs into the air, they should have (to) be registered with the Toxic release inventory program.

EPA Response: The Toxic Release Inventory Program is limited to manufacturing facilities that discharge to the environment. The remediated water discharged from the air stripper/ground water recovery system is permitted under the Kentucky Pollutant Discharge and Elimination System. Samples are collected weekly to comply with the permit. The air stripper stack is monitored monthly for airborne VOCs.

Public Comment (17) The Air Dispersion Modeling Analysis Report May 1995 assumes that with a 60-foot stack height, ambient concentrations of volatile organic compounds stripped from the ground water will be within acceptable ranges.

The Kentucky Resources Council requests that additional confirmatory sampling be conducted for all wind directions to determine whether, under normal operating conditions and during periods of stagnant air flow (i.e., inversions), in order to prove out the assumptions concerning concentrations of pollutants emitted from (the) air stripping unit.

EPA Response: The air dispersion model was based on site-specific data which incorporated site-specific meteorological conditions, such as wind speeds. The model estimates ground-level concentrations at the maximum impact point and estimates impact to the nearest resident receptor (300 feet due south on the Holiday Trailer Park). The highest predicted impact point, using a yearly average, was predicted to be northeast of the air stripper stack at 300 meters north by 300 meters east, which is located within the wooded, non-inhabited foothills in a nearby mountain. The trailer park, which is located south of the air stripper stack is monitored monthly for airborne VOCs.

Public Comment (18) What kind of chemical reaction will the VOC's emitted from the air stripper produce when they meet with the existing ozone killing chemicals in the atmosphere?

EPA Response: Trace amounts of VOCs are emitted from the air stripper stack to atmosphere where they degrade in sunlight.

MISCELLANEOUS ISSUES

Public Comment (19) As a lifelong resident of Dayhoit, after reading and studying about the things my family had been exposed to I (Ms Teri Howard) should have felt secure in the fact that EPA was finally there to protect me, but instead I was treated rude in public meetings and brow beat in the media.

EPA Response: EPA has not intentionally sought to mistreat any residents, either publicly or privately, with regards to any matters related to this Site. EPA sincerely apologizes if responses to questions asked of EPA have caused harm.

Public Comment (20) I (Mr. Tom Fitzgerald of the Kentucky Resources Council) would also recommend that as your agency makes final decisions about our community, that you review the Executive Order on Environmental Justice which was signed by President Clinton in 1994. It appears that previously the guidelines in the Executive Order on Environmental Justice, have not been implemented when EPA is making decisions about what will or will not happen in our community or if the environment and the public's health will be protected here in the future.

EPA Response: Thank you for your comment.

Public Comment (21) We (Ms Joan Robinnette of CCATW) have a definite problem with EPA terminology. You all constantly state you are "cleaning up" when it is very clear in your reports and previous statements made by EPA staff, that this process is treatment of ground water. The pollution according to Cooper contractor reports and EPA reports state that pollution cannot be cleaned up but possibly stabilized at best. Treatment is also only addressing three (3) of the many chemicals found in the drinking water.

EPA Response: EPA uses the term "clean up " in reference to NEC ground-water contamination to describe ground-water extraction and treatment (pump and treat) operations. The extraction operations reverse the flow of the groundwater, thereby halting or reversing the down-gradient movement of the plume and removing VOCs from the aquifer. The degree to which the VOC plume is stabilized, as opposed to the degree to which contaminants are removed from the aquifer is subjective. Pump and treat activities at NEC are "clean up" activities because they are employed in order to restore the aquifer to Federal drinking water standards.

This ROD specifies that the four ground-water contaminants listed in Table 9. 1 be monitored for compliance during the pump and treat activities. Although EPA has focused its attention on these chemicals, EPA analyzed the environmental samples collected during the RI for the full compliment of organic and metal contaminants listed in the EPA's Contract Laboratory Program (CLP) protocol. The contaminants listed in Table 9.1 represent those detected in levels that pose unacceptable risk to human health. Narrowing the scope of contaminants allows EPA to select the appropriate clean-up remedy. Even though ground-water samples will continue to be analyzed and monitored for other contaminants, EPA will consider the bedrock aquifer to be restored when the contaminants listed in Table 9. 1 have been reduced to their respective Federal drinking water standards.

Public Comment (22) (When) EPA emergency response was overseeing the testing of soil on site in 1989, citizens made several request that soil testing be conducted for dioxins. Cooper contractors proposed a testing plan EPA approved and testing for dioxins was not done. In turn 5,100 tons of contaminated dirt was removed. In 1993 independent dioxin sampling was conducted in the Holiday Mobile Home Park and these chemicals were found. If the soil that was removed had been tested for dioxins it could have given us an idea of what we could expect to find in soils offsite and prevent residents and workers from being presently exposed or future exposure to dioxins. Again we were ignored.

EPA Response: Please refer to EPA Response to Comments #10 and #14.

PRP OVERSIGHT ISSUES

Public Comment (23). How can the EPA put so much faith in the honesty of Cooper Industries and no one actually looks at the raw data and only look at their summary reports of testing. After all, this is a company that intentionally and willfully poisoned my community for 30 plus years.

EPA Response: Please refer to EPA Response to Comment #26.

Public Comment (24) Because of past exposures to the chemical soups in our food chain, all emissions from the pump and treat should have been permitted and regulated not just three.

EPA Response: Soil, sediment, ground-water, and fish samples collected for the NEC RI were analyzed for the full compliment of organic and metal contaminants listed in the EPA's Contract Laboratory Program (CLP) protocol. The primary contaminant risk to human health posed by this site related contamination was determined to be through ground-water consumption.

The three contaminants, to which you refer, were the volatile organic contaminants for which air emission action levels were set to monitor the performance of the air stripper and to ensure that the air stripper emissions released to air contained no contaminants above health-based levels. The air emission action levels are set for the three contaminants: vinyl chloride, trichloroethane, and dichloroethene, because the RI sampling data indicated that these contaminants were present in the impacted ground water above health-based levels. The air stripper removes most of the volatile organics present in the recovered water and transfers it to the air stream. Prior to release to atmosphere, the air stream is, currently, blown through crushed carbon, where most of the VOCs are removed. All of the other CLP chemicals were and continue to be analyzed for the ongoing biannual site monitoring, even though other chemicals not been detected above EPA health-based levels.

Public Comment (25) The Federal EPA has never swayed from any of Cooper contractors plans and reports.

EPA Response: Cooper Industries signed an Administrative Order by Consent in May 1992 with EPA to investigate the extent of environmental contamination that resulted from spills and dumping of chemicals on the site during the National Electric Services operational period. EPA 's Administrative Order outlined specific guidelines about how the site was to be sampled and how the samples were to be analyzed. Many of these procedures were specified in the July 1993 Remedial Investigation/Feasibility Study Work Plan. The results and interpretation of the collected site data were presented in the December 1994 Remedial Investigation Report. Appropriate remediation options were evaluated in the January 1995 Feasibility Study Report.

The November 1994 Baseline Risk Assessment Report and the May 1995 Air Dispersion Modeling Report were prepared by EPA contractors.

EPA is satisfied that these documents were prepared in compliance with the rigorous EPA guidelines specified for each. The documents were submitted in draft to EPA and the State. The comments prepared by EPA and the State for each document were incorporated prior to their being finalized.

Public Comment (26) In February 1995, I (Ms. Joan Robinette of CCATW) did a Freedom of Information Act (FOIA) request to the Federal EPA requesting to review all the raw data that has been generated on this site by Cooper's contractors. I was told there were seventeen (17) boxes, when I went to review I was presented with seven (7) boxes of data which had a shipping invoice stating they had been shipped to Atlanta from Houston, Texas. This was February 13, 1995. I began reviewing documents on February 14, I also discovered that EPA had never reviewed this information either, but yet had approved final reports which were done by Cooper contractors.

EPA Response: One of the provisions of the May 1992 Administrative Order that Cooper Industries signed with EPA to investigate the Site specifies that Cooper Industries prepare data package for each samples collectedfor the RI and store them. The analytical records reviewed in February 1995 were copies of the entire RI data set that Cooper is required to maintain. The entire file was copied and sent to EPA solely for the purpose of this FOIA request.

EPA does not routinely request, nor does it review all of the data packages prepared for each sample collected for NEC or other Superfund sites. EPA does, however, review a percentage of the data packages at its discretion. A representative number of NEC data packages were reviewed prior to February 1995 by appropriate EPA Region IV Environmental Services Division staff. In compliance with the Administrative Order, Cooper Industries submitted the select data packages to EPA for review. Also, as additional checks on the quality of analytical analyses performed by PRP labs, EPA routinely submits its own samples to these labs to evaluate their performance. EPA also collected and analyzed "split" samples at select sampling locations to compare the analytical results with the PRP laboratory.

Public Comment (27) We want the EPA to go back and validate all of the sampling that Cooper contractors have done.

EPA Response: Please refer to comment #26.

Public Comment (28) EPA only has to review Cooper's contractors activities once every five years. This is not enough monitoring EPA should review at least every two years at best.

EPA Response: Cooper Industries will continue to conduct ground-water monitoring, twice each year, and will annually report its analytical results to EPA. The five-year reviews will be used primarily at NEC to evaluate the long-term effectiveness of the pump and treat system by monitoring the rate of ground-water contaminant level reduction in selected wells. EPA can modify the selected remedy if data indicates that the pump and treat is ineffectual.

Public Comment (29) We want a fund established to pay residents water bills. Why should residents have to pay for water that Cooper stole from them?

EPA Response: The commentor should contact Cooper Industries concerning this matter. If the commentor is not satisfied with Cooper Industries' reply, the commentor has other options to pursue recourse from Cooper Industries.

Public Comment (30) We have not been made whole. Our piece of mind has been stolen from us by the EPA and Cooper industries.

EPA Response: EPA has no response to this comment.

Public Comment (31) We want the Health Assessment that the ATSDR recommended on former plant workers and residents.

EPA Response: ATSDR has made provisions to conduct the NEC Health Assessment. ATSDR representative, Mr. Carl Blair, should be contacted for further information.

Public Comment (32) On the evening of June 26, 1995, before the EPA meeting in Dayhoit, EPA staff people went to our public library which was closed and pulled documents from our Administrative record which is there for the public to review and threw these documents in the trash. EPA came into the meeting and did not tell citizens that these reports had been trashed.

EPA Response: EPA removed only draft copies of documents for which final versions of the documents were available. The draft documents did not contain the changes that were made to incorporate EPA and the State's comments and were not accurate representations of actions taken on the Site or did not, in some instances, reflect EPA's final interpretation of collected site data. Further, the removal of the draft documents freed up space on the visibly stuffed shelves and was done in plain view of the librarian on duty.

SELECTED REMEDY

Public Comment (33). What effect if any will this addition of two more sources of contaminated ground water will have in changing the maximum concentrations of the various constituents in the ground water entering the unit.

EPA Response: The expanded ground-water withdrawal system will consist of the one deep bedrock recovery well plus a series of extraction wells installed in the shallow and intermediate zones of the impacted site aquifer. The single deep bedrock recovery well will operate at a pumping rate of 100 to 125 gallons per minute. It is estimated that 3 to 4 recovery wells spaced approximately 100 feet apart will be required in the intermediate bedrock zone. The anticipated ground-water recovery rate per well is 10 to 20 gpm. Based on the extent of the VOC plume in the shallow zone and on the characteristics of the alluvium, it is estimated that approximately 6 recovery wells will be required in this area at an anticipated ground-water recovery rate per well is 2 to 5 gpm. The ground-water extraction system flow rate will increase from 125 gpm to 200 gpm (125 gpm deep zone, 40 gpm intermediate zone, and 25 gpm shallow zone). The anticipated average concentrations of the constituents of concern in the recovered ground water were estimated using ground-water sampling results and a weighted average approach and are as follows. The ''Projected" and "Current" headings below refer to constituents concentrations detected in recovered ground water, prior to treatment:

Contaminant	Projected	Current (Max.)	KPDES Limit
1, 1-Dichloroethene	6 :g/	ND - 2 :g/	2.1 :g/
1, 2-Dichloroethene	3,000 :g/	510 - 1700 :g/	40 :g/
Trichloroethane	4,100 :g	227 - 1,270 :g/	60 :g/
Vinyl Chloride	140 :g/	ND - 177 :g/	20 :g/

Public Comment (34). What is the capture efficiency under operating conditions, what is the reliability, and what are the outputs of the various configurations of the air stripper unit. It is not possible to compare and comment among alternatives to better control the VOCs generated from the stripper unit, and the use of a resin adsorption versus a catalytic oxidation unit, absent more thorough information regarding these technologies.

For example, one of the proposed alternatives would supplement the stripper through use of a catalytic oxidation unit which would heat the VOC compounds to temperatures well below those needed to completely destroy the molecular bonds for those compounds, raising the possibility of creation of products of combustion and products of incomplete combustion through the oxidation process. Information concerning the byproducts of these treatment processes, including a full characterization of the off-gases, and the capability of such units to effectively treat such waste streams without creating other emissions of concern should be developed and made available prior to a choice among alternatives.

EPA Response: Influent and effluent data collected for the KPDES permit indicate that VOCS are removed from recovered groundwater at approximately 99%. The vaporized VOCs are currently blown through the carbon bed where approximately 65% of the VOCs are absorbed. This Final ROD (March 1996) requires the vaporized VOCs be removed from the air stream using a catalytic oxidation unit, which is expected to attain a contaminant destruction efficiency of 95 %. The VOCs are oxidized primarily to carbon dioxide, water vapor, and hydrogen chloride.

For more details concerning the technical advantages and disadvantages of the different alternatives, please refer to Section 3. 0 Detailed Analysis of Alternatives of the NEC Feasibility Study, or Section 5. 0 Recommendations.

Public Comment (35). Additional work must be undertaken regarding the air emissions from the stripper unit under various alternatives. The choice of a 250 ton per year limit as the benchmark against which to measure compliance with the Clean Air Act ignores both the much-lower threshold for air emissions of any hazardous air pollutant (HAPs), which under the Clean Air Act Amendments (CAA) of 1990 is reduced to 10 and 25 tons of any and all HAPs, respectively, and also state air toxics regulations. Under the state air toxics regulations, which are the ARARs in this case against which air emissions both from the facility and the air stripper unit must be measured, the burden is on the applicant (in this case Cooper Industries and EPA) to demonstrate that the emissions will not include potentially "hazardous matter or toxic substances in such quantities or duration as to be harmful to the health and welfare of humans, animals and plants" 401 KAR-63-020.

EPA Response: The CAA regulations that you cited do no apply to the NEC air stripper because the annual volume of HAPs emitted to atmosphere does not reach the threshold of 10 tons per year for any one HAP or 25 tons per year for a combination of HAPs. Thus, the air stripper is not considered a major source, as defined by Title III, and is not subject to Title V operating permits.

Because air strippers used at Superfund sites usually do not meet CAA thresholds, EPA policy dictates that emissions be protective of human health. Health-based emission levels were developed in conjunction with the baseline risk assessment that was prepared under EPA direction by its contractor. As an added measure to insure compliance with the health-based emission levels, the air stripper, currently, utilizes crushed carbon as a means of air pollution control. This final ROD will require that catalytic oxidation technology be used as a control to attain greater VOC reduction efficiency. The emission levels are presented in Table 9.2 of this ROD. For further review of this matter, please refer to USEPA OSWER Directive 9355.0-28.

Public Comment (36) In treatment of the pollution, ground-water contamination is the only thing that is being addressed. Although we are well aware that millions have been spent on this site, the most economically feasible as in the cheapest way, is to pump and treat ground water and ignore the other pathways of exposure including the past pathways.

EPA Response: Analysis and interpretation of environmental data collected for the RI showed that groundwater was the only impacted site media that posed unacceptable risk to human health and the environment.

Public Comment (37). The use of an interceptor trench, rather than shallow wells, to intercept and gather contaminated groundwater flowing through the shallow zone, may provide a more reliable method of capturing the contamination prior to discharge into the river, provided that the trenching is properly located and designed to provide for interception of the flow based on proper modeling of the flow.

EPA Response: Interceptor trenches are subsurface drains designed to capture groundwater and generally consist of a trench backfilled with porous material and equipped with perforated piping which diverts collected groundwater to a collection sump that included a submersible pump for ground-water recovery. Because of the Site close proximity to the river, EPA does not favor this method to recovery shallow ground water over that of utilizing low volume extraction wells. We are concerned that the efficiency of the ground-water treatment system would be significantly reduced because river water may be recovered into the trench along with that of the shallow ground water. Thus, a larger volume of water would require treatment.

RISK ASSESSMENT ISSUES

Public Comment (38). The Risk Assessment is no good, the site history has not been characterized properly, and the cumulative risk factor of citizens being previously exposed has not been considered at all. We want the risk assessment revised to take all of the past exposure into consideration. EPA has not implemented the ATSDR's recommendations, such as more soil testing and posting the river for the fish consumption advisory.

EPA Response: The baseline risk assessment is specifically designed to evaluate only current and potential future risks associated with hazardous waste releases from the site. Thus, EPA risk assessments by definition do not evaluate past hazardous chemical exposures. Potential past chemical exposures can he evaluated by ATSDR.

EPA has taken steps to implement those recommendations made by ATSDR in its November 1994 Health Assessment Report that are within the Agency's authority to carry out under Superfund law. Specifically, this ROD will require that ground water impacted by site-related organic solvents be monitored throughout the plume remediation as stated in Recommendation 1; air emissions from the stack and process water from the system is being monitored, at regular intervals, to insure compliance with the ROD's air emission limits and Kentucky Division of Water 's surface water discharge limits as stated in Recommendation 4. The air stripper emission limits presented in Table 9.2 of this ROD were developed using conservative EPA standards. The developed air model took into account factors such as the effects of the nearby buildings, site-specific wind directions and other meteorological parameters based on a modeled maximum impact on the nearest resident (100 feet due south from the stack onto the adjacent trailer park).

The other three (3) ATSDR recommendations were directed toward the State of Kentucky's because implementation of these recommendations would fall under the State's environmental regulatory authority. The three recommendations are as follows: (1) Recommendation 2 states that a fish advisory should be issued. The Kentucky Division of Water has indicated that its does not plan to issue a Fish Advisory for the Dayhoit stretch of the Cumberland River at this time, because the levels of PCBs detected in fish were comparable to PCB levels detected in fish around the state. However, the State has distributed a notice, to residents impacted within the Dayhoit area about this matter and should be contacted for additional information. A copy of the notice is provided in Appendix C; (2) In Recommendation 3, ATSDR stated that the extent and source of elevated zinc and lead levels should be determined, even though it acknowledged that its source is not "believed to be originating from the NEC site." EPA's characterization of Superfund sites is limited to investigating the nature and extent of contamination associated with hazardous waste spills or releases that originated at the site and will not pursue further characterization of these particular contaminants; and (3) Recommendation 6 states that nearby river water should be tested for fecal coliform. Again, EPA's investigative authorities at Superfund sites are limited to characterizing hazardous materials that originated at the site. Bacterial contamination, such as coliform, is not considered a hazardous substance. The Kentucky Division of Water should be contacted for an update on the biological testing that it periodically conducts within the State's waters.

As a final point, the commentor's statement that ATSDR recommended that site soil samples should be tested further is incorrect. In fact on page 41 of its November 1994 Health Assessment, ATSDR stated that, "Low levels of these contaminants (PCBs, dioxin/furans, and heavy metals) have been found but not at levels of health concern. The testing indicates that the soil does not contain hazardous contaminants that could be taken up by plants and consumed at toxic levels by humans."

Public Comment (39). Since there are no apparent restrictions on the future use of the site and because the "Industrial" nature of the site transitions abruptly to residential and other uses, the target levels chosen for remediation must be for residential sites, and notwithstanding the attainment of "target levels" for hot spots in soil, the cumulative burden of exposure to even "target" levels of contaminants from the soil pathway and from the surface water pathway as those contaminants are carried in suspension during rainfall events, must be included in a risk assessment that seeks to accurately reflect the total exposure from all pathways to the public and workers.

EPA Response: Continued industrial use of the NEC site is the most likely future land use for the property. As presented on page 5 of the baseline risk assessment, the soil action level for PCBs was established at 2.5 times lower than USEPA 's action level for industrial sites and the action level for VOCs was based on lifetime exposure under residential use assumptions. Therefore, the soil target levels are considered protective of current and potential future uses of the site. It is noted that off-site surficial soils and surface water were evaluated for long-term residential exposures and carcinogenic risks and noncarcinogenic hazards were found to be within or below EPA's target risk levels established for Superfund under the National Contingency Plan (NCP).

Public Comment (40). The exposure factors and the formula for determining the level of risk do not account for the historic exposure within the surrounding community and workforce to these pollutants through complete pathways that potentially existed for years prior to the discovery of the contamination in drinking water supplies, soils and within the workplace. The historic exposure and possible adverse health effects, as well as the body burdens already carried by the exposed human population, should be considered in the determination of appropriate levels of remediation of the releases in failing to account for these past exposures, the health risks of leaving the additional contamination are significantly understated.

EPA Response: Please see EPA Response to Comment 38. The objective of the baseline risk assessment is to estimate the reasonable maximum exposure expected to occur under both current and future land-use conditions. Evaluation of historic exposures is typically planned and evaluated by the Agency for Toxic Substances and Disease Registry (ATSDR). Their assessment typically requires human monitoring and assessment of the health status of the people near the site based upon the monitoring results.

Public Comment (41). No consideration appears to have been given to the cumulative effect of exposure to multiple compounds. The risk assessment assumes that the total effect of exposure is additive, and fails to account for the cumulative and synergistic effects of exposure to multiple compounds, including cancer-promoters. The exposure assessment and toxicity evaluations should not merely be additive.

EPA Response: The risks and hazards from individual chemicals and pathways were summed for each medium in the NEC baseline risk assessment under the assumption of dose additivity. As stated in EPA's Risk Assessment Guidance for Superfund EPA/540/1-89/002 (RAGS), "the assumption of dose additivity ignores possible synergisms or antagonisms among chemicals, and assumes similarity in mechanisms of action and metabolism. Unfortunately, data to assess interactions quantitatively are generally lacking. In the absence of adequate information, EPA guidelines indicate that carcinogenic risks should be treated as additive and that noncancer hazard indices should also be treated as additive. These assumptions are made to help prevent an underestimation of cancer risk or potential health effects at a site."

Public Comment (42). The presence of VOCs and other contaminants in surface and near-surface soils of areas that were not excavated or filled continues to be a direct pathway for current exposure to workers and future exposure to the public through volatilization of the compounds into the air and through inhalation of particulates.

EPA Response: As presented on pages 6 and 7 of the NEC baseline risk assessment, the concentrations of three targeted VOCs in the small unexcavated regions of the warehouse and along the southern fence were at least an order of magnitude below the soil action levels established by EPA and its guidance for risk-based concentrations for residential soils.

Therefore, VOCs were not selected as chemicals of potential concern for these surface soils and the exposure pathways associated with surface soils were not carried through the quantitative risk characterization.

Public Comment (43). The decision not to take further action to remove contamination from on-site soils and subsoils does not adequately consider future land use changes which might result in increased direct physical contact, including construction which would tend to concentrate VOCs and increase exposure and redisturbance of subsoil areas containing contaminants.

EPA Response: The decision not to take further action to remove contamination from on-site soils and subsoils is based upon the conclusion that on-site soils do not pose risks above the EPA 's target risk levels that would require remediation. Exposure to subsurface soils by workers during construction activities was evaluated in the baseline risk assessment. Risks were found to be within EPA's target risk levels and noncarcinogenic hazards were found to be below FPA 's target level.

Public Comment (44). There should be a formal uncertainty analysis, which would produce a "confidence distribution" reflecting the degree of confidence with which any claim concerning the level of risk is supported by available evidence. Also, missing is a formal analysis of the variability of risk across sensitive sub-populations. Either the default parameters must be chosen to be protective of the most sensitive subpopulations, which they do not under the current set of default values, or a formal analysis of the variability of risk across the sensitive subpopulations must be included. The baseline risk assessment does not appear to adequately account for the uneven distribution of risks throughout the population. The analyses should focus on the maximally exposed and most sensitive subgroups within the population, including immuno-compromised individuals, individuals with respiratory illnesses, in utero exposure, etc.

EPA Response: The uncertainties associated with the human health exposure assessment and toxicity assessment, and with estimating ecological risks were qualitatively discussed in the NEC baseline risk assessment. As stated in EPA's Risk Assessment Guidance for Superfund RAGS) "Only on the rare occasions that an RPM may indicate the need for a quantitative uncertainty analysis should one be undertaken ... A highly quantitative statistical uncertainty analysis is usually not practical or necessary for Superfund sites."

Human health risks were calculated for the reasonable maximum exposure (RME) using the 95% UCL exposure point concentration, toxicity values based on upper-bound estimates, and standard default exposure factors based on 95th percentile values in accordance with USEPA risk assessment guidance. The goal of the RME is the maximum exposure that is reasonably expected to occur at a site.

Public Comment (45). Little attention appears to be given to the significant uncertainties surrounding the toxicity of many of the contaminants. While professing that the exposure numbers have been "peer-reviewed," and thus are sound in theory, the brief toxicological profiles reflect graphically that little testing has been conducted for many of these compounds regarding a range of chronic health consequences, including whether chronic, low-dose exposure to many of the compounds might be capable of including or facilitating cancer, reproductive, nervous, or endocrine system disruptions, etc.

The significant data gaps in the human and ecological effects of chronic, low-dose exposure to many and all of these compounds makes the supposed conservatism of the default numbers an illusion.

EPA Response: The toxicity values used in the baseline risk assessment represent the best available and defensible toxicological information that EPA has compiled and specified that should be used in Superfund risk assessments. EPA continuously updates the databases that supply this information as toxicological research is completed and reviewed. The toxicity values are derived to be protective of chronic, low dose exposures and are based on studies which have evaluated a wide range of toxicological endpoints, including cancer, reproductive, nervous, and endocrine disruptions.

Public Comment (46). The use of a risk factor of one in a hundred thousand or a million additional cancer deaths as a target for satisfactory remediation fails to provide for complete protection of public health and the environment. The Council rejects in principle the suggestion that it is "acceptable" as a matter of public policy to shift any additional risk of death or illness onto a population without their knowledge and consent. The use of risk assessment to quantify and adjudge acceptable some level of residual contamination that may be left in the land or groundwater of the surrounding community is, on a policy level, a question of whether the polluter and his successors in interest should be held completely accountable for the pollution, or whether that responsibility may be shifted to the public-at-large and to neighbors. It is, alternatively, an economic choice of internalizing completely the costs of the use of toxics at the front end, and transferring those costs evenly among consumers, or externalizing a portion of those costs through the knowing and intentional exposure of those whose live near the site to chemicals that are known or suspected of being harmful, but "acceptably" harmful under this risk -based approach.

The allowance of any residual off-site contamination of soil, subsoil or groundwater also raises significant legal questions, since the EPA approval of a plan submitted by the responsible party which does not completely abate the health risks through remediation of off-site contamination, implicates the EPA in "taking" of the surrounding land by direct physical appropriation. The target goal for any off-site contamination must be complete restoration of land and water resources.

The use of the quantitative risk assessment to justify less-than-complete restoration of the land and groundwater resource is, on another level, a profoundly troubling moral question. The Council will not endorse by our silence a deliberate decision to impose on an unconsenting population of innocent third-parties, any additional risk of bodily harm and property loss. The council reiterates its opposition to any "risk-based" remediation approach that does not assure complete protection of public health and welfare.

EPA Response: EPA uses the general 10-6 to 10-4 risk range as a "target range" within which the Agency strives to manage risk as part of a Superfund cleanup. Once a decision has been made to take an action, the Agency prefers that cleanups achieve the more protective end of the range (i.e., 10-6), although waste management strategies achieving reductions in site risks anywhere within the risk range may be deemed acceptable by the EPA. Furthermore, the upper boundary of the risk range is not a discrete line at 1 x 10-6 in making risk management decisions. A specific risk estimate around 10-4 may be considered acceptable if justified based on site-specific conditions, including any remaining uncertainties on the nature and extent of contamination and associated risk. Therefore, in certain cases EPA may consider risk estimates slightly greater than 1 x 10-4 to be protective.

Public Comment (47). In certain cases where there is no established reference dose (RfD) for exposure from a particular pathway, the agency has not yet calculated the risks associated with that exposure, leading to a significant understatement of the total risks. An example of this is the lack of consideration of noncancer effects of vinyl chloride. Cancer and/or noncancer effects are ignored because of the lack of an RfD, leading to a total risk that is understated.

EPA Response: The noncarcinogenic effects for benzene and vinyl chloride were not ignored, but could not be quantitatively evaluated due to the unavailability of an established reference dose. Noncarcinogenic effects of exposure to these compounds were qualitatively discussed in the Section 4.2 (Toxicological Profiles) of the risk assessment and carcinogenic effects were quantitatively evaluated

Public Comment (48). The problem of understatement of the risk from ground-water exposure is compounded by the failure to include exposure associated with inhalation of air at the site. When the BRA was conducted, air emissions from the site had stopped, but modeling data appears to indicate that during the plant operation this would have been a significant exposure pathway and would have dramatically increased both the cancer risk and the Hazard Quotient,

EPA Response: The purpose of a baseline risk assessment is risk to human health and the environment under both current and.future land-use conditions. Please see EPA Response to Comments 38 and 40.

Public Comment (50). The effects of exposure to dioxin-like compounds are not considered in the BRA. The assumption that this exposure can be ignored because the individual risk from the individual dioxin congeners was low enough to be considered unimportant, is unsound.

EPA Response: As indicated in Table 3 of the Baseline Risk Assessment, the site concentration of 2,3,7,8-TCDD, the most toxic dioxin congener, was approximately 18 times lower than EPA guidance for 2,3,7,8 tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). Therefore, it was not selected as a chemical of potential concern and carried through the quantitative risk assessment. In addition, the increased cancer risk from the toxicity equivalent quotient (TEQ), referred to in the Council's comments of 7x10-6, is within USEPA 's target risk range of 10 -4 to 10-6, and less than the risk level of 10-4 at which remedial action is warranted.

APPENDIX C
Commonwealth of Kentucky Fish Study

<IMG SRC 0496266P>

FRANKFORT, KY. (Dec. , 1994) - A recent report concerning possible polychlorinated biphenyl (PCB) contamination of fish caught in the Cumberland River has been reviewed by the agencies in Kentucky responsible for issuing fish consumption advisories.

The three agencies, the Dept. for Health Services, the Dept. for Fish and Wildlife Resources, and the Division of Water, reviewed a report issued by the Agency for Toxic Substances and Disease Registry (ATSDR) that dealt with an assessment of public health threats in the Dayhoit area. The area was placed on the federal Superfund list in 1992 following discovery of chemicals in wells and in the soil.

The ATSDR report recommended that a "No Fishing" advisory for the Cumberland River near Dayhoit be posted because of the detection of PCBs in certain fish samples.

The levels of contamination were reported as being between .14 and .95 parts per million (ppm). The Food and Drug Administration (FDA) "action level," that level above which food will be removed from the marketplace, for PCBs in fish has been set at 2 ppm.

Kentucky agencies have traditionally used FDA action levels as guidance in determining when a fish consumption advisory should be issued for fish caught in Kentucky waters. In addition, the state requires a considerable amount of sampling before the issuance of an advisory. There were seven composite samples of five fish each in the study done by the ATSDR.

ATSDR has based its recommendation on newly published EPA guidance which uses risk assessment to issue advisories. Under this method, eating a four-ounce portion of a fish that contained PCB contamination of .002 ppm would be considered a risk if consumed more than once a month over a period of 70 years. The risk level would be considered to be one in a million; that is, there would be the risk of one additional cancer death per million people who consumed more than one meal a month for 70 years of a four-ounce portion of fish containing PCB contamination at the level established.

- more -

STATE AGENCIES REVIEW INFORMATION CONCERNING FISH IN CUMBERLAND RIVER

The state agencies have begun to review information concerning risk levels. A decision as to whether or not to adopt this method for advising the public about fish contamination has not been made, and FDA action levels will continue to be used until such a decision is made.

Meanwhile, Division of Water information concerning levels of PCBs in fish in Kentucky waters indicates that the average level for the state is 0.37 ppm. This average is for more than 150 samples taken at monitoring stations in various streams across the state.

Fish are caught and sampled on a regular basis in order to determine whether an advisory should be issued, continued, or lifted. Advisories are in effect in six areas of the Commonwealth. In five, sampling has shown fish tissue contaminated with PCBs above the FDA action level of 2 ppm. Those are: Town Branch/Mud River, West Fork Drakes Creek, Little Bayou Creek, the Ohio River, and Green River Lake. Mercury in amounts above FDA action levels has been found in fish tissue samples from the West Kentucky Wildlife Management Area.

A fish consumption advisory alerts the public that certain contaminants above FDA action limits have been detected in specific species of fish at a particular location. An advisory is not a ban on eating the fish, but a warning that consuming large portions regularly over an extended periods of time could have the potential for creating human health problems.

<IMG SRC 0496266Q>

APPENDIX D

Summary of Cancer and Noncancer Risks by Exposure Route

TABLE 18
SUMMARY OF CANCER AND NONCANCER RISKS BY EXPOSURE ROUTE
NATIONAL ELECTRIC COIL SITE
HARLAN COUNTY, KENTUCKY

EXPOSURE	Child Resident		Adult Resident		Lifetime Resident (Child + Adult)	Adult Worker	
ROUTE	Cancer	HI	Cancer	HI	Cancer	Cancer	HI
Groundwater							
Ingestion	3E-04	21	5E-04	9	8E-04	2E-04	3
Inhalation of VOCs from Showering	9E-05	0.3	8E-05	0.06	2E-04	3E-05	0.02
Inhalation of VOCs from Non-showering	1E-05	0.05	1E-05	0.01	2E-05	NA	NA
TOTAL	4E-04	21	6E-04	9	1E-03	2E-04	3
On-site Subsurface Soils							
Ingestion	NA	NA	NA	NA	NA	7E-06	0.08
Dermal Contact	NA	NA	NA	NA	NA	3E-07	0.0003
Inhalation of Particulates	NA	NA	NA	NA	NA	3E-10	--
TOTAL	NA	NA	NA	NA	NA	7E-06	0.1
Off-site Surficial Soils							
Ingestion	1E-05	0.1	4E-06	0.01	1E-05	1E-06	0.09
Dermal Contact	2E-06	0.006	4E-06	0.003	6E-06	3E-08	0.0005
Inhalation of Particulates	2E-08	--	1E-08	--	3E-08	4E-10	--
TOTAL	1E-05	0.1	4E-06	0.01	1E-05	1E-06	0.1
Sediments							
Ingestion	4E-07	0.002	1E-07	0.0003	5E-07	NA	NA
Dermal Contact	1E-07	0.0006	5E-08	0.0002	2E-07	NA	NA
TOTAL	5E-07	0.0026	2E-07	0.0005	7E-07	NA	NA
Fish							
Ingestion	NA	NA	4E-04	--	4E-04	NA	NA

HI Hazard Index
VOCs Volatile Organic Compounds
NA Not Applicable - Pathways not evaluated for that receptor

APPENDIX E

Commonwealth of Kentucky Letter of Concurrence

<IMG SRC 0496266R>

April 5, 1996

Derek Matory
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Ga 30365

Re: National Electric Coil Superfund Site
Harlan County, Kentucky
Record of Decision

Dear Mr. Matory:

The Kentucky Division of Waste Management (KDWM) Superfund Branch has reviewed the draft Record of Decision (ROD) and supporting documents for the National Electric Coil Superfund Site located in Harlan County, Kentucky. The Kentucky Division of Environmental Services (KDES) has also reviewed the aforementioned documents as they relate to risk assessment and their comments have been submitted under separate cover.

KDWM concurs with the choice of remediation for contaminated groundwater. We ask that the same monitoring provisions utilized at the time of the initial pump and treat startup in July of 1993 again be implemented for the startup of the new and expanded treatment system, to provide assurance to the local residents that operations are being conducted in a responsible and safe manner.

It is our position that two issues remain to be resolved. The first is related to our continuing differences in risk assessment, which have been well documented in previous correspondence. While we believe that resolution of risk assessment issues would not change the selected remedy, endpoints for remediation could be affected. For this reason, site risks should be reassessed prior to any future decision regarding shutdown of the treatment system. In the interim, our respective agencies can continue to resolve their differences.

The second issue concerns soil contamination. Although existing levels of contamination may not pose an unacceptable risk, KDWM feels that a limited amount of additional sampling is needed for verification. Since EPA does not believe that additional sampling is necessary, KDWM will conduct this activity. The results will be shared with EPA so that a joint evaluation may be made. Hopefully this will resolve the issue to everyone's satisfaction.

As always, KDWM is willing to discuss the issues at your convenience.

<IMG SRC 0496266S>

cc: Robert Daniell (Director, KDWM)
Rick Hogan (KDWM)
William Hill (KDWM)
Randall McDowell (DOL)
Sally Wiley (KDES)