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EPA

Superfund Record of Decision:

Pester Refinery, KS

NOTICE

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

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15. Supplementary Notes

PB93-964305

16. Abstract (Limit: 200 words)

The 10-acre Pester Refinery site is a former petroleum refining facility located in El Dorado, Butler County, Kansas. Land use in the area is predominantly industrial and agricultural. The City of El Dorado draws its water supply from the El Dorado reservoir, 2 miles east of the site. Petroleum refining operations in the area began in 1917, and from 1958 to 1977, Fina Oil Company operated a petroleum refinery at this site. Process wastes, such as slop-oil emulsion solids, API separator sludge, and heat exchanger bundle cleaning sludge were sent through a pipe to a burn pond. Gaseous waste products were ignited at the end of the pipe, and whatever did not burn was discharged to the pond. The site historically contained the burn pond, a stormwater pond, and a settling pond, all of which became interconnected over the years. In 1977, Pester purchased the property and operated the facility until 1985. Although other portions of the property were sold, Pester still retains ownership of land surrounding the burn pond area. In 1986, the state RCRA division initiated site investigations, which confirmed that contamination had occurred. In 1992, Fina constructed an interceptor trench and pumping system near the pond to evacuate contaminated water and

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Pester Refinery, KS
First Remedial Action - Final
Contaminated Media: soil, sludge
Key Contaminants: VOCs (ethyl benzene, toluene, xylenes), other organics (PAHs, phenols), metals (arsenic, chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 60
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

Abstract (Continued)

materials. This ROD provides a final remedy for the principal source of contamination at the site, the burn pit sludge. A subsequent ROD addresses ground water contamination. The primary contaminants of concern affecting the soil and sludge are VOCs, including ethylbenzene, toluene, and xylenes; other organics, including PAHs and phenols; and metals, including arsenic, chromium, and lead.

The selected remedy for this site includes dewatering the pond and transporting the associated sludge offsite to a RCRA facility for re-refining into a usable petroleum product and/or disposal; treating the soil using in-situ soil flushing; discharging the wash water to an oil/water separator to remove free oils and sediment, followed by nutrient addition with aeration to enhance biological action; and discharging the water to a treatment facility or back to the pond for continued treatment until testing demonstrates that clean-up levels have been achieved; monitoring air; and implementing institutional controls including deed restrictions and site access restrictions such as fencing. The estimated present worth cost for this remedial action is $2,374,800, which includes a present value O&M cost of $464,700 over 3 years.

PERFORMANCE STANDARDS OR GOALS:

Chemical-specific soil and sludge clean-up goals are based on health-based levels, and include benzo(a)anthracene 13 mg/kg and chrysene 13 mg/kg. Other contaminants of concern will be treated to meet EPA acceptable risk levels, if necessary.

RECORD OF DECISION

PESTER BURN POND FIRST OPERABLE UNIT

EL DORADO, KANSAS

DECLARATION

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Pester Burn Pond Site, El Dorado, Butler County, Kansas. The selected remedy was chosen in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document is based on the information contained in the administrative record for this Site. The State of Kansas concurs with the selected remedy.

Assessment of the Site

Actual and threatened releases of hazardous substances at 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

The principal source of contamination at this Site is the sludge contained in the burn pond. The remedy for this Site addresses both the burn pond sludge and the soil beneath the pond. Polycyclic aromatic hydrocarbons (PAHs) have leached from the burn pond sludge.

The selected remedy includes the removal of sludge from the Site to a RCRA- (Resource Conservation and Recovery Act) permitted TSD (treatment, storage and disposal) facility and remediation of soil via soil flushing and bioremediation *in situ*. Since the ground water contamination has not been fully evaluated, it will be considered in a separate operable unit.

The selected remedy includes the following major components:

- The sludge will be removed and dewatered and then shipped for processing into petroleum product at an offsite refinery;
- The sludge will be dewatered by heating, pumping, and flashing;
- The soils will be treated *in situ* by flushing with water;
- Aeration will be provided with the water to augment the bioremediation of the organics in the pond water and the soils; and
- Water from the flushing will be collected in the existing interceptor trench, treated and reintroduced into the pond cavity for continued flushing and bioremediation.

Statutory Determinations

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

The remedy selected in this decision document is based on reaching health-based concentrations that have been determined to be protective in conjunction with institutional controls. Because these controls will not allow for unlimited use and unrestricted exposure at the site, a review will be performed five years after initiation of the selected remedial action, in accordance with Section 121(c) of CERCLA, 42 U.S.C. Section 9621(c), to ensure that the remedy continues to provide adequate protection of human health and the environment.

[signature]

Regional Administrator
Region VII

9-30-92

Date

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RECORD OF DECISION

PESTER BURN POND FIRST OPERABLE UNIT

DECISION SUMMARY

I. SITE NAME, LOCATION AND DESCRIPTION

The Pester Burn Pond (the "Site") is located on a 10-acre tract located in El Dorado, Kansas, approximately 30 miles northeast of Wichita, Kansas (see Figure 1). The Site is located in the southwest quarter of Section 26, Township 25 South, Range 5 East, Butler County, Kansas.

Industrial and agricultural lands surround the Site (see Figure 2). The wastewater treatment and aeration ponds owned by Coastal Derby Refinery are located south of the site. West of the Site is the active refinery complex and a Santa Fe Railroad spur that services the refinery. The West Branch Walnut River flows along the north and east boundaries of the site. Agricultural land lies east of the Site across the river.

The Site lies within the Osage Plains section (Flint Hills Upland subsection) of the Central Lowland Physiographic province. In general, the topography is characterized by flat-topped, steep-sided hills capped by chert-bearing limestone.

The Site is located to the north and west of the City of El Dorado, in Butler County, Kansas. The City is within three miles of the Site and centrally located in Butler County. According to census data, Butler County had an estimated population (1988) of 50,200 people. In 1980, the City of El Dorado was estimated to have a population of 10,510 with an additional 2,456 people in the surrounding El Dorado township. In 1990, the census population of the City of El Dorado was 11,504.

The nearest body of surface water is the West Branch Walnut River, located immediately north and east of the site. It joins the Walnut River about two miles to the south of the site. The West Branch Walnut River is used for recreational purposes and for fishing. Ground water beneath the Site flows to the east in the direction of the West Branch Walnut River.

The City of El Dorado draws its water supply from the El Dorado reservoir. The reservoir is formed by a single dam stretching across the Walnut River and Bemis Creek. The reservoir is approximately two miles east of the Site and approximately two miles upstream of the confluence of West Branch

Walnut River and the Walnut River. The town of El Dorado also owns six reserve wells located approximately 29 miles south in Cowley County.

There are a number of active water supply wells located within a three-mile radius of the site. The El Dorado Honor Camp (estimated 102 inmates and 10 staff) is served by a public water supply well located in the bedrock aquifer (Figure 3). An additional well screened in the bedrock aquifer serves a seven-person staff employed by the Kansas Turnpike Authority. There are also a number of private domestic bedrock wells within the three-mile radius. The Coastal Derby Refining Company has a public water supply well for employees at the facility. Approximately 163 residents utilize ground water (primarily from the bedrock aquifers) within a three-mile radius of the site.

There are three endangered species, the bald eagle and two species of snake, located near the site. Bald eagles are known to winter in El Dorado State Park, one mile from the site. The two species of snake, *Heterodon platyrhinos* and *H. hasicus*, have verified locations from counties on three sides of Butler County (Harvey, Cowley and Greenwood counties).

II. SITE HISTORY AND ENFORCEMENT ACTIVITY

The refinery occupying the area immediately west of the Site was constructed in 1917 soon after the discovery of oil at El Dorado in 1915. The refinery and surrounding area were purchased by Fina Oil Co. ("Fina") in 1958. The burn pond was built by Fina around the time of the purchase. Fina disposed of petroleum waste products generated by normal refinery operations by running a pipe from the refinery to the burn pond. The pond was used to store various refinery by-products such as slop oil emulsion solids, API separator sludge, and heat exchanger bundle cleaning sludges. When the waste products were of a very gaseous nature, Fina would ignite the waste product as it came out of the pipe. Whatever did not burn was discharged out of the pipe into the pond.

The Site historically contained a burn pond, a stormwater pond and a smaller settling pond (see Figure 4). The dike separating the burn pond and the larger stormwater pond was breached, resulting in an "L"-shaped pond. Eventually the dike between the stormwater pond and the settling pond also was breached, creating common water between all three ponds. This site, the Pester Burn Pond Superfund site, contains all three ponds, which are now interconnected, and this remedy addresses cleanup at the three ponds. Except for the historical references, all references to the "pond" or the "burn pond" in this document refer to all three interconnected ponds at the Pester Burn Pond Superfund site.

On January 1, 1977, Pester purchased the refinery from Fina and continued refinery operations. Pester filed for bankruptcy on February 25, 1985. Subsequent to Pester's bankruptcy, Coastal Derby Refining Company (Derby) purchased the refinery with the exception of the tract of land containing these three ponds. This tract is still owned by Pester. On February 28, 1986, Kansas Department of Health and Environment (KDHE) Administrative Order #86-E-16 was issued pursuant to state hazardous waste authorities (i.e., the state Resource Conservation and Recovery Act (RCRA) program), requiring Pester to conduct a site investigation of this surface impoundment, perform site monitoring and submit a Burn Pond closure plan.

The Site was placed on the National Priorities List (NPL) on January 31, 1989, by the EPA pursuant to its authority under CERCLA as amended by SARA. Following initial investigations, a Consent Order was signed between Pester, Fina and KDHE (April 19, 1990) to conduct a Remedial Investigation and Feasibility Study (RI/FS) of the site.

During May 1992, Fina constructed an interceptor trench on the north and east sides of the burn pond between the pond and the West Branch Walnut River. Electrical hookup of pumps to evacuate the trench has not been completed as of the date of this decision document.

III. HIGHLIGHTS OF COMMUNITY INVOLVEMENT

A draft Community Relations Plan was prepared for the Pester Burn Pond Site in June of 1990 by the responsible parties and was implemented by the KDHE. A public meeting was held after community interviews during October of 1990, prior to the start of the Remedial Investigation and Feasibility Study. The Remedial Investigation and Feasibility Study Reports were released to the public during 1991 and 1992. The documents were placed in the Administrative Record at EPA Region VII in Kansas City, Kansas, at KDHE's central office in Topeka, Kansas, and at the Bradford Memorial Library in El Dorado, Kansas. On August 27, 1992, a public meeting was held in El Dorado, Kansas, to present the Proposed Plan for the Pester Burn Pond First Operable Unit. Notice for the Public meeting was published in the El Dorado Times and in the Wichita Eagle.

IV. SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY

The remedy selected in this ROD addresses the removal and re-refining of the sludge in the burn pond and treatment of contaminated soils *in situ* by a process of flushing and bioremediation of fluids. The objectives of the remedial action are to remove the sludges, listed wastes K050 and K051, from the Site to prevent incidental contact and ingestion, and to remediate the soils to an acceptable level for incidental ingestion. Another objective of this action is to remove the sludge and soil contamination as a source of ground water contamination. Remediation of ground water contamination at the Site will be more fully addressed by a subsequent operable unit.

V. SUMMARY OF SITE CHARACTERISTICS AND EXTENT OF CONTAMINATION

A. Site Characteristics

The Site is comprised of three (3) interconnected ponds, each containing water overlying a sludge layer which is underlain by a contaminated soil zone. The western portion of the Site lies directly on the Fort Riley Limestone, sloping to the east so that the eastern portion of the Site lies on the floodplain of the West Branch Walnut River. Surface water recharges the ponds, especially the former stormwater pond, and the excess water from the ponds is pumped to a nearby wastewater treatment pond. The pond water and ground water have infiltrated through the alluvial materials into or under the river, and a layer of oily contaminated soils extends from under the ponds to the west bank of the river. Ground water moves from west to east in the Fort Riley Limestone underlying the site, some of which also provides recharge to the river. An interceptor trench has been completed to the east and north of the ponds to prevent further movement of the contamination into the river. The interceptor trench built by Fina in 1992 is designed to contain seepage which is then pumped back into the pond. The pond has an area of approximately six (6) acres.

B. Nature and Extent of Contamination

The primary source of site contamination was the disposal of API separator sludge and heat exchanger bundle sludges into the burn pond, which is an unlined pond. The dikes of two adjoining ponds to the burn pond were breached through the years and the ponds became interconnected, allowing the sludge to cover the bottom of all three ponds. The sludge contaminated the soils below the ponds, and the ground water below the ponds also became contaminated. The ground water is contained in the alluvium and in the Fort Riley Limestone underlying the alluvium.

The amount of contaminated material was calculated to be about 20,000 cubic yards of sludge in the pond and 70,000 cubic yards of contaminated soil. The sludge and contaminated soil are the primary sources of contamination of ground water. Although the ground water contamination will be addressed in a separate operable unit at the site, removal of the sludge and treatment of the soils will be effective in removal of the source of ground water contamination.

The Remedial Investigation and previous investigations at the Site included soil borings, installation of monitoring wells, excavation of test pits, sludge sampling, soil sampling, and ground water and surface water sampling. The chemical constituents of concern (see Table 1) include relatively low levels of metals, PAHs and semi-volatile and volatile organic compounds. Both the sludge and soil were found to contain levels of the carcinogenic PAH's benzo(a)anthracene and chrysene which exceeded the risk departure point of 10^{-6} for ingestion exposure.

The Site is bordered by industrial property (oil refinery) on the south and west, and bordered by agricultural land across the river to the north and east. The property has been on and adjacent to an active oil refinery for more than eighty years. It is probably fairly unlikely that the future land use on the property would be residential, but the Site is located in a region of rapid growth. Butler County is the sixth fastest growing county in the state; the population of Butler County, Kansas, grew 12.9 percent between 1980 and 1990 according to U.S. Census figures. Figure 2 shows the location of the refinery with respect to the adjacent river. Based on the present industrial setting of the site, incidental soil ingestion by trespassers was a primary risk scenario utilized to analyze risk. A residential scenario was also evaluated.

VI. SUMMARY OF SITE RISKS

A. Overview of the Baseline Risk Assessment

The baseline risk assessment is an evaluation of the potential threat to human health and the environment in the absence of any response action. A baseline risk assessment is done in part to determine whether remedial action is necessary at a site. Risk assessment was conducted for this Site to determine the potential effects of the contamination on human health and the environment that may be posed by contaminants released to the air, migrating in ground water or surface water, leaching through the soil, remaining in the soil, or bioaccumulating in the food chain.

B. Sources of Contamination

The primary source of contaminants is the estimated 20,000 cubic yards of burn pond sludge which contains volatile and semi-volatile organics as well as several metals. The first 12 to 24 inches of soil beneath the ponds is stained as a result of contamination, as well as up to 5 feet of soil in the bottom of the aquifer between the eastern boundary of the burn pond and the river. The amount of contaminated soil is estimated at 70,000 cubic yards.

Current land use in the vicinity of the Site is industrial and agricultural. As discussed above, future land use is also likely to be industrial and agricultural, although the area is situated within a region of growth. A residential risk scenario was assessed as generally required by EPA guidance; this was later supplemented by further calculations based on an assumption that land use would remain industrial.

Ground water at the Site is not a current source of drinking water. Risks which involve ground water as a means of possible exposure were not fully analyzed for this operable unit and will be considered as a separate operable unit.

Two risk scenarios were analyzed by the potentially responsible parties in the RI and the FS: a residential scenario (considered in the RI) in which persons come into contact with contaminated onsite soils and sludge frequently based on hypothetical residential use; and a limited-use scenario, added later in the FS, which made certain specific assumptions, namely, that a hypothetical trespasser, a 12- to 13-year old child, visits the Site once a week during frost-free months of the year over a two-year period. Risk under the latter assessment was also somewhat attenuated by assuming the presence of institutional controls (rather than the required no-action baseline). These risk analyses, as well as other concerns, including less quantifiable ones discussed more fully below, supported the need for this remedial action.

C. Contaminants of Concern

The risk assessment compiled a list of contaminants of concern from the results of the sampling activities at the site. These indicator contaminants of concern were based on concentrations at the site, toxicity, physical/chemical properties that affect transport/movement in air, soil and sludge, and prevalence/persistence in these media. These contaminants of concern were used in the risk assessment to evaluate potential health risks at the site.

Ten constituents of concern were identified in the pond sludge at the Site (xylenes, 2-methylnaphthalene, benzo(a)anthracene, chrysene, phenanthrene, pyrene, arsenic, barium, chromium, and lead). Barium was the only "inorganic compound" identified in the pond soil. In all, eleven compounds were evaluated in the risk assessment as constituents of concern for the burn pond soils (ethylbenzene, toluene, xylenes, 2-

methylnaphthalene, benzo-(a)anthracene, chrysene, naphthalene, phenanthrene, phenol, pyrene, and barium).

D. Toxicity Assessment

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse effects from exposure to chemicals exhibiting noncarcinogenic effects. Rfds, which are expressed in units of mg/kg/day (parts per million/day), are estimates of daily exposure levels for humans that are likely to have an appreciable risk of adverse health effects. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the Rfd.

The basic toxicity information used to calculate health risk is given in Table 2. The harmful effects of the contaminants of concern for the Site are based on the toxicological profiles of the individual contaminants as are briefly discussed in the following paragraphs.

1. Organic Contaminants

Benzene is classified as a carcinogen (a substance which increases the incidence of cancer). Ethylbenzene, toluene and xylenes are classified as noncarcinogens. Ethylbenzene is acutely toxic to the lung and central nervous system. Subchronic and chronic exposures to laboratory animals of this compound cause liver and kidney damage. A primary target for toluene toxicity is the central nervous system. Xylene, orally administered to animals, can result in central nervous system toxicity and has also been shown to cause ultra-structural liver changes. 2,4-dimethylphenol is toxic and can cause neurological and hematological changes. Pyrene is known to cause potentially toxic renal effects. The PAHs, chrysene and benzo (a) anthracene, are confirmed animal carcinogens and are therefore potential human carcinogens. Naphthalene has been shown to cause ocular and internal lesions when ingested. Acenaphthene is known for hepatotoxicity.

2. Inorganic Contaminants (Metals)

Arsenic is a carcinogen and its ingestion has been shown to increase the incidence of skin cancers. Noncarcinogenic effects include keratosis and hyper-pigmentation. Barium can cause increased blood pressure when ingested. Lead can cause damage to the central nervous system when ingested. The toxicity of chromium depends on its chemical form. Hexavalent chromium is more toxic than the trivalent form, and when exposure is via the inhalation route, is considered a human carcinogen. However, there is no evidence at the current time that hexavalent chromium is carcinogenic when ingested.

E. Exposure Assessment

The exposure assessment identified potential pathways and routes for contaminants of concern to reach the receptors and the estimated contaminant concentration at the points of exposure. Several pathways by which humans could be exposed to the chemicals of concern at the Site were evaluated based on reasonable assumptions about current and future land uses. The following pathways were evaluated: ingestion of chemicals in soil/sludge and dermal absorption of chemicals from soil/sludge. Inhalation of dusts or organic vapors from the pond soil or sludge at the Site were not considered. This was based upon an assumption made in the risk assessment that individuals would not be exposed to harmful levels of vapors at the Site because of the openness of the Site. For each evaluated exposure pathway, exposure assumptions were made for average and reasonable maximum exposure scenarios.

Exposure via ground water, although discussed in the risk assessment, will only be covered in this Record of Decision as it relates to the burn pond area as a continuing source of contamination. A separate Pester Ground Water Operable Unit RI/FS will investigate and evaluate the potential threat to human health and the environment posed by ground water contamination.

The surface water pathway includes potential runoff from contaminated areas into drainage pathways and into the West Branch Walnut River, and to the seep and trench areas. The river side of the burn pond contains many seeps. A trench along a portion of the property outside the fence and about one-third of the distance to the river collects some of the seepage. Visible evidence indicates that the open trench north of the pond has overflowed its banks in the past. Access to the trench is unrestricted.

The contaminant intake equations and intake parameters were derived from standard literature equations and data from EPA guidance documents. Chronic daily intakes (CDIs) were estimated for contaminants of concern in the risk assessment. The reference dose values (RfDs) for a substance represent a level of intake which is unlikely to result in adverse noncarcinogenic health effects to individuals exposed for a chronic period of time. The slope factor represents the upper 95 percent confidence limit value on the probability of response per unit intake of a contaminant over a lifetime (70 years). (See Tables 2, 3, 4, 5 and 6 for values used in the exposure assessment.)

(1) Contaminant Transport

The burn pond is underlain with silty clays which will adsorb the less water soluble Polycyclic Aromatic Hydrocarbons (PAHs) and Monocyclic Aromatic Hydrocarbons (MAHs), as well as the trivalent chromium. The compounds with high vapor pressures and low solubility located in the surface of the ponds and the surface soils are likely to undergo volatilization. Under proper conditions, PAHs may biodegrade in the soils. Biodegradation, however, is dependent on soil nutrient content, pH, oxygen availability, and microbial population.

Even with the presence of these retarding factors, transport of contaminants contained in the burn pond sludge through the vadose zone to the ground water table has occurred according to the findings of the RI/FS. Ground water in the alluvial aquifer flows radially to the north, east, and south from the burn ponds and discharges into the West Branch Walnut River. The ground water flow velocity through the alluvial aquifer is estimated to be 0.2 meter/year to 60 meters/year depending on whether water is moving within the silty clay or through local clayey gravels. The rate of contaminant migration will be highest in the gravel-rich zones within the alluvial sediments.

The surface expression of contaminants is indicated by a seep northeast of the pond and in an open trench north of the pond. Some contaminants appear to migrate to the top of the bedrock surface and then travel via gravity to a low area. The bedrock slopes to the east and has a surface exposure northeast of the site. The seep northeast of the pond is located on the bedrock surface. Migration is believed to be due to the hydraulic head supplied by the water levels in the pond. An open trench located northeast of the pond was excavated within eight inches of the bedrock surface. The subsurface interceptor trench installed in May 1992, and located north and east of the ponds, was excavated to the bedrock surface north and east of the pond.

Organic chemical contamination has been detected in the alluvial sediments indicating that contamination has migrated via surface runoff, aquifer/stream interconnection, trench overflow events, or river flooding of the trench, into the West Branch Walnut River. Similar conditions in the future (such as flood conditions in the West Branch Walnut River) would pose the possibility of additional releases from the site.

F. Risk Characterization

The risk characterization quantifies present and/or potential future risk to human health that may result from exposure to the contaminants of concern found at the site. The site-specific risk values are estimated by incorporating information from the toxicity and exposure assessments.

Two quantitative evaluations are made: the incremental risk to the individual resulting from exposure to a carcinogen; or, for noncarcinogens, a numerical index or ratio of the exposure dose level to an acceptable reference dose.

The risk assessment quantified the potential carcinogenic and noncarcinogenic risks to human health posed by contaminants of concern in several exposure media. The carcinogenic and noncarcinogenic risks were determined (see Tables 7, 8, 9, and 10 for values used in the exposure assessment) for the site.

Carcinogenic risk is presented as the incremental probability of an individual contracting some form of cancer over a lifetime as the result of exposure to the carcinogen. A risk of 1×10^{-6} would mean that one person in a million is in potential danger of developing cancer from the site contaminants. The carcinogenic risks were calculated for the evaluated pathways at the site.

Potential carcinogenic and noncarcinogenic risks for ingestion of, and dermal contact with, surface soil and sludge for a hypothetical residential use scenario are summarized in Tables 11 and 12.

The carcinogenic risks associated with exposure to the pond sludge and soil for the residential land use scenarios are at risk levels of 1.0×10^{-3} and 9.7×10^{-5}, respectively, for the ingestion exposure pathway for children and 7.0×10^{-4} and 7.7×10^{-5}, respectively, for the ingestion exposure pathway for adults.

For the specific limited access scenario which was used, the noncarcinogenic hazard index was less than one and the carcinogenic risks associated with incidental ingestion exposure to the pond sludge and soil are at risk levels of 2.0×10^{-5} and 2.7×10^{-6}, respectively (see Tables 13 and 14). This limited access scenario also took into account the effects that institutional controls, such as maintaining fencing, and deed restrictions limiting future land and water use, would have on the potential risk and hazards presented by the pond site.

For noncarcinogenic risk, a hazard index (HI) was calculated for each pathway evaluated. An HI of less than 1.0 (unity) indicates that the risks associated with that pathway are low. An HI above 1.0 indicates that some risk of noncarcinogenic effects exist and these risks increase proportional to the HI value. The HI values calculated have been less than one indicating no significant noncarcinogenic risk.

The effects of risks, toxicity, and exposure were integrated into quantitative and qualitative expressions indicating possible exposure to the constituents of concern in pond soil and pond sludge at the site. Carcinogenic risks exceeded the EPA "acceptable risk range" of 1.0×10^{-4} to 1.0×10^{-6} for ingestion of pond sludge by children in the residential exposure scenario. The carcinogenic risk levels associated with the incidental ingestion exposure (limited access exposure scenario) to the pond sludge and soil exceed the departure point of 1×10^{-6} for multiple exposure pathways. Non-carcinogenic risks did not exceed the EPA criteria.

The extent of human contact with the West Branch Walnut River in downstream areas is unknown. However, there is no evidence that untreated surface water is being used for human consumption on a daily basis. Furthermore, potential contamination in the West Branch Walnut River has not been fully characterized. An increase in the contaminant levels because of overflow from the burn pond area or trench, continued seepage from the surface impoundments, a failure of the impoundment diking, or flooding of the river may cause this environmental pathway to increase in importance.

G. Ecological Risks

The environmental receptors in the vicinity of the Site include common wildlife such as rabbits, snakes, migrating waterfowl, and aquatic life, including fish. Wildlife might be affected by exposure to contaminated sediments in the West Branch Walnut River, pond sludge or contaminated soils, and surface water including the West Branch Walnut River.

An Ecological Assessment (EA) was conducted as a part of the RI/FS for the purposes of determining possible effects from contamination to the site ecological system. The EA states that there is a possibility that wildlife accessing the burn pond area could be affected, but that the severity of the effect is difficult to quantify without further information. Effects would be dependent upon wildlife accessing and using the area, and ingesting or having dermal contact with the contaminated material, or upon concentrations of these oily hazardous wastes posing a hazard to river resources either directly or via bioaccumulation.

Three endangered species, the bald eagle and two species of snake, are mentioned in the EA as located near the site. Bald eagles are known to winter in El Dorado State Park, one mile from the site. The two species of snake, *Heterodon platyrhinos* and *H. hasicus*, have verified locations from counties on three sides of Butler County (Harvey, Cowley and Greenwood counties).

The principal waste threat onsite is the sludge contained in the burn pond. There is a greater potential for fish and other wildlife to be exposed to contamination if the burn ponds were to overflow in the future. The overflow might occur due to extremely heavy precipitation or failure of the diking structure. The overflow would result in direct contamination of the West Branch Walnut River with the potential for fish kills and the poisoning of the foodchain.

H. Summary

For a residential use scenario, exposure to soil and sludge at the Site would result in a maximum excess cancer risk of 1.0 X 10^{-3}. Noncarcinogenic health effects are not expected from exposure at the present detected levels of either onsite soil or sludge.

Tables 11 and 12 provide a summary of the hazards/risks for pond sludge and soil exposures associated with future residential scenarios. These calculations show that noncarcinogenic hazards for exposure to the pond sludge and soil fall within an acceptable range (<1.0). The carcinogenic risks associated with exposure to the pond sludge and soil for the residential land-use scenarios are at risk levels of 1.0 X 10^{-3}/7.0 X 10^{-4} and 9.7 X 10^{-5}/7.7 X 10^{-5}, for child/adult ingestion and dermal contact, respectively. The specific limited access scenario used in Appendix F of the Feasibility Study (a youthful trespasser exposed to the Site during warm months once a week over a two-year period) yielded risk levels of 2.0 X 10^{-5} and 2.7 X 10^{-6} respectively for pond sludge and soil. These carcinogenic risks exceed EPA's point of departure for carcinogenic risk, 1.0 X 10^{-6}, at sites with multiple exposure pathways and chemicals.

In addition, other factors beyond the quantified carcinogenic risk and the ecological risks which are discussed above contributed to the need to take action at the site. Uncertainty is posed by risk calculations, generally, of perhaps an order of magnitude or more. In addition, there is a threat of a more substantial release from the site, for example via a sudden incident such as a breach in the containment or via river flooding. This is an impoundment which is no longer in use, which contains oily hazardous waste, and which is situated in a floodplain adjacent to the river. Source reduction to remove the primary source of ground water contamination (as well as to alleviate the above-mentioned threat of sudden release) was also an important objective of this operable unit remedy.

Based on all of the foregoing factors being considered, EPA makes a finding that actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. DESCRIPTION OF ALTERNATIVES

A Feasibility Study was conducted to identify and evaluate alternatives for remediation of ground water, contaminated soils and sludge in the vicinity of the pond. However, the Feasibility Study failed to effectively characterize the nature and extent of ground water contamination in the alluvial and bedrock aquifers, so the alternatives evaluated for this Operable Unit address only source control by addressing soil and sludge, and do not directly address ground water contamination.

These remediation technologies were initially screened in the Feasibility Study based on effectiveness, implementability and cost. The alternatives meeting these criteria were then evaluated and compared to nine criteria required by the National Contingency Plan (NCP). The NCP requires that a no-action alternative be evaluated as a point of comparison for other alternatives.

The ten alternatives/sub-alternatives and their present worth costs are described below. The alternatives describe final remedial actions for source control, soil remediation and sludge remediation.

Alternative 1: **No Action**
$ 0.00

This alternative would require no actions of any kind at the site. There would be no remediation of soils or sludges, no monitoring and no operation of the interceptor trench. The current fencing around the Site would be left in place. Because this alternative will result in contaminants being left onsite above health-based levels, CERCLA Section 121(c) requires that a site review be conducted every five (5) years.

The present worth cost of this alternative for 30 years would be $0.00. This alternative could be implemented immediately.

Alternative 1A: **Limited Action**
$238,300

This alternative would not require remedial actions to address soil or sludge contamination. Deed restrictions would be used to prevent access to or excavation of the contamination areas. The interceptor trench would be pumped and maintained to prevent additional migration of contaminants into the West Branch Walnut River. Because this alternative will result in contaminants remaining onsite above health-based levels, CERCLA Section 121(c) requires that a site review be conducted every five (5) years.

The present worth costs for a 30-year period is $238,300. This alternative could be implemented immediately.

Alternative 2A1: **Removal and reuse of sludge for asphalt mix followed by capping of remaining soil.**
$2,572,900

This alternative would require that the sludge be removed from the ponds, dewatered, and transported offsite to be solidified into an asphalt product. The contaminated soils would be capped with a RCRA cap, which would include a vegetative cover. Routine maintenance of the cap would be required. The interceptor trench would be used to collect water and contaminants transported by infiltrated surface water. The water collected would be discharged to a wastewater treatment plant (WWTP). Residuals from treatment would be dealt with in accordance with RCRA, if applicable. Because this alternative will result in contaminants being left onsite above health-based levels, CERCLA Section 121(c) requires that a site review be conducted every five (5) years. The wastewater treatment plant would have to be operable over the 30-year life of the project or until wastewaster, which would need to be sampled quarterly, is clean, i.e., no longer needs to be treated to meet Clean Water Act discharge standards. The present worth cost for a 30-year period is $2,572,900.

Alternative 2A2: Removal and reuse of sludge for asphalt mix with *in situ* flushing/bioremediation of remaining soils $2,160,000

This alternative would require the removal of the sludge from the ponds, dewatering the sludge, and transporting the sludge offsite to be solidified into an asphalt product. The contaminated soils would be treated *in situ* by inundating the pond cavities with water after the sludge has been removed, thus flushing the contaminants into the interceptor trench. The oily seepage and water would be collected from the interceptor trench, chemically treated to remove organic contaminants, aerated, biologically treated, and discharged back into the ponds to be recycled into the interceptor trench. Aeration would be provided to the pond water to augment biodegradation of the organics in the water. The soils, pond water and interceptor trench water would be tested to monitor performance of the flushing/bioremediation process. Residuals from treatment would be dealt with in accordance with RCRA, as applicable.

It is thought that sludge removal and asphalt production could be accomplished within approximately one (1) year. The flushing/bioremediation process for soils is thought to be possible within an estimated three (3) years after sludge removal is accomplished. The process, however will continue until the performance standards have been achieved, and, in particular, until the health-based soil cleanup standard of 13 mg/kg of PAHs is met.

The present worth cost of this alternative (30 years) is $2,160,000. The time to complete this action is estimated to be four (4) years, after treatability studies, required as part of the remedial design for the flushing/bioremediation of the soil contamination, are completed.

Alternative 2B1: Removal and reuse of sludge at a refinery followed by capping of remaining soils. $2,787,720

This alternative would remove and dewater the sludge as in alternative 2A1 and 2A2, but the sludge would then be shipped to a refinery for re-refining into useable petroleum products. The sludge would go to a RCRA-permitted petroleum refinery. The appropriate activities must be included in the selected facility's RCRA TSD (treatment, storage, and disposal facility) permit and the facility must be in compliance with the permit and in compliance with EPA's "offsite policy" governing offsite shipments and CERCLA Section 121(d)(3). The sludge would be utilized with other refinery feedstocks of a similar nature. The soil remediation would require capping in the same manner as described in Alternative 2A1 and the interceptor trench would be operated as described in 2A1, with the interceptor trench water being treated in a WWTP.

The sludge removal, transportation and re-refining process should be completed in approximately one (1) year. Implementation of a RCRA cap would then follow sludge removal. Capping should be completed within approximately one (1) year of sludge removal. Quarterly monitoring of the water pumped from the interceptor trench will be needed to determine the need to continue treatment of water from the interceptor trench in the WWTP.

The present worth cost of this alternative (30 years) is $2,787,720. Because this alternative results in contaminants remaining onsite above health-based levels, CERCLA Section 121(c) requires that a site review be conducted every five (5) years.

Alternative 2B2: Removal and reuse of sludge at a refinery followed by *in situ* flushing/bioremediation of remaining soils. $2,374,800

This alternative would require removal and reuse of the sludge as a refinery feedstock as described in Alternative 2B1. Following removal of the sludge, the remaining soils would be treated with the *in situ* flushing/bioremediation process as described in Alternative 2A2. Removal of the sludge and recycling into petroleum product will take approximately one (1) year. Following the sludge removal process, the *in situ* flushing/bioremediation of the contaminated soil is estimated to take three (3) years, although regular monitoring of the fluids collected in the interceptor trench and sampling of the soils will determine when the flushing/bioremediation would be discontinued. The flushing and bioremediation would need to continue until the risk-based soil cleanup level of 13 mg/kg for PAHs is achieved. Monitoring of soil and water would be conducted quarterly, or more often if needed.

The present worth cost of this alternative (30 years) is $2,374,800.

**Alternative 3: Capping of sludge followed by collection and treatment of leachate.
$2,646,200**

This alternative requires dewatering of the sludge and capping the sludge with a RCRA cap, collection of leachate with the interceptor trench to be treated in a WWTP. The sludge would be dewatered, for example by being heated to approximately 200°F, pumped, and flashed to drive off the estimated 30 percent volume of water. Air pollution control equipment (a hood and fume incinerator) would be used to control volatile emissions during the dewatering process. The dewatering would take place within the pond boundaries. After dewatering, the sludge would be covered with a RCRA cap. The interceptor trench would be sampled quarterly and treated in the WWTP until the water is clean and meets Clean Water Act discharge standards without treatment. CERCLA Section 121(c) requires a site review every five (5) years.

The present worth cost of this alternative (30 years) is $2,646,200. The time to implement this alternative is estimated to be 30 years.

**Alternative 4: Stabilization/Solidification of sludge onsite followed by capping and leachate collection and treatment.
$3,353,600**

This alternative requires mixing of the sludge in place with a pozzolanic material, and a scaled-down cap, as allowed by RCRA requirements. The interceptor trench would be pumped and discharged to the WWTP for treatment. Leachate would be monitored; water samples from the interceptor trench will be collected and analyzed quarterly. Use of the WWTP would continue until the discharge water meets the performance standards discussed above.

The present worth cost of this alternative is $3,353,600. The time to implement this option may be up to 30 years, although the stabilization/solidification process for treatment of the sludge may be accomplished within an estimated one (1) year, pending further treatability studies during the remedial design process.

Alternative 5A: **Removal and thermal treatment of sludge followed by capping of remaining soils. $5,815,000**

This alternative will require removal of the sludge and transportation to an offsite cement kiln to be used as a hazardous-waste fuel. The sludges have a BTU value of between 8,000 and 9,000. Following removal of the sludge, the soil underlying the sludge would be capped with a low-permeability clay barrier, covered with topsoil and seeded to prevent erosion. The interceptor trench would be used to collect oily seepage and water infiltrating through the soil zone and the fluids would be pumped to a WWTP for treatment. Treatment would continue until the collected water, which would need to be sampled on a quarterly basis, meets Clean Water Act discharge requirements. Since the contaminated soils would be left onsite, CERCLA Section 121(c) requires that a site review be conducted every five (5) years.

The present worth cost of this alternative (30 years) is $5,815,000.

Alternative 5B: **Removal and thermal treatment of sludge followed by *in situ* flushing/bioremediation of soils. $5,402,100**

This alternative requires removal of the sludge and transportation to an offsite cement kiln to be used as a hazardous-waste fuel, as in alternative 5A. The soil flushing/bioremediation process to be used is the same as explained in Alternative 2A2 and 2B2.

The present worth cost of this alternative (30 years) is $5,402,100.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The ten remedial action alternatives described above were evaluated using nine evaluation criteria established in the National Contingency Plan (NCP). The resulting strengths and weaknesses of the alternatives were then compared to identify the alternative providing the best balance among the nine criteria.

When conducting the analysis of the remedial alternatives, the nine criteria are organized into three categories as follows:

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with applicable or relevant and appropriate requirements.

Primary Balancing Criteria

- Reduction of toxicity, mobility or volume through treatment
- Implementability
- Short-term effectiveness
- Long-term effectiveness
- Cost

Modifying Criteria

- Community acceptance
- EPA/State acceptance

An alternative must meet the threshold criteria, i.e., following two requirements, to be considered as a final remedy for the site.

A. Protection of Human Health and the Environment

A primary requirement of CERCLA is that the selected remedial action be protective of human health and the environment. A remedy is protective if it eliminates, reduces, or controls current and potential risks posed through each exposure pathway to acceptable levels through treatment, engineering controls, or institutional controls.

Alternative 1, the no action alternative, does not include treatment or controls, provides no reduction in risk, and is not protective. Alternative 1 will no longer be discussed with regard to soils or sludge remediation.

Alternative 1A, the limited action alternative, would not treat, contain or remove the primary contaminant, the sludge. Deed restrictions would be placed on the property limiting future use of the site. The interceptor trench would be used to lessen the impact of contaminants leaving the site. This alternative does provide some reduction in risk, but since the sludge is not removed or treated, or contained, this alternative will no longer be considered.

All of the remaining alternatives will involve the use of the existing interceptor trench to collect water and oily seepage leaving the vicinity of the ponds and some treatment of the collected fluids, thereby reducing the potential risk, especially to the surface water in the West Branch Walnut River.

Alternative 2A1 would be protective in that the sludge would be removed from the Site to be used as asphalt mix and the soil would be capped to prevent erosion. The interceptor trench would be used to collect and treat water carrying contamination from the soils in a WWTP, causing reduction and control of contaminants.

Alternative 2A2 would be protective in that the sludge would be removed from the Site for asphalt mix. The flushing/bioremediation process would serve to reduce and possibly eliminate the unacceptable risk from soil contamination.

Alternative 2B1 includes removal of sludge from the Site and reuse of the sludge for refinery feedstock and would be protective due to the elimination of the potential exposure pathway from the sludge. Capping of the soils and collection and treatment of the infiltrated water by the interceptor trench would be protective in that exposure to the contaminated soil would be minimized and contaminants in water would be subject to treatment, and to discharge in a controlled manner.

Alternative 2B2, is protective in that removal of sludge from the Site for reuse as refinery feedstock would eliminate the sludge pathway of contamination at the site. The flushing/bioremediation of the soils would substantially reduce the contamination and likely control contamination from the soil pathway.

Alternative 3, capping of the dewatered sludge and collection and treatment of fluids seeping from the pond area, would be protective, in that it would reduce exposure from the sludge and soil and from contaminants which would otherwise seep out into surface water or ground water. Capping would prevent exposure to and ingestion of contaminated soil and sludge, and collection and treatment of the contaminated water would reduce exposure to the contaminants.

Alternative 4, stabilization/solidification of sludge onsite, followed by capping and leachate collection and treatment, would reduce the potential for offsite migration of contamination from soils and would eliminate the risk from the sludge which would have an extremely low mobility factor. This alternative would also be protective.

Alternatives 5A and 5B, removal and thermal treatment of sludge, and capping of remaining soils (5A) or *in situ* flushing and bioremediation of soils (5B) are protective in that the sludge will be removed from the Site and burned as fuel, and exposure from leachate entering the environment will be controlled. In Alternative 5B, flushing and bioremediation reduce the levels of contamination in the soil, while in Alternative 5A, capping reduces exposure to the contamination.

B. <u>Compliance with Applicable or Relevant and Appropriate Requirements</u>

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State standards, requirements, criteria, and limitations which are collectively referred to as "ARARs", unless such ARARs are waived under CERCLA Section 121(d)(4). Applicable requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address hazardous substances found at the site, the remedial action to be implemented at the site, the location of the site, or other circumstances present at the site. Relevant and appropriate requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law which, while not applicable to the hazardous materials found at the site, the remedial action itself, the site location or other circumstances at the site, nevertheless address problems or situations sufficiently similar to those encountered at the site that their use is well-suited to the site. ARARs may relate to the substances addressed by the remedial action (chemical-specific), to the location of the site (location-specific), or the manner in which the remedial action is implemented (action-specific).

Alternatives 2A1 and 2A2 involve producing a salable product, asphalt, from K049, KO50 and KO51, RCRA-listed wastes. These alternatives would require either delisting of these wastes in accordance with 40 CFR Section 260.22 or handling of the resultant asphalt product in accordance with Part 266, Subpart C and Part 268. The sludge has some chromium and lead content, which may present an incremental health risk if the sludge and asphalt raw materials are distinguishable from one another. The leachability of the sludge-asphalt product will be compared to the leachability of asphalt product by the methods referenced in Part 266, Subpart C to insure that no incremental health risk is encountered.

Alternatives 2A1 and 2A2, as well as Alternatives 2B1 and 2B2, and 5A and 5B call for offsite destruction in compliance with RCRA. Strictly speaking, ARARs do not apply to these offsite activities. Offsite, the proper environmental laws and regulations, such as RCRA, simply apply directly; they are not subject to the ARARs analysis covered here. For example, Alternatives 2A1 through 2B2 are subject to all of the RCRA regulations that apply to recycling of hazardous waste.

Capping alternatives for the soil (2A1, 2B1, and 5A) would alleviate risk by inhibiting the soil ingestion pathway, meeting the ARARs of 40 CFR 264.111, 40 CFR 264.228 and 40 CFR 264.310 (RCRA closure regulations).

Soil flushing (2A2 and 2B2) would need to achieve levels which provide a satisfactory level of risk or risk reduction. There are no ARARs which control the level of PAHs in the soil directly. The risk-based level for this remedial action is a soil cleanup level of 13 mg/kg for carcinogenic PAHs. This level is based on continued industrial use and limited access (institutional controls) to insure that this level of soil cleanup remains protective.

While the PAH concentration for soil cleanup is not directly controlled by a chemical-specific ARAR, RCRA closure for the pond provides an action-specific ARAR because the pond has historically been treated as a RCRA "regulated unit". For clean closure, 40 CFR 264.111 and 40 CFR 264.228 apply, while for "landfill" (non-clean) closure, 40 CFR 264.111 and 40 CFR 264.228 and 40 CFR 264.310 apply. The selected soil cleanup level of 13 mg/kg is intended to provide a reasonable, health-based level for closure that, if it is met, will also comply with the applicable requirement of RCRA closure, utilizing the "health-based" standards for clean closure that are allowed optionally (in lieu of background levels) under EPA policy. (A policy allowing risk-based clean closure appeared in the Federal Register March 19, 1987.)

Alternative 3, capping of the sludge followed by collection and treatment of leachate would comply with ARARs if the sludge is left in place. If the sludge is not left in place, the RCRA land disposal restrictions (LDRs) would have to be complied with, or waived.

For each of the alternatives listed in this decision document, capping of the Site would need to be done in accordance with the RCRA regulations cited above. The RCRA regulations are applicable to this Site because the Pester burn pond was a RCRA-regulated impoundment.

Alternative 4, stabilization/solidification of sludge onsite followed by capping and leachate collection and treatment, would comply with LDRs, provided that the treatment stabilization/solidification is carried out in situ, without "placement" of the wastes, or provided the treatment standard is met for K049, KO50 and KO51 wastes.

Alternatives 5A and 5B comply with onsite ARARs for soil. The sludge would be removed and burned at an offsite cement kiln for fuel and be thermally destroyed; as discussed above, this discussion of ARARs does not cover such offsite activity. The soil would be capped under 5A, limiting the ingestion pathway and would be treated by flushing/bioremediation with the fluids being collected by the interceptor trench and treated under alternative 5B. As described above in the discussion of ARARs for alternatives 2A2 and 2B2, the soil flushing would continue until the soil sampling indicates that the treatment standards have been met.

The standards of the Clean Air Act and the Clean Water Act must be complied with for each of the alternatives described above. It appears at present that these standards could be met by each of the alternatives. Additional technical information and field data will be gathered during treatability studies to be conducted in the remedial design phase.

The second category of criteria is primary balancing criteria. The following five criteria are used to evaluate the alternatives to determine the option that provides the most balance for the final remedy for the site.

C. Reduction of Toxicity, Mobility, or Volume by Treatment

This evaluation criterion addresses the degree to which a technology or remedial alternative reduces toxicity, mobility, or volume of hazardous substances by treatment.

Alternatives 2A1, 2A2, 2B1, 2B2, 5A and 5B will reduce toxicity, mobility and volume onsite by removing the sludge from the Site (and treating it to reduce toxicity as well as mobility). Treatment of the collected fluids under those alternatives will reduce the toxicity and mobility of the treated contaminants.

Alternative 3 will not reduce toxicity, volume, or mobility through treatment, except with treatment by the WWTP of collected fluids from the interceptor trench. Mobility would be reduced by the cap, without treatment.

Alternative 4, the stabilization/solidification of the sludge option, would virtually eliminate the toxicity and mobility of contamination from the sludge, but would double the volume of waste onsite. Leachate collection by the interceptor trench and treatment of the leachate will reduce the mobility of the soil contamination.

D. Implementability

Implementability refers to the technical and administrative feasibility of a remedy, from design through construction, operation, and maintenance. It also includes coordination of Federal, State and local governments to clean up the site.

All alternatives under consideration are considered implementable. Alternatives 2A1, 2A2, 2B1, 2B2, 5A and 5B are sludge removal and reuse technologies, and while some may require RCRA delisting or application of RCRA exemptions, they involve standard methods of removal and shipment of hazardous wastes. The collection and treatment of oily seepage and ground water for soil remediation will either utilize a WWTP or flushing/bioremediation effort. The flushing/ bioremediation options will require pilot treatability studies during the design phase to insure effectiveness of the technology. Delays could result from treatability study investigations and any subsequent work required because of conclusions derived from the studies.

Alternative 3 involves capping of the sludge, which is easily implementable. Collected fluids would be treated in a WWTP, which is an accepted standard technology.

Delays could result for all alternatives which rely upon the availability of a nearby WWTP if problems arise relative to the use and/or availability of a WWTP and another treatment method must be sought.

Alternative 4, in which the sludge would be stabilized/solidified in the ponds and capped, utilizes a common technology.

E. Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to achieve protection of human health and the environment and any adverse impacts that may be posed during the construction and operation period until remediation goals are achieved.

Alternatives 2A1, 2A2, 2B1, 2B2, 5A and 5B will remove the sludge from the site, exposing workers onsite to some exposure to hazardous materials during removal operations. Alternatives 3 and 4 could cause exposure to onsite workers during sludge dewatering and sludge handling. Use of any of the alternatives causing removal or disturbance of the sludge will require following the Occupational Safety and Health Administration (OSHA) standards for the handling of hazardous materials. Air monitoring would be necessary with implementation of controls to protect the community from potential site releases via the air route. Those controls would have to be observed for the duration of the remediation. For the removal alternatives listed above, the transport of sludge materials would require protection of workers and the public as required by OSHA requirements, Hazardous Materials Transportation Act Regulations, RCRA requirements and Clean Air Act requirements. Over the short term the soils remediation would pose a relatively low risk to workers or the community. The remediation period could be as short as three (3) years with the soil flushing/bioremediation, if fully successful, to as long as 30 years for the capping alternatives.

F. Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time. Evaluation by this criterion includes the consideration of residual risk and the adequacy and reliability of controls.

All alternatives being considered (with the exception of alternatives 1 and 1A) will be effective in preventing direct contact with both sludges and soils. Alternatives 2A1, 2A2, 2B1, 2B2, 5A and 5B eliminate the sludge from the Site and thereby provide the most effective and permanent long-term solution for lowering risk from the sludge at the site.

Alternative 3 will be effective over the long term but will require long-term cap maintenance and long-term collection and treatment of fluids collected in the interceptor trench. Alternative 4 will provide a permanent treatment solution for the sludge contamination because the stabilized/solidified sludge will no longer be a source of contamination. For Alternatives 2A1, 2B1, 3 and 4, the untreated soil would require long-term collection of fluids by the interceptor trench and treatment of fluids by a WWTP.

G. Cost

This criterion examines the estimated costs for each remedial alternative. Table 15 shows capital, O & M and present worth costs.

The third category of criteria is modifying criteria. The following two criteria are considered when evaluating the alternatives and are used to help determine the final remedy for the site.

H. EPA - State Acceptance

The State of Kansas supports the remedy selected for the cleanup of contaminated sludge and soil.

I. Community Acceptance

Community acceptance of the selected remedy was evaluated during the public comment period. A public meeting on the Proposed Plan was held on August 27, 1992, in El Dorado, Kansas. The Responsiveness Summary (Appendix A) includes comments received during the public comment period and responses to those comments.

IX. SELECTED REMEDY: DESCRIPTION AND PERFORMANCE STANDARDS FOR EACH COMPONENT OF THE REMEDY

Based on the evaluations prepared for each of the proposed alternatives, EPA has made a determination that the appropriate remedy for the Pester Burn Pond Site First Operable Unit is Alternative 2B2. The selected remedy consists of the following components: (1) removal of sludge contained in the pond, dewatering of sludge, shipment to a RCRA-permitted TSD facility for re-refining into petroleum product; (2) in situ soil flushing/bioremediation; and (3) collection /treatment of oily seepage and water from the interceptor trench.

A. Removal of sludge

The sludge is located in three (3) interconnected ponds, under as much as 10 feet of water. The ponds will have to be dewatered prior to sludge removal. The water will be pumped to a WWTP which discharges to the West Branch Walnut River under an NPDES Permit. After the sludge is removed, it will be dewatered and transported via railcar as a hazardous waste to a RCRA-permitted TSD facility, permitted to carry out these activities. The sludge will be mixed with refinery feedstock and re-refined into useable petroleum product. The portion of the sludge that is not incorporated into product will be removed at the end of the process at the API separator and be handled as RCRA waste, as will any other RCRA wastes generated. Removal of sludge from the Site will eliminate the sludge from ingestion/contact risk at the Site.

B. *In situ* flushing/bioremediation of soils

Following removal of the pond sludge, the ponds will be filled with water. Any soil contaminants mobilized by the aqueous solution will flow to the interceptor trench for collection and reintroduction to the pond. The treatment process will include initially pumping the wastewater to a separator to remove free oils and sediment, followed by chemical conditioning and treatment in an aeration tank, enhancing biological action. After this treatment cycle, the water would be discharged back into the pond cavities. Aeration will be provided in the ponds via perforated pipes placed on the bottoms of the ponds. The aeration will augment biodegradation of organics in the pond water. Treatment residuals will be handled in compliance with RCRA if they are hazardous wastes.

This recycling of fluids into the ponds will continue until the soil sampling indicates that the risk-based cleanup level of 13 mg/kg of carcinogenic PAHs has been achieved; the trench fluid will also be analyzed. Analysis of soil samples will determine whether the carcinogenic PAHs, benzo(a)anthracene and chrysene, have been reduced to levels below 13.0 mg/kg. Under the industrial/limited access exposure scenario, which was used to calculate the cleanup level used for the soils, 13.0 mg/kg is the level calculated for the carcinogenic PAHs found in the soil which would limit the ingestion of soils to a $1.0E^{-06}$ risk level. Institutional control measures will be taken in order to limit access, including additional fencing if needed, and deed restrictions.

X. STATUTORY DETERMINATIONS

The EPA's primary responsibility at Superfund sites is to select remedial actions that are protective of human health and the environment. Section 121 of CERCLA also requires that the selected remedial action comply with ARAR's, be cost effective, and utilize permanent treatment technologies to the maximum extent practicable. The following sections discuss how the selected remedy meets these statutory requirements (Section 121 of CERCLA, 42 U.S.C. §9621).

A. Protection of Human Health and the Environment

The baseline risk assessment identified the ingestion of soils and sludges as the primary and principal risk at the site. The selected remedy protects human health and the environment by removing the sludge from the Site and converting it into petroleum product. There will no longer be a risk from the sludge at the Site after it is removed. The soils will remain onsite, to be treated by flushing/bioremediation to reduce contamination to an acceptable risk level. The risk level to be achieved, 10^{-6}, is based on the carcinogenic PAHs benzo(a)anthracene and chrysene. The acceptable risk level will be achieved when soil levels of the carcinogenic PAHs are reduced to 13 mg/kg.

Implementation of Alternative 2B2 may cause air releases at the site. The sludge dewatering may require heating of the sludge to 200°F, thus generating volatile emissions. If volatile emissions are present, this process will require air pollution control equipment such as a hood and fume incinerator to protect onsite workers and area residents. Air pollution will have to be monitored during all phases of the sludge removal to protect area residents and onsite personnel.

Limited risks are anticipated from the remediation of the soils through the flushing/bioremediation process. These would include possible exposure for onsite workers, and the risk of an inadvertent uncontrolled discharge to surface water.

B. <u>Attainment of Applicable or Relevant and Appropriate Requirements of Environmental Laws</u>

All ARARs will be met by the selected remedy.

There are no chemical specific ARARs that apply directly to cleanup of sludge and soil. Source reduction will assist in meeting ground water ARARs which are to be examined as part of a second operable unit at the site.

Remedial activities including removal, transport, storage, treatment, rerefining and reuse of the sludge and discharges to air and water must comply with: (1) OSHA standards governing worker safety during hazardous waste operations, (including 29 CFR 1910); (2) Solid Waste Regulations (40 CFR 240-281); (3) RCRA or Hazardous Waste Regulations (40 CFR 260-272); (4) U.S. Department of Transportation Regulations (including 49 CFR Parts 170 through 179); (5) The Kansas Solid Waste Management Act; and (6) The Kansas Hazardous Waste Management Act; (7) The Clean Water Act and its regulations will control any discharges to surface water, while the Safe Drinking Water Act may apply to discharges to ground water; and (8) Additionally, if onsite monitoring during the excavation or dewatering of the sludge shows air emissions at the site, the Clean Air Act regulations including 40 CFR Parts 50 and 61 will control.

The sludge is a listed hazardous waste because of having been generated as API separator sludges and heat exchanger bundle cleaning sludges, K050 and K051 respectively, and the pond has historically been treated as a RCRA regulated hazardous waste impoundment.

C. <u>Cost Effectiveness</u>

The selected remedy meets the requirements of CERCLA and is cost-effective in providing overall protection of human health and the environment and compliance with ARARs. Additionally the remedy is both short-term and long-term effective and reduces toxicity, mobility and volume of wastes through treatment. Estimated present worth cost for the selected remedy is $2,374,800.

D. <u>Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable</u>

The EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Pester Burn Pond site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that this selected remedy provides the best balance in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost. Also, EPA considered the statutory preference for treatment as a principal element, and considered input from the community. The State of Kansas agrees with these determinations.

The selected remedy utilizes technologies that can be effectively implemented. These processes provide the best solutions in addressing the contaminants at the site. The selected remedy permanently removes the contaminated sludge for reuse, thus providing for long-term effectiveness and permanence. The in-situ flushing/bioremediation process will provide treatment for the contaminated soil. Therefore, this remedy provides treatment technologies to the maximum extent practicable at the site.

The selected remedy provides maximum reduction of toxicity, mobility, and volume by providing for the removal of all sludge from the Site for recycling. The in-situ flushing/bioremediation will provide reduction in soil toxicity, mobility, and volume at a reasonable cost.

The short-term risks associated with the selected remedy are minimal and will be attended to with the proper controls at the site. The short-term risks apply to excavation and transport of waste. These short-term risks will be minimized through compliance with ARARs.

For these reasons, the selected alternative provides the best balance of trade-offs with respect to these criteria.

E. Preference for Treatment as a Principal Element

The selected remedy involves removal of contaminated sludge offsite for recycling at a RCRA-permitted petroleum refinery and treatment of contaminated soil with flushing/bioremediation. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Pester Burn Pond Operable Unit was released for public comment on August 20, 1992, and identified Alternative 2B2 as the preferred alternative. No significant changes were made in selecting the preferred alternative as described in the Proposed Plan.

ATTACHMENT I

Glossary of Terms

ARARS - Applicable Relevant and Appropriate Requirements - Clean up standards, standards of control or other environmental protection requirements which are required to be met under CERCLA and the NCP.

AR File - Administrative Record File - includes all pertinent documents and site information which forms the basis and rationale for selection of a remedial alternative.

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act of 1980. The federal "Superfund" law.

EPA - United States Environmental Protection Agency - The support government agency for the Pester Burn Pond site.

FS - Feasibility Study. The study used to evaluate various alternatives to clean up contamination.

KAL - Kansas Action Level is a concentration that could produce chronic health effects after long term consumption of water. If a contaminant is detected at or above the KAL in a public water supply, the well must not be used for drinking water purposes.

KDHE - Kansas Department of Health and Environment. The lead government agency for the site.

MCL - Maximum Contaminant Level - The maximum amount of contaminant allowed in ground water by USEPA.

M & E - Metcalf & Eddy

NPDES - National Pollutant Discharge Elimination System - a permit that sets standards for the discharge of potentially contaminated water.

NCP - National Oil and Hazardous Substances Pollution Contingency Plan. The procedures used to address the response powers and responsibilities created by the federal Superfund law.

NPL - National Priorities List. A list of most contaminated sites as determined by the NCP.

PRP - Potentially Responsible Party - The party identified by the U.S. EPA which is potentially responsible for contamination.

RCRA - Resource Conservation and Recovery Act

RI - Remedial Investigation - The report which identifies site conditions, extent of contamination, and site risks.

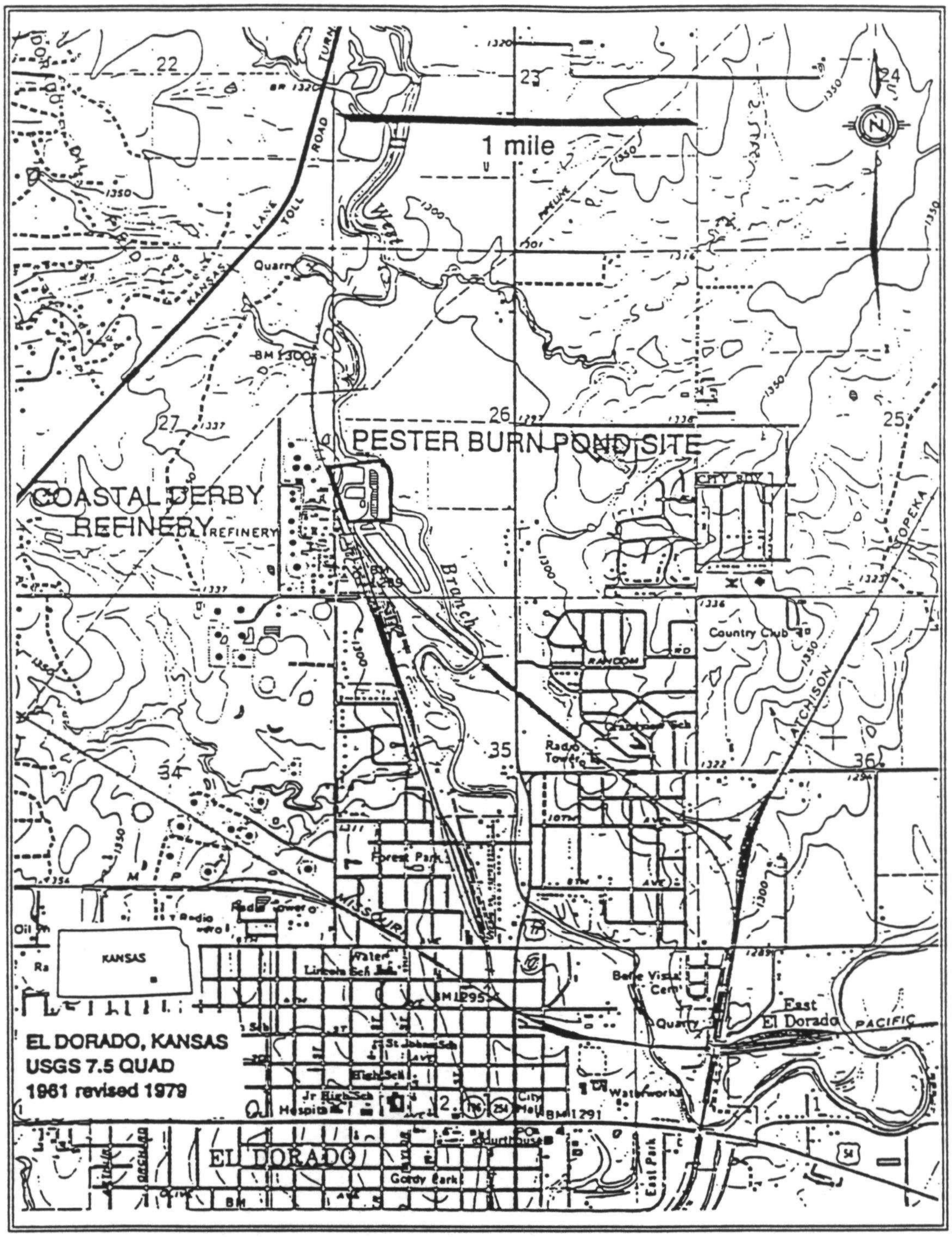
ROD - Record of Decision - The official document by U.S. EPA which selects the remedy to clean up a Superfund site.

SARA - Superfund Amendments and Reauthorization Act of 1986. The federal law which amended and extended authorization of the original Superfund law (CERCLA).

VOC - Volatile Organic Compound

FIGURE 1

Pester Burn Pond Operable Unit Location Map

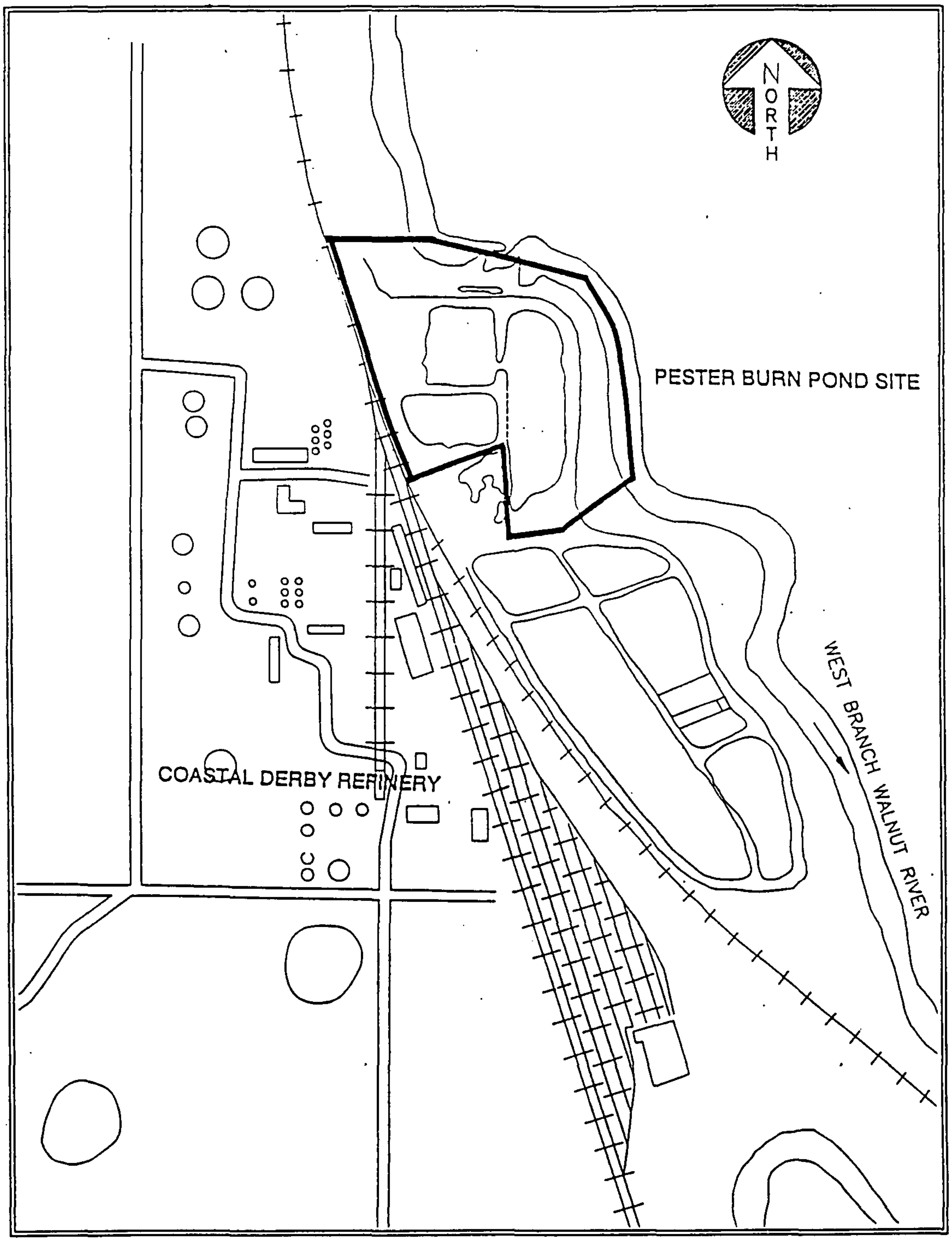


SOURCE: Remedial Investigation Report
Pester Burn Pond Site
El Dorado, Kansas
May 29, 1991 (Rev. July 8, 1991)

POOR QUALITY ORIGINAL

FIGURE 2

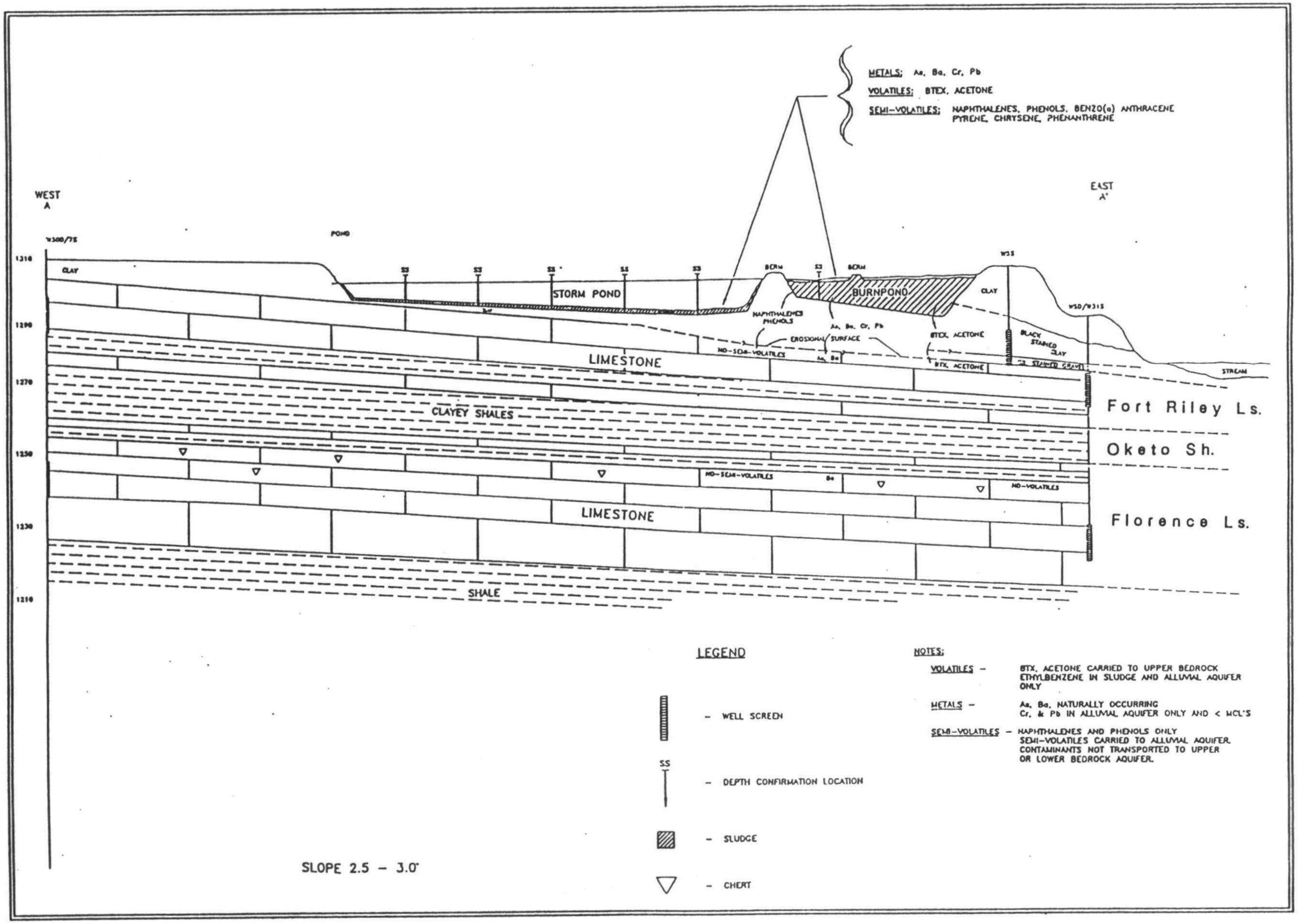
Pester Burn Pond Operable Unit and Environs, El Dorado, Kansas



SOURCE: Remedial Investigation Report
Pester Burn Pond Site
El Dorado, Kansas
May 29, 1991 (Rev. July 8, 1991)

FIGURE 3

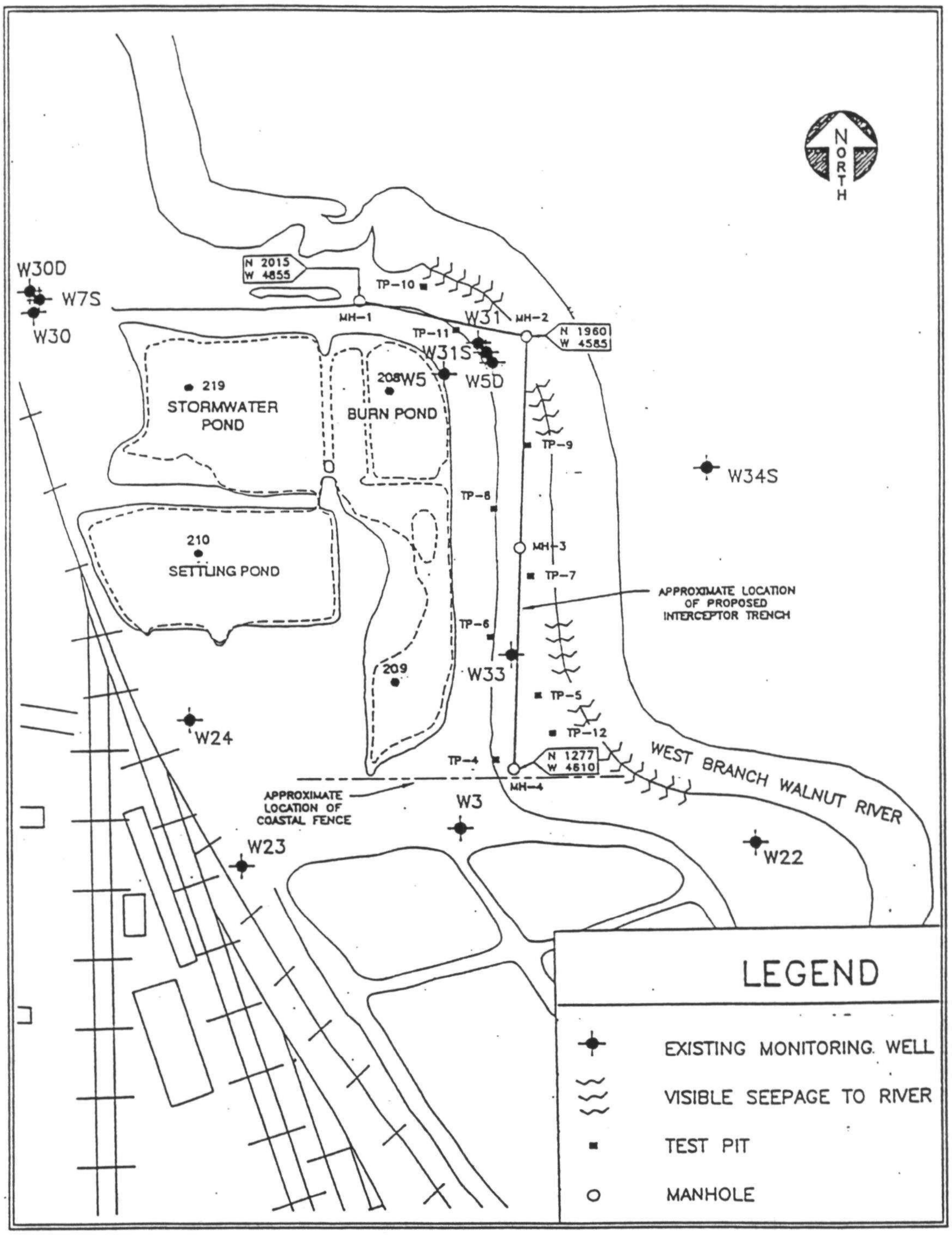
Geologic Cross Section, Pester Burn Pond Operable Unit, El Dorado, Kansas



SOURCE: Remedial Investigation Report; Rester Burn Pond Site
El Dorado, Kansas; May 29, 1991 (Rev. July 8, 1991)

FIGURE 4

Sampling Locations, Pester Burn Pond Operable Unit, El Dorado, Kansas



SOURCE: Contract Documents Bid and Specification for Installation of Interceptor Trench (Feb. 1992)

TABLE 1

CHEMICAL CONSTITUENTS OF CONCERN

Constituents of Concern	Stormwater Pond		Burn Pond		Burn Pond		Settling Pond		Seep		West Branch of the Walnut River			
	(Station 219) (MG/KG)		(Station 208) (MG/KG)		(Station 209) (MG/KG)		(Station 210) (MG/KG)		(Station S-2)		(Station 202)		(Station 203)	
									(MG/KG)	(MG/L)	Water	Surface Sed.	Water	Surface Sed.
	Sludge	Soil	Sludge	Soil	Sludge	Soil	Sludge	Soil	Waste	Aqueous	(MG/L)	(MG/KG)	(MG/L)	(MG/KG)
Metals														
Arsenic	1.3	NCC	0.9	NCC	NS	NCC	1.3	NCC	N/A	0.26	0.003	0.36	0.006	N/A
Barium	26	2	19	2	NS	2	31	0.7	N/A	0.77	N/A	N/A	N/A	N/A
Chromium	121	NCC	117	NCC	NS	NCC	107	NCC	NCC	NCC	N/A	N/A	N/A	N/A
Lead	157	NCC	114	NCC	NS	NCC	92	NCC	N/A	0.057	<0.1	12.6	<0.1	N/A
PAHs														
Acenaphthene	NCC	NCC	NCC	NCC	NS	NCC	NCC	NCC	<80	0.091	N/A	N/A	N/A	N/A
Benzo(a)anthracene	<67	<3.3	<67	<6.6	NS	<3.3	78	9.6	NCC	NCC	N/A	N/A	N/A	N/A
Chrysene	<67	<3.3	95	<6.6	NS	<3.3	150	15	NCC	NCC	N/A	N/A	N/A	N/A
Fluorene	NCC	NCC	NCC	NCC	NS	NCC	NCC	NCC	240	0.12	N/A	N/A	N/A	N/A
2-Methylnaphthalene	<67	22	<67	7.4	NS	13	75	10	1,000	0.58	N/A	N/A	N/A	N/A
Naphthalene	NCC	<3.3	NCC	<6.6	NS	7	NCC	<6.6	250	0.15	N/A	N/A	N/A	N/A
Phenanthrene	150	18	220	7.3	NS	9.1	190	<6.6	1,100	0.54	N/A	N/A	N/A	N/A
Pyrene	95	<8.8	130	<6.6	NS	<3.3	160	14	130	<0.80	N/A	N/A	N/A	N/A
Semi-volatiles														
Phenol	NCC	<3.3	NCC	<6.6	NS	<3.3	NCC	6.7	NCC	NCC	0.01	0.18	0.01	N/A
Volatiles														
Ethylbenzene	NCC	0.7	NCC	<0.025	NS	0.3	NCC	0.7	NCC	NCC	NCC	N/A	NCC	N/A
Toluene	NCC	1.1	NCC	<0.025	NS	0.4	NCC	1.2	NCC	NCC	NCC	N/A	NCC	N/A
Xylenes (total)	0.6	3.4	0.6	0.1	NS	2.2	4	3.7	NCC	NCC	NCC	N/A	NCC	N/A

NCC = Not a Constituent of Concern
N/A = Not Analyzed
NS = Not Sampled

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Draft) March 13, 1992.

TABLE 2
TOXICITY FACTORS FOR QUANTIFICATION OF CHRONIC AND LIFETIME HAZARDS FOR CONSTITUENTS OF CONCERN AT THE PESTER BURN POND SITE

CHEMICAL	CHRONIC REFERENCE DOSE (RfD) (MG/KG/DAY)		SUBCHRONIC REFERENCE DOSE (MG/KG/DAY)		CANCER SLOPE FACTOR (MG/KG/DAY)-1	
	ORAL	INHALATION	ORAL	INHALATION	ORAL	INHALATION
ARSENIC	1E-03 (b)	ND	1E-03 (b)	ND	2E+00 (c)	5E+01(b)
BARIUM	7E-02 (a)	1E-04 (b)	7E-02 (a)	1E-03 (b)	ND	ND
CHROMIUM (VI)	5E-03 (a)	5.7E-07(e)	5E-03 (a)	5.7E-06(e)	ND	4.1E+01 (b)
LEAD	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	2.9E-02 (a)	2.9E-02 (b)
ETHYLBENZENE	1E-01 (a)	ND	1E+00 (b)	ND	ND	ND
TOLUENE	2E-01 (a)	5.7E-01(e)	2E-0 (b)	5.7E-01(e)	ND	ND
XYLENES	2E+00 (a)	8.6E-02(e)	4E+00 (b)	8.6E-02(e)	ND	ND
PHENOL	6E-01 (a)	ND	6E-01 (a)	ND	ND	ND
2,4-DIMETHYLPHENOL	2E-02 (b)	ND	2E-01 (b)	ND	ND	ND
NAPHTHALENE	4E-03 (b)	ND	4E-02 (b)	ND	ND	ND
2-METHYLNAPHTHALENE	4E-03 (f)	ND	4E-02 (f)	ND	ND	ND
BENZ(A)ANTHRACENE	ND	ND	ND	ND	1.15E+01 (d)	6.1E+00 (d)
CHRYSENE	ND	ND	ND	ND	1.15E+01 (d)	6.1E+00 (d)
PHENANTHRENE	ND	ND	ND	ND	ND	ND
PYRENE	3E-02 (b)	ND	3E-01 (b)	ND	ND	ND

(a) From IRIS, accessed on January 11,1991.
(b) From Fourth Quarter FY 1990 Health Effects Assessment Summary Tables
(c) Value provided by U.S. EPA Region V (7/20/1990) for use in a previous risk assessment.
(d) From Health Effects Assessment on Polycyclic Aromatic Hydrocarbons.
(e) Derived from Fourth Quarter FY 1990 HEAST.
(f) Assumed to be similar to naphthalene.

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 3

EXPOSURE ESTIMATES (MG/KG/DAY) FOR POTENTIAL RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: INGESTION OF POND SLUDGE

CHEMICAL	95% C.I. CONC (MG/KG)	ADULT EXPOSURE			CHILD EXPOSURE	
		NONCARCINOGEN CHRONIC	NONCARCINOGEN SUBCHRONIC	CARCINOGEN	NONCARCINOGEN SUBCHRONIC	CARCINOGEN
ARSENIC	1.52	8.5E-07	8.5E-07	3.6E-07	7.4E-06	5.3E-07
BARIUM	35.20	2.0E-05	2.0E-05	8.4E-06	1.7E-04	1.2E-05
CHROMIUM	126.78	7.1E-05	7.1E-05	3.0E-05	6.2E-04	4.4E-05
LEAD	174.91	9.8E-05	9.8E-05	4.2E-05	8.6E-04	6.1E-05
XYLENES	4.93	2.8E-06	2.8E-06	1.2E-06	2.4E-05	1.7E-06
BENZ(A)ANTHRACENE	81.04	4.5E-05	4.5E-05	1.9E-05	4.0E-04	2.8E-05
CHRYSENE	172.95	9.7E-05	9.7E-05	4.2E-05	8.5E-04	6.1E-05
PHENANTHRENE	244.02	1.4E-04	1.4E-04	5.9E-05	1.2E-03	8.5E-05
2-METHYLNAPHTHALENE	77.21	4.3E-05	4.3E-05	1.9E-05	3.8E-04	2.7E-05
PYRENE	181.46	1.0E-04	1.0E-04	4.4E-05	8.9E-04	6.4E-05

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 4
EXPOSURE ESTIMATES (MG/KG/DAY) FOR POTENTIAL RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: INGESTION OF POND SOIL

CHEMICAL	95% C.I. CONC (MG/KG)	ADULT EXPOSURE			CHILD EXPOSURE	
		NONCARCINOGEN CHRONIC	NONCARCINOGEN SUBCHRONIC	CARCINOGEN	NONCARCINOGEN SUBCHRONIC	CARCINOGEN
BARIUM	3.45	1.9E-06	1.9E-06	8.3E-07	1.7E-05	1.2E-06
ETHYLBENZENE	1.12	6.3E-07	6.3E-07	2.7E-07	5.5E-06	3.9E-07
TOLUENE	1.76	9.9E-07	9.9E-07	4.2E-07	8.6E-06	6.2E-07
XYLENES	5.24	2.9E-06	2.9E-06	1.3E-06	2.6E-05	1.8E-06
NAPHTHALENE	12.47	7.0E-06	7.0E-06	3.0E-06	6.1E-05	4.4E-06
BENZ(A)ANTHRACENE	14.52	8.1E-06	8.1E-06	3.5E-06	7.1E-05	5.1E-06
CHRYSENE	20.58	1.2E-05	1.2E-05	4.9E-06	1.0E-04	7.2E-06
PHENANTHRENE	13.66	7.6E-06	7.6E-06	3.3E-06	6.7E-05	4.8E-06
2-METHYLNAPHTHALENE	17.71	9.9E-06	9.9E-06	4.3E-06	8.7E-05	6.2E-06
PYRENE	19.40	1.1E-05	1.1E-05	4.7E-06	9.5E-05	6.8E-06

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 5

EXPOSURE ESTIMATES (MG/KG/DAY) FOR POTENTIAL FUTURE RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: DERMAL CONTACT WITH SVOCs AND INORGANIC CONSTITUENTS [illegible] POND SOIL

CHEMICAL	95% C.I. CONC (MG/KG)	ADULT EXPOSURE			CHILD EXPOSURE	
		NONCARCINOGEN CHRONIC	NONCARCINOGEN SUBCHRONIC	CARCINOGEN	NONCARCINOGEN SUBCHRONIC	CARCINOGEN
BARIUM	3.45	2.3E-02	2.3E-02	9.8E-03	3.6E-03	5.1E-02
NAPHTHALENE	12.47	1.2E-03	1.2E-03	5.3E-04	2.0E-04	2.7E-03
BENZ(A)ANTHRACENE	14.52	1.4E-03	1.4E-03	6.2E-04	2.3E-04	3.2E-03
CHRYSENE	20.58	2.0E-03	2.0E-03	8.7E-04	3.2E-04	4.5E-03
PHENANTHRENE	13.66	1.4E-03	1.4E-03	5.8E-04	2.1E-04	3.0E-03
2-METHYLNAPHTHALENE	17.71	1.8E-03	1.8E-03	7.5E-04	2.8E-04	3.9E-03
PYRENE	19.40	1.9E-03	1.9E-03	8.2E-04	3.0E-04	4.3E-03

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 6
EXPOSURE ESTIMATES (MG/KG/DAY) FOR POTENTIAL FUTURE RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: DERMAL CONTACT WITH SVOCs AND INORGANIC CONSTITUENTS IN POND SLUDGE

CHEMICAL	95% C.I. CONC (MG/KG)	ADULT EXPOSURE			CHILD EXPOSURE	
		NONCARCINOGEN CHRONIC	NONCARCINOGEN SUBCHRONIC	CARCINOGEN	NONCARCINOGEN SUBCHRONIC	CARCINOGEN
ARSENIC	1.52	1.2E-06	1.2E-06	5.3E-07	3.6E-06	2.6E-07
BARIUM	35.20	2.9E-05	2.9E-05	1.2E-05	8.3E-05	5.9E-06
CHROMIUM	126.78	1.0E-04	1.0E-04	4.5E-05	3.0E-04	2.1E-05
LEAD	174.91	1.4E-04	1.4E-04	6.2E-05	4.1E-04	2.9E-05
BENZ(A)ANTHRACENE	81.04	6.7E-04	6.7E-04	2.9E-04	1.9E-03	1.4E-04
CHRYSENE	172.95	1.4E-03	1.4E-03	6.1E-04	4.1E-03	2.9E-04
PHENANTHRENE	244.02	2.0E-03	2.0E-03	8.6E-04	5.8E-03	4.1E-04
2-METHYLNAPHTHALENE	77.21	6.3E-04	6.3E-04	2.7E-04	1.8E-03	1.3E-04
PYRENE	181.46	1.5E-03	1.5E-03	6.4E-04	4.3E-03	3.0E-04

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 7

HAZARD/RISK ESTIMATES FOR POTENTIAL RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: INGESTION OF POND SLUDGE

CHEMICAL	ADULT NONCANCER HAZARD				CHILD NONCANCER		CANCER RISK			
	RfD	CHRONIC HAZARD QUOTIENT	RfD	SUBCHRONIC HAZARD QUOTIENT	RfD	SUBCHRONIC HAZARD	CANCER SLOPE FACTOR	ADULT RISK	CANCER SLOPE FACTOR	CHILD RISK
ARSENIC	1.0E-03	8.5E-04	1.0E-03	8.5E-04	1.0E-03	7.4E-03	2.0E+00	7.3E-07	2.0E+00	1.1E-06
BARIUM	7.0E-02	2.8E-04	7.0E-02	2.8E-04	7.0E-02	2.5E-03	----	----	----	----
CHROMIUM	5.0E-03	1.4E-02	5.0E-03	1.4E-02	5.0E-03	1.2E-01	----	----	----	----
LEAD	----	----	----	----	----	----	----	----	----	----
XYLENES	2.0E+00	1.4E-06	4.0E+00	6.9E-07	4.0E+00	6.0E-06	----	----	----	----
BENZ(A)ANTHRACENE	----	----	----	----	----	----	1.2E+01	2.2E-04	1.2E+01	3.3E-04
CHRYSENE	----	----	----	----	----	----	1.2E+01	4.8E-04	1.2E+01	7.0E-04
PHENANTHRENE	----	----	----	----	----	----	----	----	----	----
2-METHYLNAPHTHALENE	4.0E-03	1.1E-02	4.0E-02	1.1E-03	4.0E-02	9.5E-03	----	----	----	----
PYRENE	3.0E-02	3.4E-03	3.0E-01	3.4E-04	3.0E-01	3.0E-03	----	----	----	----
TOTAL		3.0E-02		1.7E-02		1.5E-01		7.0E-04		1.0E-03

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 8
HAZARD/RISK ESTIMATES FOR POTENTIAL RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: INGESTION OF POND SOIL

CHEMICAL	ADULT NONCANCER HAZARD					CHILD NONCANCER SUBCHRONIC HAZARD	CANCER RISK			
	RfD	CHRONIC HAZARD QUOTIENT	RfD	SUBCHRONIC HAZARD QUOTIENT	RfD	CHILD NONCANCER SUBCHRONIC HAZARD	CANCER SLOPE FACTOR	ADULT RISK	CANCER SLOPE FACTOR	CHILD RISK
BARIUM	7.0E-02	2.7E-05	7.0E-02	2.7E-05	7.0E-02	2.4E-04	----	----	----	----
ETHYLBENZENE	1.0E-01	6.3E-06	1.0E+00	6.3E-07	1.0E+00	5.5E-06	----	----	----	----
TOLUENE	2.0E-01	5.0E-06	2.0E+00	5.0E-07	2.0E+00	4.3E-06	----	----	----	----
XYLENES	2.0E+00	1.5E-06	4.0E+00	7.3E-07	4.0E+00	6.5E-06	----	----	----	----
NAPHTHALENE	4.0E-03	1.8E-03	4.0E-02	1.8E-04	4.0E-02	1.5E-03	----	----	----	----
BENZ(A)ANTHRACENE	----	----	----	----	----	----	1.2E+01	4.0E-05	1.2E+01	3.3E-05
CHRYSENE	----	----	----	----	----	----	1.2E+01	5.6E-05	1.2E+01	4.4E-05
PHENANTHRENE	----	----	----	----	----	----	----	----	----	----
2-METHYLNAPHTHALENE	4.0E-03	2.5E-03	4.0E-02	2.5E-04	4.0E-02	2.2E-03	----	----	----	----
PYRENE	3.0E-02	3.7E-04	3.0E-01	3.7E-05	3.0E-01	3.2E-04	----	----	----	----
TOTAL		4.6E-03		4.9E-04		4.3E-03		9.7E-05		7.7E-05

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 9

HAZARD/RISK ESTIMATES FOR POTENTIAL RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: DERMAL CONTACT WITH SVOCs AND INORGANIC CONSTITUENTS IN POND SLUDGE

CHEMICAL	ADULT NONCANCER HAZARD				CHILD NONCANCER SUBCHRONIC HAZARD		CANCER RISK			
	RfD	CHRONIC HAZARD QUOTIENT	RfD	SUBCHRONIC HAZARD QUOTIENT	RfD	HAZARD	CANCER SLOPE FACTOR	ADULT RISK	CANCER SLOPE FACTOR	CHILD RISK
ARSENIC	9.5E-04	1.3E-03	9.5E-04	1.3E-03	9.5E-04	3.8E-03	2.1E+00	1.1E-06	2.1E+00	5.4E-07
BARIUM	3.5E-03	8.3E-03	3.5E-03	8.3E-03	3.5E-03	2.4E-02	----	----	----	----
CHROMIUM	2.5E-03	4.2E-02	2.5E-03	4.2E-02	2.5E-03	1.2E-01	----	----	----	----
LEAD	----	----	----	----	----	----	----	----	----	----
BENZ(A)ANTHRACENE	----	----	----	----	----	----	----	----	----	----
CHRYSENE	----	----	----	----	----	----	----	----	----	----
PHENANTHRENE	----	----	----	----	----	----	----	----	----	----
2-METHYLNAPHTHALENE	4.0E-02	1.6E-02	4.0E-02	1.6E-02	4.0E-02	4.6E-02	----	----	----	----
PYRENE	3.0E-02	5.0E-02	3.0E-01	5.0E-03	3.0E-01	1.4E-02	----	----	----	----
TOTAL		1.2E-01		7.2E-02		2.1E-01		1.1E-06		5.4E-07

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 10
HAZARD/RISK ESTIMATES FOR POTENTIAL RESIDENTIAL LAND USE AT THE PESTER BURN POND SITE: DERMAL CONTACT WITH SVOCs AND INORGANIC CONSTITUENTS IN POND SOIL

CHEMICAL	ADULT NONCANCER HAZARD				CHILD NONCANCER		CANCER RISK			
	RfD	CHRONIC HAZARD QUOTIENT	RfD	SUBCHRONIC HAZARD QUOTIENT	RfD	SUBCHRONIC HAZARD	CANCER SLOPE FACTOR	ADULT RISK	CANCER SLOPE FACTOR	CHILD RISK
BARIUM	3.5E-03	6.6E+00	3.5E-03	6.6E+00	3.5E-03	1.0E+00	----	----	----	----
NAPHTHALENE	3.4E-03	3.6E-01	3.4E-03	3.6E-01	3.4E-03	6.0E-02	----	----	----	----
BENZ(A)ANTHRACENE	----	----	----	----	----	----	----	----	----	----
CHRYSENE	----	----	----	----	----	----	----	----	----	----
PHENANTHRENE	----	----	----	----	----	----	----	----	----	----
2-METHYLNAPHTHALENE	3.4E-03	5.4E-01	3.4E-02	5.4E-02	3.4E-02	8.3E-03	----	----	----	----
PYRENE	2.5E-01	7.5E-03	2.5E-02	7.5E-02	2.5E-02	1.2E-02	----	----	----	----
TOTAL		7.5E+00		7.1E+00		1.1E+00				

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 11
SUMMARY OF TOTAL HAZARDS/RISKS FOR ADULTS ASSOCIATED WITH FUTURE RESIDENTIAL LAND USE EXPOSURES TO POND SOIL AND POND SLUDGE AT THE PESTER BURN POND SITE

MEDIA	EXPOSURE PATHWAY	ADULT NONCARCINOGENIC HAZARDS		ADULT CARCINOGENIC RISK
		CHRONIC	SUBCHRONIC	
POND SLUDGE	INGESTION	3.00E-02	1.70E-02	7.00E-04
POND SLUDGE	DERMAL CONTACT	1.20E-01	7.20E-02	1.10E-06
TOTAL		1.50E-01	8.90E-02	7.01E-04
POND SOIL	INGESTION	4.60E-03	4.90E-04	9.70E-05
POND SOIL	DERMAL CONTACT	7.50E-02	4.20E-02	--
TOTAL		7.96E-02	4.25E-02	9.70E-05

TABLE 12
SUMMARY OF TOTAL HAZARDS/RISKS FOR CHILDREN ASSOCIATED WITH FUTURE RESIDENTIAL LAND USE EXPOSURES TO POND SOIL AND POND SLUDGE AT THE PESTER BURN POND SITE

MEDIA	EXPOSURE PATHWAY	CHILD NONCARCINOGENIC SUBCHRONIC HAZARD	CHILD CARCINOGENIC RISK
POND SLUDGE	INGESTION	1.50E-01	1.00E-03
POND SLUDGE	DERMAL CONTACT	2.10E-01	5.40E-07
TOTAL		3.60E-01	1.00E-03
POND SOIL	INGESTION	4.30E-03	7.70E-05
POND SOIL	DERMAL CONTACT	1.20E-01	--
TOTAL		1.24E-01	7.70E-05

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 13
SUMMARY OF TOTAL HAZARDS/RISKS FOR A 12 TO 13 YEAR OLD MALE CHILD IN ASSOCIATION WITH LIMITED ACCESS EXPOSURES TO POND SOIL AND POND SLUDGE AT THE PESTER BURN POND SITE

MEDIA	EXPOSURE PATHWAY	SUBCHRONIC HAZARDS	CARCINOGENIC RISK
POND SLUDGE	INGESTION	7.10E-03	2.00E-05
POND SLUDGE	DERMAL CONTACT	4.30E-02	4.40E-08
TOTAL		5.01E-02	2.00E-05
POND SOIL	INGESTION	2.00E-04	2.70E-06
POND SOIL	DERMAL CONTACT	4.50E-02	--
TOTAL		4.52E-02	2.70E-06

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 14
COMPARISON OF TARGET SOIL LEVELS TO PROTECT HUMAN HEALTH
FOR RESIDENTIAL AND LIMITED ACCESS LAND USE SCENARIOS

TOTAL PAHs EXPOSURE	TARGET RISK	SLOPE (MG/KG/DAY)-1	EXPOSURE (MG/KG/DAY)	SOIL LEVELS (MG/KG)
RESIDENTIAL FUTURE USE				
INGESTION BY ADULT	0.000001	11.5	8.70E-08	3.62E-01
INGESTION BY CHILD	0.000001	11.5	8.70E-08	2.48E-01
LIMITED ACCESS				
INGESTION BY 12 TO 13 YEAR OLD MALE	0.000001	11.5	8.70E-08	1.30E+01

SOURCE: Feasibility Study Report for Pester Burn Pond Site in El Dorado, Kansas (Revised), June 17, 1992

TABLE 15
Summary of Estimated Costs for Remedial Action Alternatives Under Consideration

	Alternative	Capital Cost	Present Value O & M Costs	Total Cost
1A –	Limited Action	$0	$238,300	$238,300
2A1 –	Removal and Reuse of Sludge for Asphalt Mix Followed by Capping of Remaining Soils	$1,958,000	$614,900	$2,572,900
2A2 –	Removal and Reuse of Sludge for Asphalt Mix Followed by In Situ Flushing/ Bioremediation of Remaining Soils	$1,695,300	$464,700	$2,160,000
2B1 –	Removal and Reuse of Sludge at a Refinery Followed by Capping of Remaining Soils	$2,172,820	$614,900	$2,787,720
2B2 –	Removal and Reuse of Sludge at a Refinery Followed by In Situ Flushing/Bioremediation of Remaining Soils	$1,910,100	$464,700	$2,374,800
3 –	Capping of the Sludge Followed by Collection and Treatment of Leachate	$2,031,300	$614,900	$2,646,200
4 –	Stabilization/Solidification of Sludge On-Site Followed by Capping and Leachate Collection/Treatment	$2,738,700	$614,900	$3,353,600
5A –	Removal and Thermal Treatment of Sludge Followed by Capping of Remaining Soils	$5,200,100	$614,900	$5,815,000
5B –	Removal and Thermal Treatment of Sludge Followed by In Situ Flushing/ Bioremediation of Remaining Soils	$4,937,400	$464,700	$5,402,100

SOURCE: Remedial Investigation Report; Pester Burn Pond Site El Dorado, Kansas; February, 1992

APPENDIX A

RESPONSE TO PUBLIC COMMENTS
ON THE
PROPOSED PLAN
FOR THE
PESTER BURN POND SITE
EL DORADO, KANSAS

Response to Public Comments
on the
Proposed Plan
for the
Pester Burn Pond Site
El Dorado, Kansas

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) held a public comment period from August 20 through September 21, 1992, on the EPA Proposed Plan for the Pester Burn Pond Superfund Site in El Dorado, Kansas. The purpose of the public comment period was to provide interested parties with an opportunity to comment on the Proposed Plan. The Proposed Plan was made available on August 20, 1992, at the Bradford Memorial Library in El Dorado, Kansas. Notification of the public comment period was published in the El Dorado Times.

A public meeting was held on August 27, 1992, at the Bradford Memorial Library in El Dorado, Kansas. At this meeting representatives from EPA and the Kansas Department of Health and Environment (KDHE) described the alternatives evaluated, presented the preferred alternative and the remedial alternatives under consideration.

Section 113 (k)(2)(B)(iv) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that EPA respond to significant comments on the Proposed Plan. This Response Summary provides a review and summary of significant comments on the Proposed Plan. In addition to summarizing significant concerns and questions, the Response Summary presents EPA's responses to those concerns.

2.0 PUBLIC COMMENTS AND EPA RESPONSES

2.1 COMMENTS FROM JIM MAHON, FINA OIL AND CHEMICAL COMPANY. (Copies of the identical comments were also received from Peggy Pester Lammers of the Pester Refining Company and from Coastal Mart, Inc.).

Comment #1

(Section 3.2, page 9, paragraph 4) The subsurface interceptor trench installed in May 1992 and located north and east of the ponds was excavated to the bedrock surface north and east of the ponds. The open trench located north of the ponds is excavated into the bedrock surface to provide drainage and allow for increased withdrawals from the extraction pump.

EPA Response

This clarification information has been reflected in the Record of Decision.

Comment #2

(Section 3.3, page 9) The Proposed Plan indicated that RCRA closure standards are "applicable". FINA contends that RCRA standards are not "applicable" because the site is not a RCRA site. Some of the RCRA standards may be "relevant and appropriate". The "relevant and appropriate" standards will be complied with to allow for fulfilling the substantive parts of RCRA without requiring completion of the paper work to obtain all the permits as allowed under CERCLA.

EPA Response

RCRA closure standards are applicable, rather than relevant and appropriate, because the Pester Burn Pond is an impoundment which has been regulated under RCRA. Although RCRA is therefore applicable to onsite activities, rather than relevant and appropriate, Section 121 (e) of CERCLA provides that "No Federal, State, or local permit shall be required for the portion of any removal or remedial action carried out entirely onsite, where such remedial action is selected and carried out in compliance" with Section 121 of CERCLA. A RCRA permit is not required for onsite activities at the Pester Burn Pond site, but substantive compliance with the requirements of RCRA is required.

Comment #3

(Section 3.3, page 10 par 3) The plan indicates that another RI/FS will be conducted for the ground water, Fina recognizes that the proposed plan excludes the ground water operable unit. However, the authors are reminded that the active interceptor trench was intended, at a minimum, to be an integral part of the evaluation of the ground water operable unit. Prior to proceeding with the RI/FS for the ground water operable unit, Fina requests that KDHE and EPA consider evaluation of data being collected from the interceptor trench. Per our conference call of June 15, 1992, KDHE, EPA and Fina agreed to evaluate the performance of the interceptor trench to determine its effectiveness. If these data indicate that the trench is hydraulically capturing both the alluvial and upper bedrock unit, then the additional RI/FS would not be necessary. If, on the other hand, the trench was not effectively eliminating migration from the upper bedrock unit, then an abbreviated/focused RI/FS would be conducted.

EPA Response

The interceptor trench was not proposed or approved by KDHE or EPA before it was constructed, and so it would be difficult for these agencies to speak to its basis or confirm that "the active interceptor trench was intended, at a minimum to be an integral part of the evaluation of the ground water operable unit." A second RI/FS is currently planned for the purpose of evaluating ground water contamination and what further remedial activity, if any, beyond source control, will be needed to alleviate it. Such a study would normally take account of both existing structures and any pre-existing validated data available to EPA. The second RI/FS is necessary because the first operable unit did not adequately evaluate the ground water route. As is statutorily required, the no-action alternative will be evaluated at that time for ground water. This second, ground water RI/FS will be conducted on an appropriate scale to gather the data that are needed.

Comment #4

(Section 4.3, page 15) The proposed plan indicates that the sludge will be sent to a TSDF oil refinery. There is no reason why the refinery needs to be a TSDF. The site remediation goal of overall protectiveness of human health and environment is met as long as Fina ensures that any wastes from the refining of the sludge are handled as hazardous waste with the other API Separator sludge produced at the refinery. In order to do this, the facility only needs to be registered as a hazardous waste "generator". It is assumed that the further requirement of treatment, storage, and disposal are not required.

EPA Response

If hazardous wastes (as defined under RCRA) are to be sent offsite for treatment, storage, or disposal, they will need to be sent to a facility legally authorized to conduct such treatment, storage, or disposal. If hazardous wastes are treated, stored, or disposed of offsite, EPA does not have discretion whether or not regulations should be considered applicable, as they might onsite if the regulations were determined to be "relevant and appropriate", or, "to be considered" under CERCLA. Offsite, the requirements of other (non-CERCLA) environmental laws are applicable, not merely relevant and appropriate, and, in addition, the Section 121 (e) permit exemption does not apply.

For offsite treatment, storage, or disposal of hazardous waste, the facility must be a RCRA-permitted TSD facility with a permit to carry out the activity in question. A RCRA generator would not have the legal authority to carry out regulated treatment, storage, or disposal.

Comment #5

(Section 5.2.2, page 19 par 3) Delisting is a time consuming option, therefore EPA suggests "transport of sludge as hazardous waste and to close the impoundment in accordance with RCRA". Fina contends that because the hazardous waste will be pre-processed onsite for use as a feedstock for the refining process, the processed sludge should be considered a feedstock or intermediate feed stream at that point. (Note: no further pre-processing will be done at the refinery.) The processed sludge is essentially identical to the refinery feedstock (vacuum tank bottoms) or other intermediate feed stream entering the processing unit.

Thus, Fina believes processed sludge should not be considered a hazardous waste when it leaves the site; and manifesting should not be required. As a raw material feedstock, the material goes directly into the Propane Deasphalting Unit (PDU). The refinery should not have to handle this material any differently from other feedstocks.

The second part of the proposed plan statement is that the impoundments should be closed in accordance with RCRA. The RCRA impoundment closure requirement is unwarranted. This is a CERCLA site and CERCLA guidance applies. Fina will do nothing that triggers RCRA regulations of the Pester Burn Pond Site closure.

As stated in Section 3.3 of the Proposed Plan, the cleanup of both the sludge and soil will be risk based using the limited access scenario to attain risk levels below the 1×10^{-6} cancer risk. The RCRA closure regulations would require post closure care until soil concentrations are below background (40 CFR 264.280 included in reference from 40 CFR 264.111). This standard conflicts with the risk based levels determined by the risk assessment. The final cover specifications (40 CFR 264.310) would indicate that the interceptor trench must be operated until no leachate is detected. The risk-based standards for ground water cleanup will be above background and set at a level that is protective of human health. In summary, the cleanup levels for this site are already established as risk based using the limited access scenario. Incorporation of RCRA would require cleanup levels that may not be attainable.

EPA Response

There are two separate issues to respond to here.

(1) Applicability of RCRA to offsite sludge shipments. The EPA's Superfund program has no authority to waive the requirements of environmental laws and regulations for regulated substances or activities offsite. Onsite applicable requirements, such as those of RCRA at this site, can be waived for the reasons listed in CERCLA Section 121 (d)(4) (the "ARAR waivers"), if such a waiver is invoked. However, none of the ARAR waivers has been invoked for this Site at present.

Delisting of hazardous waste under RCRA is conducted via a petition for rulemaking. Delisting would be required for any otherwise-hazardous waste leaving the Site to be exempt from RCRA. Otherwise, RCRA regulations are applicable to offsite hazardous waste shipments and treatment or disposal.

Criteria for delisting are given in 40 CFR 260.22; such criteria do not include the criteria mentioned in the comment. The applicant would have to show that the waste at this particular facility "does not meet any of the criteria under which the waste was listed as a hazardous...waste;" and that if there are other factors, including additional constituents other than those for which the waste was listed, which could cause the waste to be a hazardous waste, that "such factors do not warrant retaining the waste as a hazardous waste." Delisting is a rulemaking process conducted by EPA Headquarters with OMB approval and can take some time to complete.

Finally, even after the contemplated onsite processing or treatment, the sludge may still be hazardous waste even though it is to be recycled; the RCRA regulations regulate certain materials which are to be recycled.

(2) Applicability of RCRA to onsite closure. Since RCRA is applicable to this impoundment, based upon its past history as a RCRA-regulated impoundment, RCRA regulations, including RCRA closure requirements, are applicable. CERCLA guidance and the National Contingency Plan require that applicable requirements must be followed.

Since this was a RCRA-regulated surface impoundment, it will need to be closed in accordance with RCRA closure requirements. Section 264.111, 264.228, and 264.310 contain the closure requirements that apply to closure of a RCRA impoundment. The first two sections apply to "clean closure"; all three sections apply if the impoundment must be closed containing hazardous waste at levels above those which constitute "clean closure" (in this instance, the health-based cleanup level for PAHs). The requirements of 40 CFR 264.280 do not apply directly, though they are listed in 264.111; 40 CFR 264.280 concerns land treatment units.