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Superfund Record of Decision:

John's Sludge Pond, KS

50272-101

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The Johns' Sludge Pond site is in a relatively undeveloped area in the city of Wichita, Sedgwick County, Kansas. The 0.5-acre site, which lies within the 500-year floodplain of the nearby Little Arkansas River, neighbors a large rail yard, an interstate highway, a large borrow pit, and farm land. The city of Wichita owns approximately 1/3 of the site as a result of condemnation for highway drainage. During the 1950s and 1960s the Super Refined Oil Company used the sludge pond for the disposal of waste oil and up to 15,000 cubic yards of oily sludge generated by the oil recycling and reclamation operation. Because sulfuric acid was used to refine waste oil for recycling, the wastes dumped into the pond were very acidic. Additionally, high lead concentrations and low PCB concentrations (less than 50 ppm) were also detected in the sludge. As surface water flowed into the pond, an extremely acidic layer of water formed on top of the sludge which often overflowed into nearby surface waters. The city subsequently built berms to prevent further surface runoff. In 1983 EPA ordered the city to undertake interim cleanup activities which consisted of excavating and solidifying the sludge using cement kiln dust with redeposition of the treated sludge into a compacted clay-lined cell followed by capping using a compacted clay cap. Surface and ground water monitoring following the interim action have not detected any contaminant levels that would require further action. (See Attached Sheet)

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16. Abstract (continued)

The selected remedial action for this site includes a no further action scenario. Previous interim remedial activities were adequate to protect human health and the environment. There are no costs associated with this no action remedy. The city will continue to provide post-closure maintenance. The county will continue to provide post-closure monitoring.

RECORD OF DECISION

DECLARATION

REMEDIAL ALTERNATIVE SELECTION

SITE NAME AND LOCATION

Johns' Sludge Pond
Wichita, Kansas

STATEMENT OF BASIS AND PURPOSE

This decision document presents the remedial actions selected for the Johns' Sludge Pond site in Wichita, Kansas. The final site remedy was selected in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 U.S.C. §9601 et seq. and with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision is based upon the documents and information contained in the Administrative Record for the site. A copy of the Administrative Record is available for public review in the U.S. Environmental Protection Agency (EPA) Region VII Docket Room in Kansas City, Kansas, at the Department of Public Works in Wichita, Kansas and at the City-County Health Department in Wichita, Kansas.

The State of Kansas was consulted with and concurs on the remedy selected for this site, provided that periodic reviews and post-closure maintenance and monitoring are conducted at the site.

DESCRIPTION OF THE SELECTED REMEDY

In consultation with the State of Kansas, EPA has determined that no further remedial actions are required for the Johns' Sludge Pond at this time. The EPA finds that the cleanup already conducted at the site by the City of Wichita under EPA's oversight satisfies the criteria established in Section 121 of SARA for the selection of remedial actions and is protective of human health and the environment.

In 1986 the City of Wichita completed an interim site cleanup which consisted of the following:

- Acidic, contaminated sludge was removed from the disposal cell and stockpiled on the adjacent ground surface. A compacted clay liner was constructed on the bottom of the disposal cell.

- Stockpiled sludge was solidified with cement kiln dust to raise the pH of the sludge so that it was no longer acidic and did not pose a threat of direct contact exposures. Solidification also reduced the solubility of lead, the principal chemical contaminant in the sludge, and reduced the potential for continuing ground water contamination by the site. Finally, solidification allowed a cap and cover to be constructed over the solidified sludge to further reduce the potential for direct contact exposures.

- Solidified sludge was then redeposited back in the lined disposal cell. A compacted clay cap was constructed on top of the sludge and on the sidewalls of the disposal cell.

- A soil cover was installed above the clay cap. The site was then seeded with vegetation and fenced.

- Deed restrictions were placed on the property preventing land uses which would interfere with the effectiveness of the remedy implemented.

- Post-closure environmental monitoring for site contaminants is being conducted by the City-County Health Department. Postclosure maintenance of the site is being provided by the City Public Works Department.

DECLARATION

The selected remedial alternative is protective of human health and the environment and attains federal, state and local requirements that are applicable, or relevant and appropriate, to the remedial actions and is cost effective. This remedy satisfies the statutory preference in CERCLA/SARA for remedies which employ treatment technologies that reduce the toxicity, mobility or volume of the hazardous substances present at the site.

Because this remedy results in hazardous substances, pollutants or contaminants being left at the site above health-based levels, a review of the continued adequacy of the site remedy shall be conducted no less than once every five years as required by Section 121 of SARA. Available analytical data and information from the post-closure monitoring and maintenance will be used in these reviews.

9-22-89
Date

Morris Kay
Regional Administrator

RECORD OF DECISION (ROD)

Johns' Sludge Pond

Wichita, Kansas

Prepared by:

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION VII

726 MINNESOTA AVENUE

KANSAS CITY, KANSAS 66101

September 1989

TABLE OF CONTENTS

For information purposes the following abbreviations for units of measurement used in text are provided:

Liquids: Milligrams per liter (mg/l)=parts per million (ppm).
Micrograms per liter (ug/l)=parts per billion (ppb).

Solids: Milligrams per kilogram (mg/kg)=parts per million (ppm).
Micrograms per kilogram (ug/kg)=parts per billion (ppb).

DECISION SUMMARY

SECTION 1, SITE LOCATION AND DESCRIPTION

1.1. Site Location

Johns' Sludge Pond is located at 29th and Hydraulic Streets in the northern portion of Wichita in Sedgwick County, Kansas. The site is approximately ½ acre in size and is located in a relatively undeveloped part of the city, north of an industrialized section of Wichita. To date, very little development has occurred north of the site (Refer to Figure 1, Area Map).

Land uses immediately surrounding the site include: a large rail yard south and southwest of the site; an interstate highway to the west; a large borrow pit to the north (dug for the construction of the adjacent highway and now filled with water); and farm fields to the east and southeast of the rail yard. The nearest residences are approximately ½ mile south-southeast of the site, on the other side of a farm field. Much of the land in the vicinity of the site is industrialized and includes several large grain elevators, the rail yard, an oil refinery, and a variety of other industrial operations. Remaining land near the site is vacant or undeveloped.

The City of Wichita owns slightly more than half of the property on which Johns' Sludge Pond is located. The remainder of the site is owned by the Estate of Ava Johns, the owner-operator of the site when it was used for waste disposal (Refer to Section 2 discussion on site history).

1.2. Topography

Before the construction of the adjacent highway, which is elevated some 20 feet above the surrounding terrain, the area landscape was quite flat. The site is located in the 500-year floodplain of the Little Arkansas River and is about 1,100 feet east of the river. Surface water runoff from the site drains into the East Fork of Chisholm Creek, just south of the site, and then into Chisholm Creek. Chisholm Creek then drains into a concrete-lined ditch or canal approximately 6,000 feet south of the site. This ditch parallels the highway, and receives runoff from the highway before discharging into the Arkansas River in the southern part of the city, about 7.0 miles south of the site.

When the site was used for the disposal of liquid wastes by the Johns' Refinery, it was an open pit into which surface water runoff from the surrounding land would drain. However, as a result of the City's cleanup actions the site now has a clay cap and soil cover which are some 15 feet above grade (nearly as high as the overpass of the adjacent highway). Consequently, surface

water runoff now drains off of the site onto surrounding land and into the East Fork of Chisholm Creek. A dirt road, which is elevated above existing grade, separates the site from the borrow pit and prevents any runoff from the site reaching the borrow pit.

1.3. Hydrogeology

The Arkansas River Valley consists of unconsolidated alluvium and terrace deposits of Upper Pleistocene age (Wisconsin-Recent). These surficial deposits are composed of fine to coarse-grained sands and fine to coarse-grained gravels with clayey silt in the upper portions of the sequence. In the western part of the county, these deposits are an important ground water source with the sands and gravels providing adequate water production rates. The rates decrease eastwardly as the percentage of clays and silts increase toward the eastern edge of the floodplain.

The alluvial deposits are underlain by the Wellington Formation which consists of calcareous shales, interbedded gypsum and anhydrite, and salt. In some western portions of the county, the salt thickness can reach as much as 300 feet.

Local ground water flow direction has been calculated to be toward the south-southeast, using the monitoring wells around the site. The Wellington formation southeast of the site yields less water than the alluvium found closer to the river.

The alluvium thickness is generally about 50 feet thick at the site and consists of silty clay with sand intervals ranging from 5 to 15 feet in thickness. Eastwardly, the alluvium thins and eventually is erosionally truncated, outcropping at the surface. The Wellington Formation also outcrops at the extreme eastern edge of the floodplain. Typically any wells finished in the Wellington would be completed between 40 and 50 feet, large in diameter (providing for adequate storage volumes), and used for limited domestic and livestock supplies or as process water. In general, the production rates in wells near the site are low. Within the bedrock, water occurs in solution cavities, crevices, and openings in the weathered upper portions of the Wellington Shale formation and in the void spaces of the overlying alluvial soils, where present.

Two municipal wells exist in the area but are located considerably upgradient (3½ and 4½ miles) and are not at risk of contamination by the site. The EPA completed a ground water use survey in 1989 and identified 13 private wells within 1½ miles of the site. Of these 13 wells only three were used for drinking and all three of these were upgradient, and were, therefore, at little or no risk of contamination by any contaminant releases from the site. All three of these wells appear to be above

thicker alluvial deposits than are found downgradient of Johns' Sludge Pond. The alluvial deposits yield more water and are more productive than the underlying shale found near the surface in the absence of alluvium.

Ground water at the site is hard with levels between 500 and 700 mg/l total solids. Naturally occurring chloride concentrations also tend to be high and ranged between 38 and 227 mg/l. Although high, the chloride values are still less than the 250 mg/l Secondary Maximum Contaminant Level (SMCL) established by the EPA. (See Section 4 for definitions of SMCL and Maximum Contaminant Level, or MCL.) The distribution of dissolved solids in the ground water is closely related to the geology and hydrogeology of the area. The high concentrations of dissolved solids in the water are attributable to the Wellington Formation, where the shale contains large amounts of gypsum, anhydrite and locally thin seams of salt. A zone of highly mineralized ground water is found adjacent to the river. This zone is the result of movement of mineralized water from the river into the aquifer. Conductivity measurements taken in June 1987 and September 1987 indicate total dissolved solids concentrations ranging from 458 to 786 mg/l and from 449 to 1079 mg/l, respectively.

Onsite ground water from monitoring wells tends to be very turbid, containing a large amount of suspended or particulate matter. The EPA analyzed ground water for nephelometric turbidity units (NTUs) and reported a value of 101. The EPA has established an MCL for surface water supplies of 1.0 NTU. This turbidity measure of 101 NTU in the onsite monitoring well water is an indication of the unsuitability of the ground water as a drinking water source. Alternately, the silty water may be a function of the differences in construction and development of monitoring wells as compared to drinking water wells. A greater degree of care is taken to exclude suspended solids from drinking water wells.

1.4. Climate

The site is located in the city of Wichita, which is in south-central Kansas. Wichita has a continental climate with a wide range of temperature extremes. The hottest month of the year, on average, is July with an average high temperature of 90 degrees Farenheit. The coldest month of the year is January with an average low temperature of 20 degrees Farenheit.

Table I, taken from a U.S. Department of Agriculture/Soil Conservation Service publication on Sedgwick County, summarizes monthly averages for temperature and precipitation. Most of the precipitation in Sedgwick County falls in the months of December through March with the remainder of the year being quite dry.

Wichita is often very windy. The prevailing wind direction is from the west, with winters tending to have winds from the northwest and summers having winds from the southwest. Sustained winds speeds of 15-25 miles per hour are quite common, with gusts even higher. South-central Kansas has many tornadoes and thunderstorms, most of which occur from April through September.

SECTION 2, SITE HISTORY

2.1. Waste Disposal

Primarily in the 1950s and 1960s, Johns' Sludge Pond was used by the Super Refined Oil Company for the disposal of waste oil and oily sludge generated in its recycling/reclamation of motor oil and other oils at the Johns' Refinery in Wichita, Kansas. At the time, the site was used for disposal it was owned by Ava Johns. Ava Johns was the owner-operator of the Super Refined Oil Company, which was commonly known as the Johns' Refinery. Johns' Refinery was located on 21st Street, approximately 1¼ mile southwest of the Johns' Sludge Pond.

Johns' Sludge Pond was originally a depression near the East Fork of Chisholm Creek. Johns used the property for disposal of liquid wastes from his refinery. In order to be able to dispose larger quantities of wastes, the original depression was enlarged by excavation into what eventually became the disposal cell of Johns' Sludge Pond. Johns' Sludge Pond eventually covered about ½ acre and contained an estimated 15,000 cubic yards of oily sludge prior to cleanup. It is believed that the pit was excavated as deep as 15 feet below grade, down near the highest level of the water table. The average depth of the pit was eight feet.

The method of disposal was to truck the semi-liquid, oily sludge to the site and dump it into the pit. Sulfuric acid was used by Johns in refining waste oil for recycling. As a result, the waste dumped into the site was often quite acidic. The inflow of surface water into the disposal cell resulted in an extremely acidic layer of water on top of the sludge.

Originally, the site lacked berms or other measures to prevent the overflow and release of contaminated water or liquids into nearby surface waters. During heavy rains the site would release contaminated water or liquid to the drainage of Chisholm Creek and the Arkansas River. Prior to EPA's involvement with the site, the City built a berm around the site which prevented any additional contamination of surface waters by the site.

When used for disposal by Johns, the cell was unlined and had no leachate collection or other engineering or design controls to prevent or control contaminant releases to the environment. Based upon available information, all of the wastes disposed at the site appear to be from the Johns' Refinery.

The principal hazard associated with the wastes disposed in the cell was the acidity of the sludge and of the water on top of the sludge. The water had a pH as low as 1.0 (pH scale of 1.0 to 14.0). However, the sludge also contained potentially toxic concentrations of lead and low levels of polychlorinated biphenyls (PCBs), other metals and other organics (see Table II). Some of the wastes disposed at the site were flammable, as evidenced by the occasional fires which reportedly occurred several years before EPA's involvement with the site.

2.2. Contaminant Releases

Ground and surface water samples have been collected at and near the site by EPA and by the City-County Health Department for chemical analysis. Surface and ground water samples are collected and analyzed by the Health Department pursuant to a post-closure monitoring plan approved by EPA. No releases of hazardous substances from the site via surface water have been found.

Ground water samples are collected and analyzed for lead, the principal chemical contaminant, and also PCBs as part of the post-closure monitoring for the site. A series of six shallow, alluvial shallow monitoring wells surround the site and are used for ground water sample collection. Table III summarizes ground water contaminant levels noted in these monitoring wells.

No PCBs have been found in the ground water during post-closure monitoring. In the inner ring of three monitoring wells nearest the site, elevated levels of total lead, attributable to releases from the site, have been noted. (Total lead analyses include dissolved lead, which could be expected to be carried with normal ground water flow as well as lead adsorbed onto suspended solids in the ground water samples collected. Ground water flow would not transport suspended solids offsite, except in unusual circumstances such as in karst geology, which is not found at this site.) Drinking water wells are constructed and developed to provide nonturbid (clear) water, generally free of suspended solids or particulate matter, in which the lead found in post-closure ground water samples has been associated. In the outer ring of three monitoring wells, elevated levels of total lead, exceeding the maximum contaminant level (MCL) of 50 ug/l for public drinking water supplies, have been recorded in one of three samples collected from each well. Analyses of ground water samples for dissolved lead have not exceeded the MCL of 50 ug/l for drinking water supplies.

SECTION 3, DESCRIPTION OF THE REMEDY

3.1. Interim Site Remediation

In November 1983, the EPA issued a Consent Order under Section 106 of CERCLA to the City of Wichita, as the owner of the site, requiring that an interim cleanup action be conducted at the site. Subsequently, the City submitted a work plan to EPA for this work, which EPA approved and the City implemented.

Because the sludge contained low levels of PCBs, with an average concentration of 44 mg/kg, the reconstructed disposal cell was designed to meet the technical requirements of the Toxic Substances and Control Act (TSCA) for a chemical waste landfill. Two of the technical requirements of a chemical waste landfill could not be achieved because of the setting of the site:

- The 50-foot separation between the bottom of the disposal cell and the water table could not be achieved. (The shallow water table at the site, approximately 20 feet below ground surface, would have required a regional lowering of the water table, which is impractical. In addition, the lack of viable disposal options for any ground water extracted to lower the water table made this impractical.)

- A leachate collection system could not be installed. The land space necessary for leachate collection was not available because of surrounding land uses, e.g., the highway, the railroad, and the road between the site and the borrow pit to the north. (Sludge treatment, with cement kiln dust, increased waste volume to the point that all available onsite land was used for the reconstructed disposal cell. The clay cap, the clay liner, and the sludge treatment with cement kiln dust preclude the formation of significant quantities of leachate. Leachate collection was, therefore, not necessary. No leachate seeps have ever been noted at the site.)

Site cleanup was completed by the City in 1986 under EPA oversight and consisted of the following:

- Sludge was removed from the existing disposal cell and stockpiled on the adjacent ground surface.

- A compacted clay liner was constructed on the bottom of the disposal cell using clay soils of suitable density, plasticity, particle size, moisture content and compaction. A permeability no greater than 10-7 cm/second was achieved for the compacted clay liner.

- Stockpiled sludge was solidified with cement kiln dust. A ratio of 2½:1 (cement kiln dust to sludge) was initially selected for treatment of the upper sludge and ½:1 for the lower sludge. During remedy implementation it was evident that portions of the sludge required additional quantities of cement kiln dust, which were used. Solidification of the sludge with cement kiln dust accomplished the following objectives:

  1. It tied up the lead in the mixture of cement kiln dust and sludge and reduced the potential for lead to be released and contaminate ground water;

  2. It raised the pH of the sludge mixture and further reduced the potential for lead to be released and contaminate ground water. (As the pH is raised, the solubility of lead in water is reduced); and,

  3. It improved the structural stability of the sludge-cement kiln dust mixture to support a low permeability cap and cover, which reduced the potential for direct contact exposures and contaminant releases from the site.

- The sludge-cement kiln dust mixture was then redeposited back into the lined disposal cell. To further reduce the potential for direct contact exposures and to reduce the potential for water to percolate through the fixed sludge, a compacted clay cap over the top and on the sidewalls was installed. As with the clay liner, a permeability no greater than 10-7 cm/second was achieved.

- To improve long-term stability and ensure continued encapsulation of the treated sludge, a soil and vegetative cover was installed above the clay cap. The soil cover consisted of a silty loam topsoil. A mixture of buffalo grasses was used as the vegetative cover.

- As the final step in the remedy, after the installation of the cap and cover was completed, a four foot woven wire fence was installed around the perimeter of the site. Warning signs were posted at various locations on the fence. The fence prevents dirt-bike riding and other activities which could damage the cap and cover. The fence also excludes unauthorized personnel from entering the site. A deed restriction has been obtained for the property and

prevents, or controls, changes in land uses which could interfere with the effectiveness of the cleanup conducted, or which would have the potential to release contaminants into the environment.

Pursuant to an EPA-approved post-closure monitoring and maintenance plan, the City-County Health Department monitors ground and surface water at the site for lead and PCB contamination. The City's Public Works Department provides post-closure maintenance at the site on the cap, covers and fence.

SECTION 4, APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 121 (d) of CERCLA, as amended by SARA, requires that remedial actions comply with applicable, or relevant and appropriate, requirements or standards (ARARs) under federal or state environmental statutes or regulations. Several ARARs have been considered for this site.

4.1 The Safe Drinking Water Act

The Safe Drinking Water Act's Maximum Contaminant Level (MCL) of 50 ug/l for lead was considered as a potential ground water ARAR for this site. However, the MCL is not applicable to ground water at this site. MCLs are enforceable, and, thus, applicable, only for public drinking water supplies, as defined below. PCBs have not been found in the ground water in post-closure monitoring.

> Definitions: Primary drinking water standards are established by EPA under the Safe Drinking Water Act and are referred to as Maximum Contaminant Levels, or MCLs. The MCLs are enforceable standards for public drinking water systems, serving at least 25 people, or having 15 or more service connections, and are based upon concentrations of regulated contaminants at the tap. The MCLs are often used for private drinking water supplies as nonenforceable, advisory levels. Secondary Maximum Contaminant Levels, or SMCLs, are also established by EPA under the Safe Drinking Water Act. SMCLs set maximum levels for contaminants in water which could discourage or limit water use, when present at sufficient concentrations. The SMCLs deal with taste, odor, color and corrosivity of water. SMCLs are advisory and not legally enforceable.

The MCL for lead is not applicable at this site, because the site has not contaminated public drinking water supplies as defined above. The MCL for lead might still be relevant and appropriate as an ARAR for ground water, even if not applicable. The EPA generally considers MCLs relevant to ground water at Superfund sites. However, for the following reasons, the MCL for lead is not considered appropriate for the ground water at this site:

a. Suspended Solids

Lead found above the MCL in onsite ground water in the post-closure monitoring is associated with the suspended solids or particulate matter in the water samples. Lead has not been found in the supernatant (sediment-free) portion of ground water samples. Because of the large amount of suspended solids in the water (more than 500 mg/l), the lead being measured could be due to natural conditions. In any event, drinking water wells are constructed and developed to provide sediment-free water, which has not contained lead above the MCL.

b. Low yield

The aquifer beneath the site yields very small quantities of water. Bailing the well to collect samples has shown that wells completed in the vicinity of the site would yield less than two gallons of water per minute. This is insufficient for use as a public water supply, for most process water uses, or as a supply of drinking water for most single family wells or homes.

c. Turbidity

While sampling the wells, EPA has noted that the water collected is extremely silty, containing an inordinate amount of naturally occurring suspended solids or particulate matter. Water containing this much silt, which exceeds the MCL for surface water supplies, is generally considered undrinkable. Alternately, it is possible that the silty water from the monitoring wells could be due to the differences in construction, e.g., screen slot size, and development of monitoring wells as compared to drinking water wells.

d. Hardness

Due to hardness, the ground water beneath the site has limited potential uses, unrelated to the existence of Johns' Sludge Pond. Hardness in water is caused primarily by calcium and magnesium cations, existing as bicarbonates, carbonates and sulfates. Water over 180 mg/l hardness is generally classified as very hard and is generally "softened" prior to use. Water above 200 mg/l hardness is generally considered too hard to effectively soften, and for that reason, often unsuitable for domestic or commercial uses. Historic data from the Kansas Geologic Survey indicates that ground water in the area has hardness of 700 mg/l or more.

e. Iron

The concentrations of iron in ground water further limit the potential uses of the water. The iron content of water is important due to staining of clothes and utensils, disagreeable taste, encrusted well screens, clogged pipes, and because the growth of certain bacteria using iron is promoted. The EPA has established an SMCL of 0.3 mg/l for iron. The iron concentrations in samples from Johns' Sludge Pond range from 0.1 to 55.8 mg/l.

4.2. The Resource Conservation and Recovery Act (RCRA)

The Resource Conservation and Recovery Act (RCRA) was evaluated as a potential ARAR on the site. However, the sludge was neither a RCRA-listed nor a characteristic hazardous waste. RCRA is thus not an ARAR for this site.

4.3. The Toxic Substances and Control Act (TSCA)

Region VII considers the regulations on chemical waste landfills under the TSCA regulations to be ARARs for this site. The average concentration of PCBs in the sludge was 44 mg/kg, which is less than the 50 mg/kg level at which TSCA regulates current disposal. (Past PCB waste disposal is regulated under TSCA at concentrations above 500 mg/kg.) Therefore, the TSCA regulations for chemical waste landfills are not applicable to this site. Nevertheless, the TSCA regulations do appear to be relevant and appropriate. For that reason the reconstructed disposal cell was designed and constructed to meet the technical requirements of a TSCA chemical waste landfill, to the extent practical, given the setting of the site.

SECTION 5, CURRENT SITE RISKS

5.1. Direct Contact

Before the City's interim cleanup, the principal hazard posed by Johns' Sludge Pond was from potential direct contact exposure to people who might enter the site. Although the site was located in a relatively undeveloped portion of the City, where many of the surrounding land uses were industrial and did not have the potential to result in pedestrian traffic on the site, such exposures were still possible.

Prior to cleanup, the sludge and water on top of the sludge was very acidic, with a water pH as low as 1.0. The acidity of the water and the sludge could have burned tissue if contacted for a sufficient period of time. The sludge also contained relatively high concentrations of lead, other metals, and some organic contaminants, including PCBs (Refer to Table II).

The levels of lead in the sludge may have been high enough to result in adverse health effects if the sludge were inadvertently consumed often enough and in large enough quantities. The consumption of sufficient quantities of lead can result in adverse health effects on the human central nervous system (including dullness, restlessness, irritation, muscular tremors, ataxia, memory loss, convulsions and coma), the peripheral nervous system (including hyperaesthesia, analgesia and impaired neural function), and the kidneys (including damage to proximal tubules and generally impaired kidney function). The most serious human health effect from oral lead exposures is the impaired mental development of children. Symptoms similar to retardation are commonly reported from serious or long-term exposures of children to environmental lead.

Other than exposure via water or sludge consumption, the lead did not pose a threat to human health, i.e., via direct contact or skin exposures. The other metals present in the sludge (Refer to Table II) presented similar risks of human exposure from the ingestion of sufficient quantities of sludge or water, although the specific symptoms or health effects would be different, and the risks from the other metals were lower than for lead.

The PCBs and some of the other organics found in the sludge are potential human carcinogens. The consumption of sludge or water containing carcinogenic organics carried some increased lifetime risk of cancer. However, the incremental increase in cancer risk was minimal, because the amount of sludge or water consumed would have been small and would have occurred very infrequently.

The PCBs and some of the other organics in the sludge would have posed an additional direct contact risk. Chloracne, which is similar to a severe skin rash, could have resulted from the exposure to materials containing PCBs and some of the other organics in the sludge.

All of the above risks have been effectively eliminated by the City's cleanup. Such risks will continue to be effectively abated so long as the sludge and cement kiln dust remain mixed, or so long as the sludge remains beneath the cap and cover.

5.2. Air

Prior to cleanup, the site posed only a marginal threat of contaminant releases to the air. In the early 1970s, not long after the site was still used for sludge disposal, fires reportedly occurred at the site. During the fires smoke, containing hazardous substances may have been released into the air and resulted in some human exposures at that time. However, prior to the City's cleanup, the site did not appear to represent a significant threat to health or environment via the air pathway.

5.3. Surface Water

Sampling and analyses of surface water and sediments in the creek into which runoff water from the site discharges has not found contamination attributable to the site. Prior to cleanup, the site was a marginal threat to contaminate surface water. However, the berm built by the City around the site appeared to have effectively reduced the threat of releases to surface water.

5.4. Ground Water

The pathway in which some potential endangerment remained after the City's interim cleanup was ground water. Although there are no known drinking water wells at risk of contamination by the site, there is some potential for additional ground water uses to develop. These potential uses may be limited by the hydrogeologic setting of the site (Refer to discussion in Sections 2.2 and 4.1). In EPA's opinion, in order for human health to be endangered via the ground water pathway, additional drinking water wells at risk of contamination would have to be drilled or found near the site. Alternately, exposure might also result if water from some of the existing lawn watering or process water wells were to be used for drinking.

In consideration of the potential endangerment via the ground water route that might exist after the City's cleanup, EPA evaluated additional alternatives regarding ground water remediation.

SECTION 6, GROUND WATER ALTERNATIVES

The interim remedial measures were implemented primarily to prevent direct contact exposures to the acidic, lead-contaminated sludge and water in the sludge pond. A secondary objective was to mitigate the site as a source of ground water contamination. Active restoration, or cleanup, of ground water was not a short-term objective of the interim remedial actions implemented. However, EPA has now evaluated the adequacy of the interim remedial actions as the final remedial actions, along with the post-closure maintenance and monitoring and the land-use restrictions. The EPA has also identified and evaluated additional alternatives to address ground water quality restoration as the final site remedy.

6.1. Ground Water Extraction for Treatment or Disposal

Treatment of ground water was identified as a possible ground water remedy at this site. Lead is the principal site contaminant and has been found in ground water above the MCL only as total lead. Dissolved lead has not been found in ground water at concentrations exceeding the MCL. At sites where cleanup of ground water containing such low levels of lead is necessary, the collected water would generally be disposed as hazardous waste. Alternatively, extracted ground water might be disposed as solid waste if tested and determined to be nonhazardous. Treatment of ground water to further reduce lead levels would not be reliable at these low concentrations.

Ground water collection for disposal is not a viable alternative, since only total lead has been found above the MCL. It is not possible to remove all solids from an aquifer. Moreover, sediment-free ground water has not contained lead above the MCL.

6.2. Complete Removal of All Wastes and Residual Soils

The interim remedial measures have reduced, but would not completely eliminate, the site as a source of contaminants to ground water. Although the cap and the liner are relatively impermeable, they will allow the movement of small quantities of water, which may contain very low levels of contaminants, into the underlying ground water.

Only by completely removing the treated sludge and any residual contaminated soils can the potential for ground water contamination be completely eliminated. However, complete removal would require a number of preliminary steps, such as removal of the soil and vegetative cover, removal of the cap and the liner, and breaking up the treated sludge in order that it

could be handled. Such activities may lead to contaminant releases into the environment and increase the threat to human health and the environment.

In addition, complete removal would not immediately or quickly restore ground water to an uncontaminated condition. Complete removal would allow natural flushing to reduce (lead) contaminant levels to background levels more quickly, but this would still take many years. For these reasons, complete removal would not effectively protect health and environment.

6.3. No Further Action

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline for comparison to other alternatives. Under this alternative, EPA would take no further action at the site to mitigate the site as a source of possible ground water contamination.

In the absence of any contamination in sediment-free ground water, coupled with the lack of current use of ground water at risk of contamination, the No-Further Action alternative was considered further.

Under this alternative the City would continue post-closure maintenance, and the City-County Health Department would continue post-closure monitoring. If ground water contaminant levels were to increase and/or if additional ground water uses that were at risk of contamination by the site were to be identified, EPA would reassess the need for ground water cleanup as appropriate.

SECTION 7, DETAILED EVALUATION OF THE GROUND WATER ALTERNATIVE

The EPA has identified the "No Further Action" alternative as the preferred alternative based upon the following criteria.

7.1. Protection of Human Health and the Environment

This criterion addresses whether or not a remedy provides adequate protection of human health and the environment and describes how risks are eliminated, reduced or controlled through waste treatment, engineering controls, or institutional controls. In the absence of any current ground water at risk of contamination, and with only limited potential uses, human health and the environment would be effectively protected by the "No Further Action" alternative.

7.2. Compliance with ARARs

This criterion addresses whether or not a remedy complies with (ARARs). The "No Further Action" alternative would meet the ARARs established for the site, as discussed in Section 4.

7.3. Long-Term Effectiveness and Permanence

This criterion addresses the long-term effectiveness of a remedy to maintain protection of human health and the environment after the cleanup is completed. Long-term effectiveness of the interim cleanup already completed appears satisfactory. Direct contact exposures continue to be prevented by the interim cleanup. Post-closure monitoring has not shown contaminant releases in surface water or in sediment-free ground water.

7.4. Short-Term Effectiveness

This criterion examines the effectiveness of alternatives to achieve protection from any adverse impacts on human health and the environment, during the construction and implementation of the remedy, until cleanup is completed. It has now been several years since the interim cleanup, which has proven effective in preventing direct contact exposures to site contaminants.

7.5. Reduction of (Waste) Toxicity, Mobility or Volume

This criterion addresses the anticipated performance of a remedy in reducing the toxicity, mobility or volume of the wastes at the site. CERCLA as amended by SARA, established a preference for remedies which reduce waste toxicity, mobility or volume. The EPA notes that the sludge fixation with cement kiln dust, implemented as the interim cleanup, substantially reduced contaminant mobility. The potential for direct contact exposures with the acid sludge and water was also eliminated.

7.6. Implementability

This criterion evaluates the technical and administrative feasibility of a remedy, including the availability of materials and services needed for implementation. By definition, the "No Further Action" alternative is fully implementable.

7.7. Cost

This criterion evaluates the capital and operation and maintenance costs of an alternative. The "No Further Action" alternative would not involve any additional costs for remedial actions. The City and the County have already committed to conducting the necessary maintenance and monitoring for the site. The EPA has agreed to install one or two additional monitoring wells downgradient (southeast) of the site. The Health Department has agreed to add these wells to the post-closure monitoring for the site and to add aluminum to the analyses of

ground water samples collected. The EPA estimates that its costs for the installation of the additional monitoring wells will be less than $50,000, including contractor procurement and management.

7.8. State Acceptance

This criterion addressed preferences or concerns of the supporting agency, KDHE, about the site alternatives. The EPA has been the lead agency on this site since 1981 and has coordinated management of this site with KDHE. The KDHE has stated that it agrees with the acceptability of the "No Further Action" alternative at this time as the final site remedy. The KDHE has recommended that one or two additional monitoring wells to the southeast be added and that ground water samples collected also be analyzed for aluminum. The EPA and the City-County Health Department have agreed to make these changes in the post-closure monitoring plan.

7.9. Community Acceptance

This criterion reflects EPA's perception of the community's preferences or concerns about the site alternatives. The EPA received three extensive written comments when it released a draft Enforcement Decision Document (EDD) for public review and comment in March 1987. This EDD was never finalized by EPA. The comments on the draft EDD and EPA's responses thereto are presented in the attached Responsiveness Summary.

The EPA also received two letters (one from the City's Public Works Department and another from the City-County Health Department) when the Proposed Plan was released for public review and comment in August 1989. These two comment letters support the alternative of "No Further Action" preferred by EPA as the final site remedy in the Proposed Plan and selected in this Record of Decision. These comments and EPA's responses thereto are also presented in the attached Responsiveness Summary. The EPA did not receive any negative written comments on the alternative preferred as the final site remedy in the 1989 Proposed Plan.

SECTION 8, SELECTED ALTERNATIVE

The interim remedial measures implemented by the City have already abated potential direct contact exposures posed by the site. Such measures have also mitigated the site as a continuing source of surface and ground water contamination.

Therefore, EPA is selecting the the "No Further Action" alternative as the final remedy for this site. The post-closure maintenance and monitoring for the site will continue. The EPA will install one or two additional monitoring wells and the

City-County Health Department will add these wells to the post-closure monitoring plan and analyze the samples collected for aluminum. The deed restrictions will remain in effect and EPA will continue to evaluate the effectiveness and adequacy of the remedy implemented no less than once every five years. The EPA believes the "No Further Action" alternative is protective of human health and the environment and has selected it for the reasons outlined in Sections 6 and 7.

SECTION 9, STATUTORY DETERMINATIONS

The selected remedial alternative is protective of human health and the environment and attains federal, state and local requirements that are applicable, or relevant and appropriate, and is cost effective. The remedy selected satisfies the CERCLA/SARA statutory preference for remedies which employ treatment technologies that reduce the toxicity, mobility or volume of the hazardous substances present at the site.

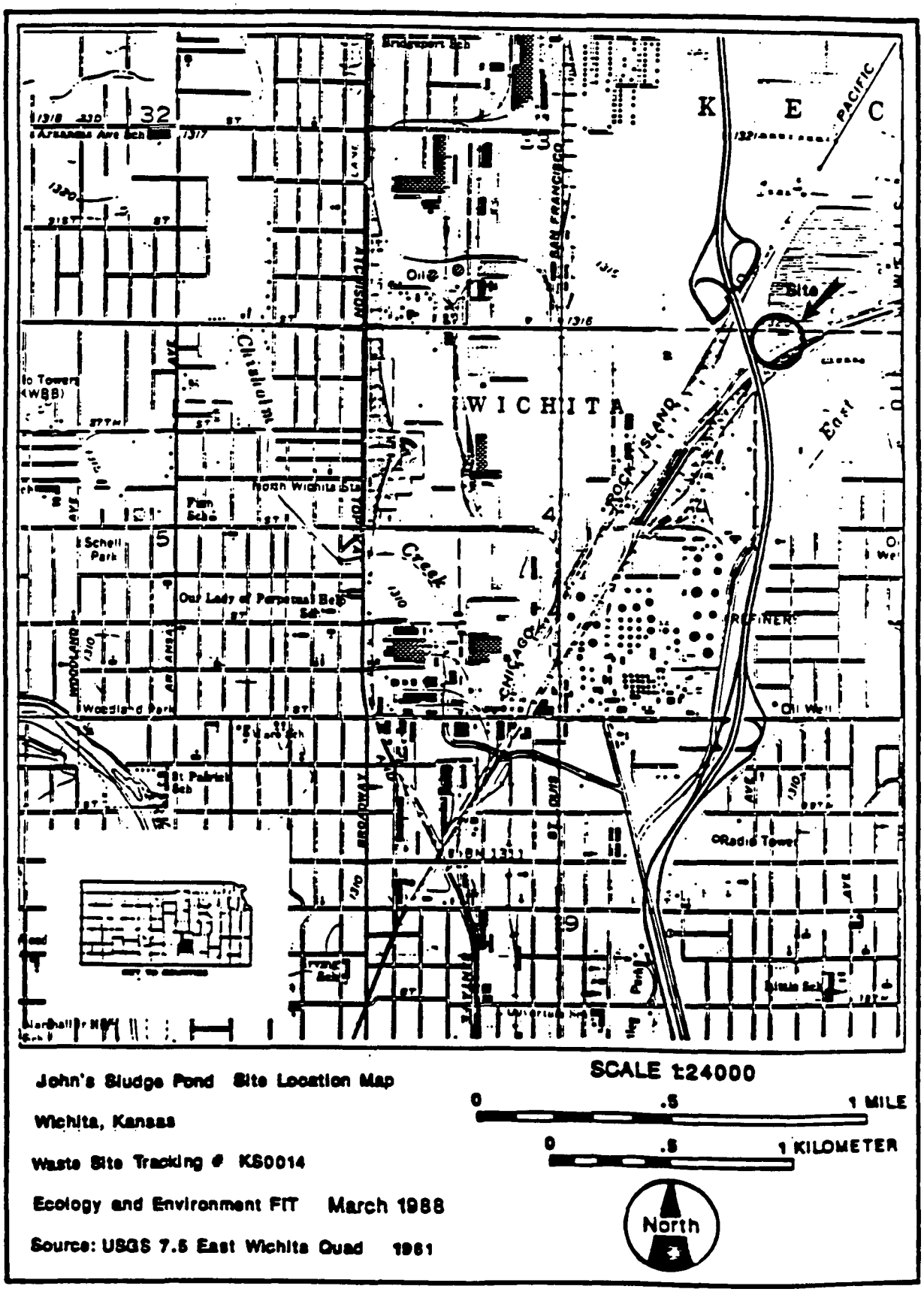
Because this remedy results in hazardous substances, pollutants or contaminants being left at the site above health-based levels, a review will be conducted no less than once every five years to ensure that the remedy continues to provide adequate protection of human health and the environment, as required by Section 121 of SARA. Available analytical data and information from the post-closure monitoring and maintenance will be used in these reviews.

SECTION 10, IMPLEMENTATION

The interim remedial actions for the site were implemented by the City of Wichita through its Public Works Department. The Public Works Department is continuing to provide post-closure maintenance for the site. The EPA will install two additional monitoring wells at the site. The City-County Health Department is providing post-closure monitoring.

The Regional Administrator retains the authority to make decisions regarding the need for further actions at this site. If new information or additional data is received by EPA, additional response or remedial actions may be considered as necessary to protect human health and the environment.

Figure 1



John's Sludge Pond Site Location Map

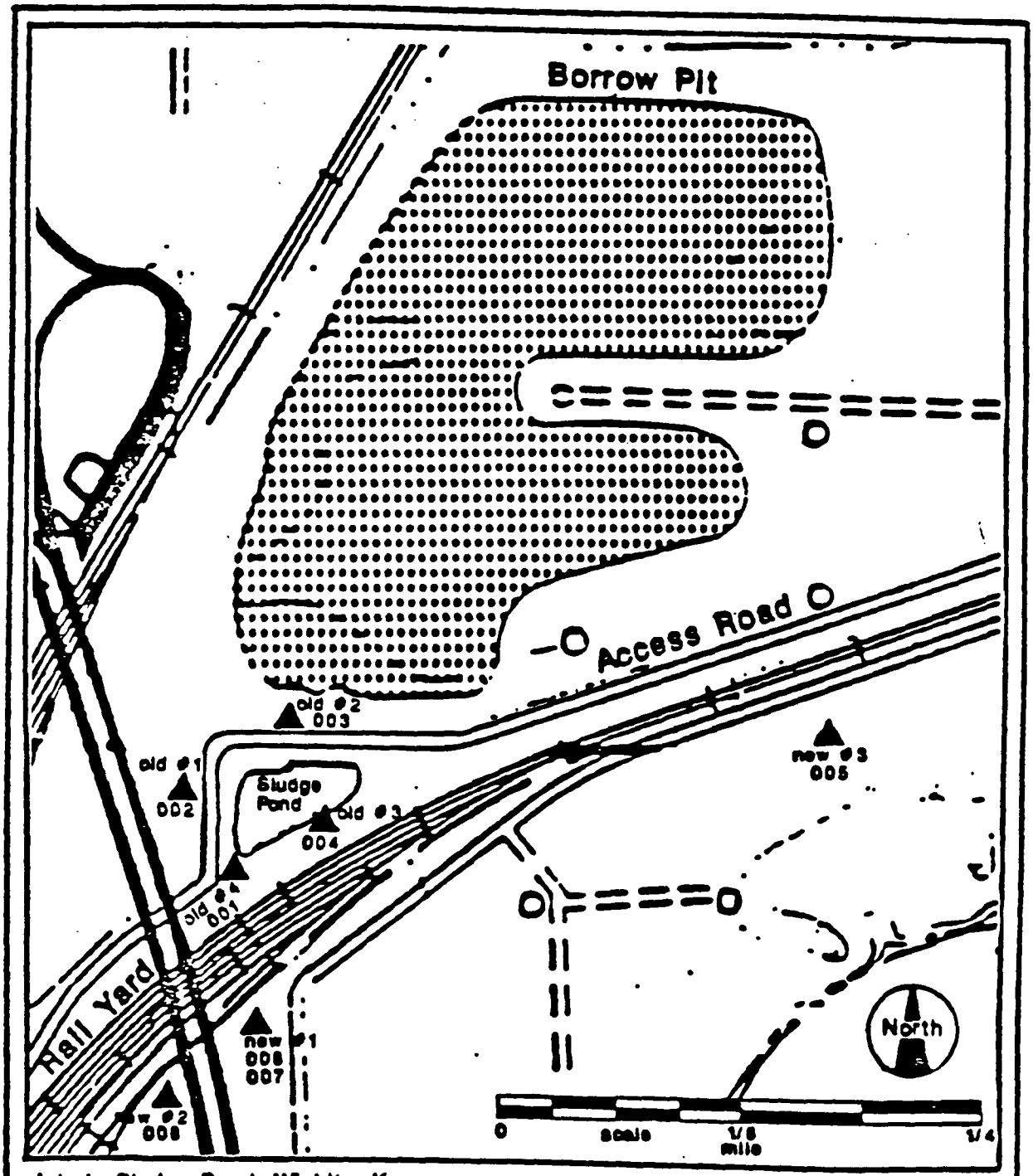
Wichita, Kansas

Waste Site Tracking # KS0014

Ecology and Environment FIT March 1988

Source: USGS 7.5 East Wichita Quad 1961

Figure 2



John's Sludge Pond, Wichita, Kansas

Sample Location Map with Monitoring Well Locations

Waste Site Tracking #KS0014 Sample Series #TQ735

Source: USGS 7.5 Minute Series East Wichita Quad (Photo Revised in 1975)

Prepared by John K. Cook E & E/FIT, January 1988

SOIL SURVEY

TABLE 1.—TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]					Precipitation[1]				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	In	In	In		In
January	40.6	20.2	30.4	69	- 5	0.53	0.17	0.91	2	3.9
February	46.5	24.7	35.6	77	2	0.79	0.21	1.42	2	3.2
March	54.9	31.5	43.2	86	8	1.55	0.53	2.64	3	3.7
April	69.0	45.2	57.1	92	26	2.06	1.15	3.11	4	0.1
May	78.0	55.6	66.8	98	35	3.80	1.41	5.96	6	0
June	86.4	64.6	75.5	102	47	4.38	2.37	6.76	7	0
July	92.6	70.2	81.4	106	55	3.30	1.59	6.81	6	0
August	91.1	68.1	79.6	107	52	3.05	1.02	5.39	4	0
September	81.4	59.5	70.5	101	42	4.04	1.79	5.99	6	0
October	70.9	47.7	59.3	92	29	2.77	0.98	4.93	4	0
November	55.9	33.7	44.8	77	11	1.15	0.04	2.42	2	0.5
December	44.7	24.4	34.6	68	- 2	0.89	0.37	1.49	2	3.2
Year	67.7	45.4	56.6	107	- 5	28.93	19.88	36.93	47	15.4

[1]Recorded in the period 1954-70 at Wichita, Kansas.

Table II Johns' Sludge Pond

Sludge Inorganic Contaminant Concentrations
(mg/kg, or ppm)

Sample No.	1	2	3	4	5	6
barium	400	349	1290	523	71	9.8
cadmium	7.6	67	13	10	12	12
chromium	70	67	64	70	64	65
copper	162	214	261	181	245	301
lead	4520	3180	13,500	5980	8740	1210
mercury	.05	.04	.46	.18	.40	.03
nickel	87	10	10	16	7.7	16
selenium	ND	ND	.08	ND	NA	NA
silver	ND	.79	ND	ND	ND	12
vanadium	ND	ND	ND	ND	ND	ND
zinc	2340	2040	3280	2280	1810	1590

*Samples collected by the County and analyzed by Wilson Laboratories of Salina, Kansas.

ND= Not detected.
NA= Not analyzed.

Table II Johns' Sludge Pond

Sludge Contaminant Concentrations, Organics

mg/kg (ppm)

Sample No.	1	2	3	4	5	6
benzene	.041	.036	.051	.060	.057	.070
chloro-ethane	.042	.056	ND	.240	.100	.160
1,2-di-chloroethane	ND	ND	.032	.043	ND	.037
ethyl-benzene	ND	.193	ND	.110	.820	.160
methyl bromide	.171	.115	1.10	1.05	.570	.760
methyl chloride	ND	ND	.140	1.400	.700	.110
methylene chloride	ND	ND	.025	ND	ND	ND
tetra-chloroethylene	.087	.081	.093	.036	.050	.062
toluene	.307	.689	.280	.230	.540	ND
trichloro-ethylene	.100	.077	.083	.110	.110	.130
PCB 1254	14	12	10	15	17	10
PCB 1260	15	21	10	15	ND	17
PCB 1016	16	14	15	24	ND	12

*Samples collected July 1983 by the County and analyzed by Wilson Laboratories of Salina, Kansas.

ND= Not detected.
NA= Not analyzed.

TABLE III Lead Concentrations in Ground Water, Johns' Sludge Pond

All data in ug/l or parts per billion (ppb)

	MW1 inner ring NE of site	MW2 inner ring North of site	MW4 inner ring SW of site	MW5 outer ring West of site	MW6 outer ring SW of site	MW7 outer ring SE of site
1982 (EPA, total)	ND	ND	655	NS	NS	NS
1984 (EPA, total)	ND	56	121	NS	NS	NS
May 1987 (County, total)	94	4.0	34	NS	NS	NS
November 1987 (County, total)	40	39	81	NS	NS	NS
January 1988 (EPA total/dissolved)	180/ND	11/5	NS/NS	ND/ND	260/ND	ND/ND
June 1988 (EPA total/dissolved)	20/ND	11/6.5	360, 210*/9	74/15	14/ND	28/ND
May 1988 (County, total)	6.0	7.0	133	7.0	8.0	6.0
November 1988 (County, total)	45	43	352	24	17	19
July 1989 (County, total)	68	38	1290	17	10	7.0

ND-not detected
NS-not sampled
* duplicate sample analysis

RESPONSIVENESS SUMMARY

Johns' Sludge Pond

Wichita, Kansas

This Responsiveness Summary (RS) presents the responses of the Environmental Protection Agency (EPA) to public comments received regarding the proposed actions for the Johns' Sludge Pond site in Wichita, Kansas.

The EPA released a Proposed Plan and related documents on the site, for twenty-one (21) days of public review and comment. The public comment period ran from the date of EPA's public notice in the Wichita Eagle Beacon on August 9, 1989 until August 30, 1989. The public notice indicated that a public meeting would be considered if a request for one was received by EPA. No requests for a public meeting were received by EPA. However, the EPA did brief the City of Wichita, Sedgwick County, and members of the Sierra Club on the Proposed Plan, on August 7, 1989. These parties had previously expressed their interests or concerns about the site to EPA.

In March 1987, EPA released a draft Enforcement Decision Document (EDD) for public review and comment. Substantial written comments were received by EPA from three individuals or groups in response to the draft EDD. This Responsiveness Summary sets forth the comments received on the draft EDD dated March 1987, as well as the Proposed Plan dated August 1989, and presents EPA's responses to these comments and concerns.

COMMENTS ON THE ENFORCEMENT DECISION DOCUMENT (EDD)

The following comments were received from the Kansas Chapter of the Sierra Club in 1987 on the draft EDD:

1. Comment: "This law (The Superfund Amendments and Reauthorization Act, SARA), which went into effect October 17, 1986, requires to the maximum extent practicable remedial actions that use permanent solutions and alternative treatment technologies or resource recovery techniques. The evaluation process is to assess alternatives that will result in a permanent and significant decrease in the toxicity, mobility, or volume of hazardous substances. The long-term effectiveness of each alternative is to be evaluated, taking into consideration persistence, toxicity, mobility and bioaccumulation; the short and long-term potential for adverse human health effects; the potential for future remedial action costs if the remedy fails; and, other factors.

Response: The draft EDD and the Proposed Plan were both developed with the intention of addressing the reduction of contaminant mobility, toxicity or volume, although the site cleanup was implemented before the effective date of SARA. An innovative treatment technology was used and the remedy does reduce contaminant mobility, toxicity and volume as follows:

- By raising the pH of the sludge and reducing the acidity, the potential for direct contact exposures ("toxicity") was reduced or eliminated;

- Raising the pH of the sludge above neutral will reduce the solubility of lead in the water and, thus, the potential for lead to be released from the site via either ground or surface water;

- The treatment is permanent in that as long as the sludge and cement kiln dust remain mixed, the pH adjustment will remain effective; and,

- The mobility of the lead in ground water, as well as any other contaminants present in the sludge, is reduced because the percolation of water through the sludge is reduced by both the cap above and the liner below the sludge.

2. Comment: The EDD has noted several times that the cleanup was initiated and approved by EPA as an interim remedy, with the understanding that additional actions might be required at the site. The EDD contains no discussion of the permanence of cleanup activities undertaken at the site to date. We believe that SARA requires EPA to review the interim cleanup plan and add the most permanent technologies to its cleanup procedures for the type of hazardous substances found at Johns' Sludge Pond.

Response: It is true that the remedy implemented was initially approved as an interim remedial measure. However, after review, EPA determined that it is also acceptable as a long-term remedy for the site. The permanence of the remedy is discussed in more detail in the Proposed Plan, which was completed after this comment was received in 1987.

The Wichita-Sedgwick County Health Department conducts post-closure monitoring of the site under a plan approved by EPA. The City of Wichita's Department of Public Works provides post-closure maintenance for the site. Pursuant to the requirements of SARA, EPA will reevaluate the effectiveness and adequacy of the site remedy at least once every five years.

3. Comment: We note that Section 121(b) of SARA states that the new cleanup standards do not apply to any remedial action for which the ROD was signed or for the Consent Decree already in place before SARA's enactment. The EDD on this site does not contain a ROD or a Consent Decree. It only contains an Order on Consent dated December 9, 1983. We believe, therefore, that all of the cleanup standards in SARA apply to Johns' Sludge Pond.

Response: EPA agrees that no ROD or Consent Decree on remedy selection was in effect prior to the effective date of SARA. Therefore, EPA has satisfied the provisions of SARA relevant to this site in the Proposed Plan and the Record of Decision.

4. Comment: The National Contingency Plan (NCP) requires that a community relations (CRP) plan be developed and implemented for public comment on the alternatives developed through a remedial investigation/feasibility study (RI/FS).

Response: EPA selected the interim cleanup before policy and guidance for community relations was developed. However, EPA later developed and implemented a CRP on the site in 1986. A copy of the CRP is in the Administrative Record for the site. Twice, the EPA has formally offered the public the opportunity to comment on the alternatives considered and recommended for the site, first with the draft EDD in 1987 and then again with the Proposed Plan from August 9 to August 30, 1989. EPA has considered all of the information it has received in these comments and is presenting its responses to these comments in this Responsiveness Summary.

5. Comment: The EDD contains no information concerning an RI/FS. The EDD contains no information concerning public comments received. We believe that both an RI and FS, and a public participation process are required for this site.

Response: No formal RI was completed for the site. However, the site was sufficiently characterized, and the equivalent of a RI was achieved through investigations conducted by EPA (Environmental Services Division's Report of August 1982) and the City (Wilson Laboratories' Report of October 1983). Furthermore, the EPA completed a study on ground water alternatives for the site which is memorialized in the memorandum of August 3, 1989. A copy of this document is found in the Administrative Record for the site. EPA invited public review and comment on these documents during the August 1989 public comment period. The State of Kansas (Department of Health and Environment, KDHE) suggested certain changes to the Memorandum of August 3, 1989 which have been incorporated by EPA.

6. Comment: Clause 18 of the Consent Order states: "All actions undertaken pursuant to this Order by the City or its duly authorized representatives shall be so done in accordance with all applicable federal, state and local regulations of the Occupational Safety and Health Administration (OSHA), the Resource Conservation and Recovery Act (RCRA) and the Toxic Substances and Control Act (TSCA)." Title 40 CFR Parts 161, 164 and 165 under RCRA require a permit and various prerequisites such as: detailed chemical analyses; double liners to protect ground water; runoff control; and, leachate removal. The EDD does not mention the existence of a RCRA permit, which we believe is required, for this site.

Response: In evaluating which regulations were applicable, relevant or appropriate for the site, EPA determined that TSCA requirements were relevant and appropriate but not applicable; because, the average concentration of PCB's in the sludge was 44 mg/kg. TSCA regulates current disposal at levels above 50 mg/kg. Accordingly, EPA constructed the disposal cell to comply with the technical requirements of TSCA to the maximum extent practicable. RCRA requirements are not applicable, relevant or appropriate because the sludge is neither a listed or characteristic RCRA hazardous waste. Nevertheless, the disposal cell cap and liner were designed to satisfy RCRA land disposal facility standards to the maximum extent practical. No permit was required under either program as EPA is not required to obtain permits for remedies conducted onsite pursuant to CERCLA/SARA.

7. Comment: RCRA also allows the use of EP toxicity procedures as one factor in addition to other characteristics and listing. RCRA regulations do not allow sequential dilution in order to "pass" the EP toxicity test. We do not believe the EP toxicity procedures used for Johns' Sludge Pond comply with the RCRA regulations. We also note that EP toxicity does not reflect long-term hazards from leaching (of contaminants from the waste into the environment).

Response: The principal purpose of mixing the sludge with cement kiln dust was not dilution, although the mixing resulted in some dilution. More significantly, the mixing of the sludge with cement kiln dust raised the pH which reduced the direct contact hazard of the sludge. Furthermore, raising the pH reduced the potential for lead to be leached into ground water, since the solubility of lead in water is reduced by raising the pH. Mixing sludge with cement kiln dust also resulted in a more structurally sound mixture which allowed a cap and cover to be installed above the treated sludge.

EPA did, in fact, design the EP toxicity test to predict the leaching of contaminants from wastes into the environment.

8. Comment: Title 40 CFR Part 761, Subpart D under TSCA concerns the storage and disposal of PCBs. Sludge contaminated with more than 50 mg/kg PCBs may only be deposited in a landfill that has been approved for such use prior to disposal. Federal regulations specifically prohibit dilution to achieve lower concentrations. Section 761.75(b) lists technical requirements for which chemical waste landfills are allowed to accept PCBs. The soils at the landfill site are to be thick, relatively impermeable formations with high clay and silt content. Synthetic membrane liners "shall be used when, in the judgment of the Regional Administrator, the hydrologic or geologic conditions at the landfill require such a liner in order to provide at least a permeability equivalent to the soils requirement." The liner is to be chemically compatible with PCBs so the integrity of the liner is maintained. The EDD does not contain discussion of how these requirements were or were not met at Johns' Sludge Pond.

Response: As explained in the response to comment No. 6, EPA determined that the TSCA regulations were relevant and appropriate to the site. The liner was specifically designed and constructed to meet, to the maximum extent practicable, the technical requirements of a TSCA chemical waste landfill.

9. Comment: Section 761.75 also states: "The bottom of the landfill shall be above the historical high ground water as provided below floodplains. Shorelines and ground water recharge areas shall be avoided. The site shall have monitoring wells and leachate collection. The bottom of the landfill liner system or natural in-place soil barrier shall be at least fifty feet from the historical high water table." The EDD gives conflicting information about the distance between the surface of the soil, the bottom of the sludge pond, and the ground water table. At one point the EDD states that the ground water table averages 14 feet below ground surface, and the sludge pond is assumed to be 8 to 10 feet deep, leaving a separation of four to six feet, which is inadequate to meet the regulations.

A November 1981 memorandum in the EDD says: "Records suggest the pond may be as deep as 15 feet in some parts," which means the pond may actually penetrate the ground water table at its deepest points. We believe Johns' Sludge Pond violates regulations under TSCA. The EDD does not discuss the pond's proximity to the ground water table in relation to TSCA.

Response: A 50-foot separation and the water table is a practical impossibility at this site. EPA has concluded that the sludge fixation, the clay liner, the clay cap and the soil and vegetation covers above the site preclude the formation of measurable quantities of leachate and any continuing, significant release of contaminants to ground water. The various references to the assumed depth of the sludge and the depth to the water table reflect some early assumptions made about the site.

Current information indicates that the sludge pond was on average 8 to 10 feet deep, but as deep as 15 feet in some places. Depth to ground water varies but is generally 20-25 feet below ground surface. Current information further suggests that sludge disposal approached but probably did not enter the water table.

10. Comment: Section 761.75 also discusses flood protection requirements, and states: "If the landfill site is below the 100-year floodwater elevation, the operation shall provide surface water diversion dikes around the perimeter of the landfill site with a minimum height equal to two feet above the 100-year floodwater elevation. If the landfill site is above the 100-year floodwater elevation, the operators shall provide diversion structures capable of diverting all of the surface water runoff from a 24-hour, 25-year storm." The EDD notes that on June 8, 1972, and on May 1, 1973, the sludge pond flooded and overflowed into Chisholm Creek. This indicates that Johns' Sludge Pond is below the 100-year floodwater elevation. The EDD mentions a three-foot dike was constructed around the pond, which has prevented overflow since its construction. The EDD does not discuss whether this dike is at least two feet above the 100-year floodwater elevation as required by the regulations. In the absence of complete information, we believe the dike is not high enough to comply with the regulations.

Response: Before the City's cleanup, the site was below the 100-year floodplain. However, the remedy implemented included the addition of large quantities of cement kiln dust and the installation of a clay liner, a clay cap and a soil cover. The net result of this remedy was a finished disposal cell some 20 feet above the original grade of the site, well above the 100-year floodplain. The steep grade of the sidewalls of the finished disposal cell effectively divert any surface water from entering the site.

11. Comment: Kansas Statutes Annotated 1986 Supplement 65-3458 prohibits the underground burial of hazardous waste produced by persons generating quantities of such waste greater than those specified in KSA 65-3451, except as provided by order of the Secretary of Health and Environment (KDHE), issued pursuant to KSA 65-3458. The EDD does not discuss an order of the Secretary of the KDHE approving Johns' Sludge Pond as a landfill for hazardous wastes. In the absence of complete information, we believe the use of this site as a landfill for hazardous wastes violates Kansas laws.

Response: EPA consulted with KDHE officials about the impact of Kansas statutes on the remedy implemented at the site. EPA and KDHE determined that depositing treated sludge back into the disposal cell was the disposal of solid, not hazardous waste, and

was not precluded by Kansas statutes. The sludge had been tested before treatment and was not found to be EP toxic or to otherwise be a hazardous waste. Also, no new wastes were generated during the implementation of the remedy.

12. Comment The proximity of this site to the Arkansas River, 1¼ mile away via Chisholm Creek, which flows into Cheyenne Bottoms National Wildlife Refuge, makes it even more important that the hazardous substances found at the site be prevented from overflow and/or ground water contamination. Only by complying with all applicable laws and regulations can this be accomplished. The EDD did not discuss the effects of the 1972 and 1973 overflows on Cheyenne Bottoms or migratory waterfowl. It did note that evidence of the 1973 overflow is still visible on the banks of the creek.

Response: EPA notes that the Cheyenne Bottoms are located near Great Bend, Kansas, which is approximately 115 miles upriver from Wichita and the site. EPA, therefore, sees no potential impact from Johns' Sludge Pond on the Cheyenne Bottoms. EPA assumes that the commenter thought the Cheyenne Bottoms is downriver not upriver from Wichita. The EPA further notes that the contaminant levels in surface water and sediments in the creek, into which runoff from the site discharges, were no higher downstream than upstream of the site. Finally, EPA is not aware of any data, information, or current observations indicating that the banks of the creek still appear to be contaminated by previous releases from the site.

13. Comment: The EDD noted that a fire occurred at Johns' Sludge Pond, which could have formed polychlorinated dibenzofurans (PCDFs) from the incomplete combustion of PCBs. Personnel implementing the cleanup were required to wear protective gear to prevent exposure to PCDFs, because they are extremely toxic, bioaccumulative and persistent compounds. The EDD states that no analyses were done to determine concentration levels of PCDFs in the sludge, because PCDFs were not, and apparently still are not, priority pollutant list analytes. We are extremely concerned about possible migration of the PCDFs and PCBs from the site and do not believe they have been dealt with in a way that complies with SARA. The EPA Water Quality Criteria Documents recommend an ambient water concentration of zero for PCBs, and we assume the same concentration would be recommended for PCDFs. We believe that the release or threat of release of hazardous substances from this facility still presents an imminent and substantial endangerment to public health and welfare and the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. 9606(a).

Response: EPA has not analyzed samples for the potential presence of PCDFs. The commenter is correct in that the reported fires at the site could have formed PCDFs from the incomplete combustion of PCBs. EPA did not analyze sludge samples from the site for PCDFs in part, because when the samples were collected and analyzed, PCDFs were not commonly recognized to be potential contaminants at sites, and were, thus, not on EPA's list of priority pollutants.

However, if PCDFs exist at the site, they would coexist with PCBs from which they would have been formed. Since all materials potentially contaminated with either PCDFs or PCBs were mixed with cement kiln dust and encapsulated, there is a very low potential for PCDFs to be released from the site. The post-closure monitoring for PCBs serves as a sufficient early warning of the potential release of either PCBs or PCDFs, which would exist only with PCBs but in much lower concentrations than PCBs if at all.

14. Comment: The Order on Consent issued in 1983 noted that hazardous organics were found in monitoring wells. Cleanup efforts at the site, to date, have concentrated on the lead contamination and the acidity of the water on top of the sludge pond, ignoring requirements pertaining to PCBs. The laws and regulations referred to in this comment are not arbitrary hurdles but requirements found to be generally necessary to protect human health and the environment. When they are not followed, public alarm results.

Response: The EPA believes it was appropriate to concentrate on the most immediate hazards present at the site, namely the acidity of the sludge, water on top of the sludge and the lead content of the sludge. Nevertheless, the remedy implemented at the site was also designed to remove the site as a continuing source of contaminants released to ground water.

The following comments were received from the Southwind Group of the Kansas Chapter of the Sierra Club:

15. Comment: The Superfund Amendments and Reauthorization Act of October 17, 1986 requires, to the maximum extent practicable, "remedial actions" that use permanent solutions and alternative treatment technologies or resource recovery techniques. The long-term effectiveness of each alternative is to be evaluated, taking into consideration persistence, toxicity, mobility and bioaccumulation; the short-term and long-term potential for adverse human health effects; the potential for future remedial action costs if the remedy fails; and, other factors.

Response: EPA believes the remedy implemented was quite innovative. At the time the cleanup plan was approved, EPA found very few successful sludge solidification processes. EPA also believes the remedy is permanent as long as the sludge and the cement kiln dust mixture remains intact. The long-term effectiveness of the technology was discussed in more detail in the memorandum of August 3, 1989 and in the Proposed Plan.

16. Comment: The EDD on Johns' Sludge Pond notes several times that the cleanup "was initiated and approved by EPA as an interim remedy, with the understanding that additional actions might be required at the site." The EDD contains no discussion of the permanence of the cleanup activities undertaken at this site to date. It is clear that SARA requires the EPA to provide permanent technologies. The monitoring plan, which will be used over the next 20 years at this site, does not meet the standards required by SARA. This monitoring will simply tell us, after the fact, when we have a real situation that already has placed the public in danger. This is not only irresponsible but more expensive in the long run.

Response: The permanence and long-term effectiveness of the remedy are more completely discussed in the Memorandum of August 3, 1989 and the Proposed Plan. EPA agrees that since hazardous substances have been left in place, post-closure monitoring and maintenance will be required for the site. The City and County have submitted post-closure monitoring and maintenance plans which are being implemented. The remedy implemented has already removed the endangerment of health and environment the site once posed. The post-closure monitoring will provide adequate early warning of any additional contaminant releases into the environment.

17. Comment: Clause 18 of the Order states: "All actions undertaken pursuant to this Order by the City or its duly authorized representatives shall be so done in accordance with all federal, state and local statutes and regulations, including the OSHA, RCRA, and TSCA." Title 40 CFR Parts 161, 164, and 165 under RCRA requires a permit and various prerequisites such as a detailed chemical analyses, double liners to protect ground water, runoff control and leachate removal. The EDD does not mention the existence of a RCRA permit, which we believe is required for this site.

Response: See response to Comment No. 6.

18. Comment: There is no question that EPA is relying on a partly clay soil as a substitute for double liners to protect ground water. It is also clear from the fact that flooding has occurred at the site in the past that the toxic substances found at this site can be expected to drain into sources of water which become part of the Wichita water supply.

Response: EPA believes the solidification of the sludge with cement kiln dust has precluded the formation of significant quantities of leachate. It is, therefore, adequate to use compacted clay as the material for the liner, as well as the cap, in lieu of synthetic materials or double liners.

EPA sees no potential for the drinking water supplies for the City of Wichita to be contaminated by this site. The City obtains drinking water from two sources: 1) Equus beds (an alluvial aquifer) approximately 25 miles northwest of Wichita and 2) Cheney Reservoir, fed by the north fork of the Ninnescah River and about 25 miles west of Wichita. Neither water supply is hydrologically connected to Johns' Sludge Pond or at risk of contamination by this site.

19. Comment: Also the EDD did not discuss the effects of the 1972 and 1973 overflows on Cheyenne Bottoms.

Response: See response to Comment No. 12.

20. Comment: The EDD states that we still have no idea what the concentration levels of PCDFs in the sludge are. The fact that this site was subject to a fire at one time, thus creating PCDFs, should lead you to address the probable existence of these toxic substances, as well as the chance that a similar occurrence will take place in the future.

When the public health is not protected by pinning down the existence of dangerous substances, our future becomes more uncertain. Would you please respond accordingly to the standards set forth at Section 106(a) of CERCLA, 42 U.S.C. 9606(a).

Response: If PCDFs exist at the site, they coexist with PCBs. Any soil or sludge, which may have contained PCDFs, has been deposited in the reconstructed disposal cell. No endangerment to human health or the environment exists as long as the disposal cell and the sludge mixture remain intact. Since the sludge is now mixed with cement kiln dust and is below a soil and vegetative cover, EPA sees no potential for additional fires to occur at the site which could involve the sludge.

21. Comment: EPA is given the responsibility to protect the public from toxic substances such as are found at the Johns' Sludge Pond. The EPA should continue its efforts to establish permanent solutions so that the public is protected in the future. The monitoring plan set forth is insufficient in this regard. Let us not wait until a threat to the public health occurs. We must take action now to prevent such a possible scenario.

Response: EPA believes that the remedy implemented is adequately protecting public health from the endangerments posed by the site. The commenter maintained that the monitoring plan was insufficient but made no specific comments on the plan. The monitoring plan was reviewed by both EPA and the State of Kansas before it was approved by EPA. The EPA found that it met the relevant requirements of the TSCA regulations and was otherwise sufficient. In response to recent comments received from the State of Kansas, EPA has now agreed to install one or two additional monitoring wells to the southeast and to include aluminum as an analyte in the post-closure monitoring for the site.

The following comments were received from Mr. Thomas R. Kneil of Wichita on the draft EDD:

22. Comment: I am appalled that even though PCDFs are acknowledged as being extremely toxic (EDD) page 13 and that a fire occurred at the site that may have produced PCDFs, they were not tested for---apparently only because they are not on the priority pollutant list. Does this mean that we should not be concerned about PCDFs or similar compounds even where there is good evidence that they may have been released into the environment just because they are not listed as priority pollutants? Not only on the basis of the acknowledged evidence of their presence, but also as part of its charge to protect the environment, I believe that under RCRA it (EPA) was obligated to do so.

Response: See response to comment No. 13. In reviewing the effectiveness of the remedy implemented as a long-term solution to the endangerments posed by the site, EPA has determined that because all wastes, sludge, or soil, which may have contained PCDFs, were placed in the reconstructed disposal cell, there is no potential for direct contact exposures to PCDFs as long as the disposal cell remains intact. Post-closure monitoring for PCBs, with which PCDFs would coexist but in lower concentrations, will provide early warning of any potential PCDF releases into the environment.

23. Comment: The draft EDD expresses concern for lead in the environment (with which I agree) but it shows little concern for PCB/PCDF presence. The Environmental Health Division of the Wichita-Sedgwick County Health Department will monitor surface water, ground water, and pond sediments for PCBs according to the Post-Closure Monitoring Plan dated October 10, 1986. Will there be monitoring for PCDFs by whom, and who is doing the analyses?

Response: In EPA's opinion, the monitoring for PCBs is a sufficient early warning of the potential for PCDF releases. If PCBs are ever found in releases from the site, in sufficient concentrations, then a decision would be made as to whether monitoring for PCDFs should then be initiated.

24. Comment: Kansas Senate Bill No. 1 (1985) bans the burial of hazardous waste unless the Secretary of KDHE issues a permit for such burial. Was this site granted such a permit?

Response: See response to Comment No. 11. EPA consulted with Kansas officials as to how Kansas Senate Bill No. 1 applies to Johns' Sludge Pond. KDHE ruled that the redeposit of the treated sludge, which was not a hazardous waste when earlier tested, was not disposal of hazardous waste prohibited by Kansas law but rather the disposal of a solid waste. Accordingly, no RCRA permit was required or sought.

25. Comment: As RCRA regulations apply to this site, were detailed chemical analyses done that included testing for PCDFs? Regarding the construction of a disposal cell, was a double liner installed as called for by RCRA? Does the slope of the hill meet RCRA specifications?

Response: See response to Comment No. 6. In response to the specific questions, RCRA did not require that the sludge from the site be tested for PCDFs. At the time the sludge was sampled and analyzed, PCDFs were not recognized as a potential site contaminant. Consequently, the sludge and the soil were not tested for PCDFs. The disposal cell does not have a double liner. However, it does have a compacted clay liner as then required for RCRA interim status land disposal facilities. There are no specific requirements for sideslopes. EPA requested and received additional information from the City on the stability of the proposed cover for the site before approving the cleanup plan. EPA further notes that, in the three years after the completion of the cover, the sideslopes have remained stable.

26. Comment: The draft EDD documents the fact that additional cement kiln dust was added during the treatment process in order to raise the pH and presumably reduce the leachability and solubility of lead. At the same time this appears to be a dilution process which is not permitted under RCRA as a means of "passing" the EP toxicity test.

Response: See response to Comment No. 7.

27. Comment: Was a community relations plan developed and implemented as required under the National Contingency Plan? If such a plan, providing for public comment on alternatives to the selected cleanup process was in fact developed, I am not aware of it. On a related note, was an RI/FS done?

Response: See responses to Comment Nos. 3 and 4.

28. Comment: Lastly, I must comment that the statement in the EDD that "Exposures to blowing cement kiln dust were reduced and ultimately eliminated," I had personal contact with the dust. On two occasions, when driving past the site on I-135 while crews were mixing the cement kiln dust and the sludge, I had to close my car windows because of dust blowing across the highway (elevated at that point). I do not know if it was before or after the attempt to reduce the blowing dust in the adjacent railyard.

Response: Although railyard employees complained to EPA and KDHE of blowing cement kiln dust, this is the only complaint EPA has received regarding nonoccupational exposures. When blowing cement kiln dust was recognized as a potential nuisance and problem, measures were instituted to eliminate or reduce blowing dust. These measures included not working during windy weather and performing more of the dust-generating work down inside the disposal cell, where dust was less likely to blow offsite. EPA agrees that the blowing kiln dust was irritating. However, the potential adverse health effects resulting from human exposure are limited to irritation of the eyes and upper respiratory tract. System toxic effects or long-term effects, resulting from human exposure to cement kiln dust, have not been reported in the literature to the best of EPA's knowledge.

COMMENTS ON THE PROPOSED PLAN

The EPA received two additional comments on the preferred alternative in the Proposed PLan during the 1989 public comment period.

1. An August 25, 1989 letter was received from Mr. Jack Brown, Acting Director of the Environmental Health Division of the Wichita-Sedgwick County Health Department. In the letter the Health Department stated that it agreed with EPA's "No Further Action" preferred alternative. The Health Department reaffirmed its commitment to continuing post-closure monitoring at the site. The Health Department recommended that EPA select the "No Further Action" alternative as the final remedy in the Record of Decision.

2. An August 28, 1989 letter was received from Mr. Steve Lackey, Director of Public Works for the City of Wichita. The Department of Public Works also supported the alternative of "No Further Action" preferred by EPA in the Proposed Plan. The Department of Public Works reaffirmed its commitment to provide post-closure maintenance for the site.