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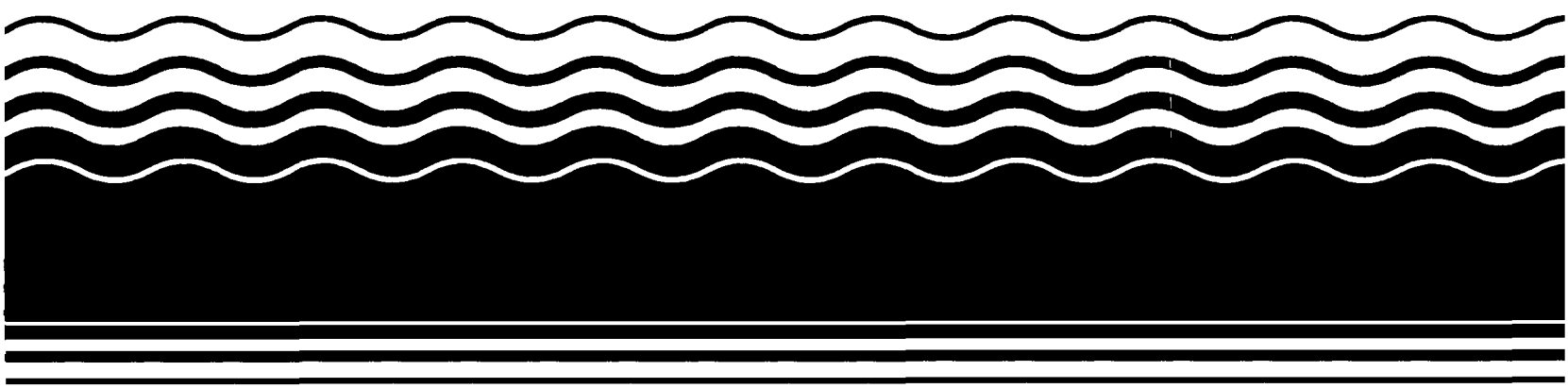
EPA Superfund Record of Decision:

Reilly Tar & Chemical (Indianapolis Plant), Operable Unit 5, Indianapolis, IN 6/30/1997



Declaration for the Record of Decision
Reilly Tar & Chemical
Operable Unit 5

Site Name and Location

Reilly Tar and Chemical
Indianapolis, Indiana

Statement of Basis and Purpose

This decision document presents the selected remedial action for operable unit 5 at the Reilly Tar & Chemical site (the Site) in Indianapolis, Indiana. This remedial action was selected in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. The selection of this remedy is based on the Administrative Record for the Site.

The State of Indiana concurs with the selected remedy.

Assessment of the Site

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

Description of the Selected Remedies

This action is the final action planned for the site. It specifically outlines an action to address off-site groundwater contamination, which has been determined by the Remedial Investigation to pose unacceptable risks to human health and the environment.

The major components of the selected remedy include:

- Natural attenuation (with long-term groundwater monitoring) for off-site groundwater contamination. This selection, when combined with the continued operation of the OU 1 Groundwater Interim Remedial Measures (GWIRM) system, will provide long term protection to human health and the environment from exposure to groundwater contamination in the OU 5 area. The perimeter groundwater extraction system, selected as an interim remedy for OU 1, is an integral component of the final groundwater cleanup for the site. The GWIRM system will be in operation until the cleanup and performance standards listed in the OU 1 ROD are met at the facility boundary.

- Long term groundwater monitoring to supplement the existing water quality monitoring program which is currently conducted on a quarterly basis. This monitoring will be utilized to evaluate the performance of the selected remedy over time.

Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements for this operable unit action, is cost effective, and is consistent with achievement of a permanent remedy. This final action fully addresses the statutory mandate for permanence and treatment to the maximum extent practicable. This action also satisfies the statutory preference for remedies that employ treatment that reduces the toxicity, mobility, or volume as a principal element. Because this remedy will result in hazardous substances remaining onsite above health based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action.

6/30/97
Date

Wm. E. Muno
William E. Muno, Director
Superfund Division

Decision Summary - Operable Unit 5
Reilly Tar and Chemical
Indianapolis, Indiana

Site Name, Location and Description

Reilly Tar and Chemical
Indianapolis, Indiana

The Reilly Tar and Chemical site (the Site) is located at 1500 South Tibbs Avenue in the southwest quadrant of Indianapolis. Minnesota Street divides the 120 acre site into two parcels. The Oak Park property, occupying approximately 40 acres, is located north of Minnesota Street. The Maywood property occupies approximately 80 acres, and is located south of Minnesota Street (see Figures 1 and 2). The Oak Park property contains the majority of Reilly Industries, Inc.'s (Reilly) operating facilities, including above-ground storage tanks, distillation towers, and above- and below-ground utilities. The Oak Park property also contains one area formerly used for disposal of hazardous wastes, the Lime Pond, a surface impoundment which received hazardous wastes. Drums containing hazardous wastes were also buried in the soils adjacent to the Lime Pond. The Maywood property contains operating facilities on its northern end. This property was formerly the site of chemical process and wood preserving activities and currently contains four other areas used in the past for hazardous waste disposal. These four former hazardous waste disposal areas include the Abandoned Railway Trench, the Former Sludge Treatment Pit, the Former Drainage Ditch, and the South Landfill/Fire Pond. The majority of the operating facility buildings are located north of Minnesota Street; approximately 75% of the Oak Park property is covered by buildings, pavement and above-ground tank farms. Approximately 20% of the Maywood property is covered by buildings, pavement and above-ground storage tanks. Excavation and thermal desorption activities have occurred on portions of the remainder of the property. Following completion of these activities, the areas will be revegetated.

A new building has been constructed on the northern portion of the Maywood property. This building houses the equipment for a new manufacturing process to produce a raw material for use in the chemical production activities.

The Reilly Tar site is surrounded by a mix of residential, industrial and commercial properties. Residential neighborhoods are located immediately adjacent to the eastern boundary (on the east side of Tibbs Avenue) of the Oak Park property. Two residences are also located abutting the northern property boundary near the Lime Pond in the northwest corner of the site. Commercial and industrial properties are located south and west of the site.

Site History and Enforcement Activities

Industrial development of the Reilly site began in 1921 when the Republic Creosoting Company (which later became Reilly Tar & Chemical, which in turn became Reilly Industries, Inc.) started a coal tar refinery and a creosote wood treatment operation on the Maywood property. On-site wood treatment operations occurred from 1921 until 1972. Beginning in 1941, several chemical plants were constructed and operated on the Oak Park property. Environmental problems at the site are related to the management and disposal of creosoting process wastes and to wastes associated with and substances used in the process of manufacturing custom synthesized specialty chemicals.

The earliest recorded complaint about odors and disposal practices at the site was in 1955, which referenced the fact that a chemical manufactured at Reilly (alpha picoline) had been found in nearby residential wells. In 1964, three contaminants from Reilly were detected in off-site groundwater samples and on-site surface water samples. In 1975, State investigations revealed several on-site problems which were believed to have been contributing to groundwater contamination with organic chemicals. In 1980, an on-site soil sample collected by State personnel was found to contain various organic chemicals including toluene and trichloroethylene. In 1987, 60,000 gallons of waste fuel, containing primarily pyridine and pyridine derivatives, benzene, xylene, and toluene, were accidentally spilled on the Oak Park property. Some, but not all, of the fuel oil was recovered and some, but not all, of the contaminated soil was excavated by Reilly.

In 1984, Reilly Tar was listed on U.S. EPA's National Priorities List (NPL), a roster of the nation's worst hazardous waste sites, making it eligible for cleanup under the Superfund program.

In 1987, the potentially responsible party (Reilly) agreed to conduct a remedial investigation (RI) to characterize the nature and extent of contamination at the site, and a feasibility study (FS) to evaluate and compare remedial alternatives according to the terms of an Administrative Order on Consent between the U.S. EPA and Reilly Tar & Chemical.

In 1989, Reilly Tar & Chemical changed their corporate name to Reilly Industries, Incorporated, under which they operate today.

In June, 1992, a Record of Decision was signed by the Regional Administrator for the first operable unit at the site, calling for a groundwater extraction/treatment/discharge system to be installed to contain the migration of groundwater contaminated by the site at the site boundary.

In September, 1992, Reilly agreed to incorporate RCRA corrective action requirements into existing site studies according to the terms of an amendment to the existing Administrative Order on Consent between the U.S. EPA and Reilly Tar & Chemical. Operable unit actions outlined in this Record of Decision address areas incorporated into site studies by the 1992 Amendment to the 1987 Administrative Order on Consent.

In September, 1993, a Record of Decision was signed by the Regional Administrator for the second operable unit at the site, calling for the excavation and thermal desorption of soil at four on-site source areas and the solidification of sludge and placement of a soil cover over a fifth on-site source area.

Consent Decrees have been negotiated and entered for operable units 1 and 2. The consent decree for operable unit 1 was entered on August 19, 1993. The consent decree for operable unit 2 was entered on February 1, 1995.

In September, 1996, a Record of Decision was signed by the Regional Administrator for the third and fourth operable units at the site, calling for the installation of a permeable cover over the OU 3 area and soil vapor extraction and a concrete cover over portions of the OU 4 area.

The perimeter groundwater extraction system has been in operation since October 1994, containing contaminated groundwater at the site boundary. The sludge accumulation at the South Landfill portion of OU 2 has been solidified and a soil cover has been placed over the area. The thermal desorption of the four remaining areas addressed under OU 2 was completed in January 1997. Soils from these areas that were unable to be treated by

thermal desorption have been stockpiled on-site and will be disposed of at the direction of U.S. EPA in the near future.

Highlights of Community Participation

Public participation requirements under CERCLA Sections 113 (k)(2)(B)(i-v) and 117 were satisfied during the RI/FS process. U.S. EPA has been primarily responsible for conducting the community relations program for this site, with the assistance of the Indiana Department of Environmental Management (IDEM). The following public participation activities, to comply with CERCLA, were conducted during the RI/FS.

- A Community Relations Plan was developed in August 1987 to assess the community's informational needs related to the Reilly site and to outline community relations activities to meet these needs. Residents and community officials were interviewed and concerns were incorporated into this plan.

- A public information repository was established at the Indianapolis/Marion County Public Library-Central Branch.

- A mailing list of interested citizens, organizations, news media, and elected officials in local, county, State and Federal government was developed. Fact Sheets and other information regarding site activities were mailed periodically to all persons or entities on this mailing list. This mailing list was also updated from time to time as persons approached EPA for information about the site.

- A Fact Sheet was mailed to the public in August 1987, that announced a public meeting to discuss the upcoming Remedial Investigation and answer site related questions from the public.

- A public meeting on September 2, 1987, at the Indianapolis City-County Building announced the initiation of the Remedial Investigation and provided details about its conduct.

- A Fact Sheet was mailed to the public in Winter 1988, that announced the beginning of Phase 1 RI sampling and the release of the EPA approved Phase 1 RI workplan.

- A Fact Sheet was mailed to the public in Fall 1988, that summarized the findings of the Phase 1 investigation and provided a preview of proposed Phase 2 sampling activities.

- A Fact Sheet was mailed to the public in January 1990, that announced the findings of the Phase 2 investigation and provided a preview of proposed Phase 3 sampling activities.

- Two availability sessions were held on September 6, 1990, at the Stout Field School to discuss site progress and discuss results of completed sampling activities.

- A Fact Sheet was mailed to the public in August 1991, that summarized results of the completed Remedial Investigation. The EPA approved Remedial Investigation Report was also released at this time.

- A Fact Sheet was mailed to the public in January 1992, that summarized EPA's recommended remedial alternative in a proposed plan for the groundwater operable unit. The EPA approved Focused Feasibility Study was also released at that time. This fact sheet also announced a public comment period for the proposed remedial action and was accompanied by paid newspaper advertisements in the Indianapolis Star and the Indianapolis News.

- A Public Meeting was held on January 23, 1992, at the South Wayne Junior High School to present EPA's proposed plan for the groundwater operable unit and to receive formal public comment.

- Paid newspaper advertisements announced the RI public meeting, the availability sessions, and the OU 1 FS and proposed plan public meetings.

- Periodic news releases announced results of studies at the site.

- A public comment period of thirty days was originally planned, running from January 16, 1992, to February 14, 1992. Based on a written request during the original comment period, the comment period was extended until March 31, 1992, for a total comment period of 76 days. The extension was announced by letter to the requestor and in a newspaper advertisement in the Indianapolis Star.

- A Record of Decision was signed by the Regional Administrator on June 30, 1992, for the groundwater operable unit.

- Two availability sessions were held on November 19, 1992, at the Stout Field School to discuss site progress and discuss results of completed sampling activities, including drum removal activities near the Lime Pond.

- A Public Meeting was held on August 4, 1993, at the Indiana Government Center-South to present EPA's proposed plan for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Areas operable unit (OU 2) and to receive formal public comment.

- A public comment period of thirty days for the CERCLA Areas proposed plan was originally planned, running from July 22, 1993, to August 22, 1993. Based on a written request during the original comment period, the comment period was extended until September 7, 1993, for a total comment period of 45 days. The extension was announced by letter to the requestor and in newspaper advertisements in the Indianapolis Star. The comment period was further extended until September 22, 1993, for a total comment period of 60 days. The extension was announced by phone and confirmed by letter to the requestor and announced to the general public by a newspaper advertisement in the Indianapolis Star.

- A Public Meeting was held on July 24, 1996, at the South Wayne Junior High School to present EPA's proposed plan for operable units 3 and 4 and to receive formal public comment.

- Paid newspaper advertisements announced the OU 3 and 4 FS and proposed plan public meetings.

- A public comment period of thirty days for operable units 3 and 4 ran from July 15, 1996, to August 14, 1996.

- A Record of Decision for Operable Units 3 and 4 was signed by the Regional Administrator on September 29, 1996.

- A Public Meeting was held on March 26, 1997, at the Stout Field School to present EPA's proposed plan for operable unit 5 and to receive formal public comment.

- A public comment period of thirty days for operable unit 5 ran from March 24, 1997, to April 22, 1997.

- Paid newspaper advertisements announced the OU 5 FFS and proposed plan public meetings.

This Record of Decision presents the selected remedial action for operable unit 5 at the Reilly Tar and Chemical site in Indianapolis, Indiana. Operable unit 5 addresses the off-site groundwater plume and is the final remedial action at the site addressing contaminated groundwater.

This remedial action was chosen in accordance with CERCLA, as amended by SARA, and the National Contingency Plan. The decisions for this operable unit at the site is based on the Administrative Record.

Scope and Role of the Operable Unit

As with many Superfund sites, the problems at the site are complex. The Remedial Investigation (RI) investigated five distinct on-site source areas and groundwater. The RI determined that groundwater had been contaminated by the site and is migrating away from the site at levels that were determined by the site Risk Assessment to pose unacceptable threats to human health.

The first operable unit action was selected by EPA to stop further off-site migration of contaminated groundwater by installing a groundwater extraction system/treatment system. This action provided adequate time to study and remediate on-site source areas as well as to prevent the further contamination of area groundwater resources by contaminants migrating from the Reilly site.

The second operable unit at the site addressed five distinct on-site source areas that were contributing to contamination of both soils and groundwater. These areas were initially investigated in the RI. The selected remedy for this operable unit was the excavation and thermal treatment of soils from four of these areas and the solidification of sludge with placement of a soil cover for the fifth area.

The third and fourth operable units at the site will address the direct contact threats from potential exposure to contaminated soils in the kickback area and the north process area as well as prevention of future leaching of site contaminants to groundwater from these areas.

This Record of Decision encompasses the fifth and final operable unit remedial action to be taken at the site. This action is the final remedial action to address contaminated groundwater. It includes actions to address groundwater contaminated by the site that has migrated to off-site areas. It also represents the final remedial action chosen for the entire site.

This operable unit has been designed to be consistent with all remedial actions taken at or planned for the site.

Site Characteristics

The RI/FS was conducted to identify the types, quantities and locations of contaminants at the site and to develop alternatives that best address these contamination problems. Because of the size and complexity of the site, the RI was performed in three distinct phases. The first phase focused on sampling off-site commercial, industrial and residential wells to determine the presence of and extent of off-site contamination. The second phase concentrated on sampling activities to determine the extent of contamination onsite so that site contributions to areal contamination could be determined. The third phase concentrated on collecting additional onsite and off-site data to complete the investigatory picture so that a Feasibility Study could be started to address contamination problems. The nature and extent of actual or potential contamination related to the site was determined by a series of field investigations, including:

- development of detailed information regarding historical site operations;
- on-site geophysical surveys;
- surface soil sampling, both onsite and off-site;
- exploratory test pit excavation and sampling;
- installation and sampling of groundwater monitoring wells, both onsite and off-site;
- surface water sampling, both onsite and off-site;
- identification and sampling of existing groundwater wells in the site vicinity;
- installation and sampling of soil borings;
- a surface water drainage study;
- a water level monitoring program, both onsite and off-site;
- identification of groundwater contamination sources within a one-mile radius of the Reilly site;

- hydraulic conductivity testing and the performance of a short-term continuous water level monitoring program;

- preparation of a site-wide human health and ecological risk assessment.

Geology/Hydrogeology:

The Reilly site lies within the White River drainage basin, located approximately three miles to the west of the River. Eagle Creek is an attendant tributary and flows in a southeasterly direction approximately 4000 feet to the east of the site. Topography in the site area is relatively flat with a gentle downward slope in an easterly direction. Other surface water bodies in the site area include Blue Lake (a former gravel pit) located approximately 2000 feet northeast of the site, several small ponds or surface water impoundments located 2000 to 4000 feet east of the site, and one surface-water impoundment located immediately southwest of the Maywood property (see Figure 2). The westernmost extension of Blue Lake has been filled in since 1979.

The sand and gravel deposits that underlie almost all of the White River drainage basin form the principal aquifer in the area. There are three industrial well fields located to the east of the site that have a reported combined pumping rate of 10 million gallons per day, or approximately 7000 gallons per minute (see Figure 2). In the vicinity of the site, upper and lower zones have been identified within the sand and gravel outwash aquifer. At some locations, especially directly underneath the site, these zones are separated by one or more till units which, because of their silt content, are less permeable layers and may impede flow vertically. The lack of a continuous fine grained unit and similar groundwater levels in shallow and deep wells suggest that the upper and lower zones of the outwash sand and gravel deposits are hydraulically connected and that the till units do not act as a barrier to contaminant flow in groundwater.

Regional hydrogeologic data indicate that groundwater in the unconsolidated material in the area of the Reilly site flows east towards Eagle Creek with a southerly component. Water level data from the RI indicate that groundwater flow is generally from the northwest to the southeast and that withdrawals from neighboring industrial production wells significantly impact the flow of groundwater east of the site, thus providing a barrier to further movement to the east of groundwater impacted by the site.

Hydraulic conductivities for wells tested during the RI range from 10(-2) to 10(-3) centimeters per second. An average linear groundwater velocity of 0.68 feet per day was calculated for the area that is not influenced by the industrial pumping to the east of the site. An average linear groundwater velocity of 2.0 feet per day was calculated for the area that is influenced by the industrial pumping.

Groundwater Contamination

Groundwater benzene concentrations in the OU 5 off-site area range from below detection limits to 2700 ppb, with the highest levels detected directly east of the central portion of the site. Pyridine and pyridine derivative concentrations, which were summarized in the RI as total pyridine derivatives, were found in the OU 5 off-site area at levels ranging from below detection limits to 2805 ppb, with the highest levels detected east of the northern portion of the site. Ammonia concentrations in the ground water in the OU 5 off-site area ranged from below detection limits to 68 parts per million (ppm) with concentrations greatest in the area directly east of the northern portion of the site (See Figure 3 for a map of the benzene contaminant plume). The maximum detected levels of contamination in the groundwater are in excess of Federal and State MCLs, as outlined below.

Summary of Site Risks

This Record of Decision is written for an operable unit action to address the off-site contaminated groundwater plume. The RI report includes a risk assessment, prepared by Reilly using the Risk Assessment Guidance for Superfund and approved by EPA as a portion of the RI report, that calculated the actual or potential risks to human health and the environment that may result from exposure to site contamination.

Because this action is the final action for groundwater and incorporates all previous remedial actions into its execution, only risks calculated for exposure to groundwater will be presented. Risks associated with exposure to onsite soil contamination were summarized in the RODs for OU 2, 3, and 4.

Groundwater use in the area is currently restricted by the Marion County Health Department (MCHD). As outlined below, the MCHD restricts groundwater use in the area through an ordinance that prohibits the installation of groundwater wells in the area affected by the ordinance and requires that all well users

properly abandon their groundwater wells in accordance with State of Indiana well abandonment regulations.

The risk assessment determined that three chemicals in the groundwater are of primary concern: **benzene, pyridine and pyridine derivatives,** and **ammonia** (See Table 1). Other chemicals that were detected in the groundwater are also of concern but were not found at the same frequency or amounts as these listed here. Concentrations of these chemicals in the groundwater have resulted in the calculation of unacceptable risks to human health and the environment posed by exposure.

Exposure Assessment

The exposure assessment conducted as a part of the RI concluded that several media are impacted by site contaminants, and that there are several potential exposure routes for contamination. These routes of exposure were identified for both current and future scenarios (as is commonly done in EPA risk assessments) so that all potential pathways can be evaluated. The baseline risk assessment computed risks from exposure to these contaminants using the upper 95% confidence intervals of the arithmetic mean of the Phase II and III sampling data concentrations of the above contaminants. The use of the confidence intervals is suggested in the Risk Assessment Guidance for Superfund and represents a conservative step towards assessing risks associated with potential exposures. In some cases where sample results vary widely or sample size is small, these confidence intervals may exceed maximum detected concentrations.

Due to the proximity of the site to the surrounding neighborhood and major streets, and its size, the following potential receptors were identified in the risk assessment, and risks were computed for their exposure.

Under the future-use scenario, off-site residents could potentially be exposed through **ingestion and dermal contact** with groundwater (if residents used wells for water supply for drinking and other household uses). Future off-site industrial workers could be at risk through **inhalation** of volatilized contaminants from the groundwater (industrial water usage).

Toxicity Assessment

Benzene is classified as a known human carcinogen (Class A) and has been associated with hematologic effects on humans as well as anemia (decreased red blood cells), leukopenia (decreased white blood cells), and thrombocytopenia (decreased platelets).

Chronic exposure has been shown to cause pancytopenia (decrease in all circulating cells) and aplastic anemia (failure to manufacture blood cells). Exposure by inhalation has been shown to cause leukemia. Benzene has been shown to be a growth inhibitor in utero; however, it has not been shown to be teratogenic (causing birth defects). Animal studies have shown preliminary evidence of carcinogenicity; a link to leukemia via inhalation has also been suggested. Benzene has been shown to be nonmutagenic (not causing mutations); benzene oxide, the presumed initial metabolite of benzene, is mutagenic (causing mutations).

Limited data exists on the oral absorption of **pyridine**; data on the pulmonary and dermal absorption of the chemical was not located. Available evidence indicates that pyridine is well absorbed rapidly from the GI tract and is not expected to accumulate in the body. Available information from animal testing does not suggest that lethality is a human health concern for exposure to pyridine by inhalation or ingestion. The major human health concern is for liver damage, based on recent studies with laboratory rats. Other human health concerns include the potential for neurologic effects and kidney effects. Pyridine has been administered to mice and rats in order to evaluate the potential carcinogenicity of pyridine. The studies have concluded that pyridine did not produce increases in the incidence of tumors with respect to controls. EPA has decided that increased liver weight in female rats is the most sensitive toxic endpoint.

Ammonia has been shown to cause deleterious effects in acute exposures. Irritation of the eyes, nose, throat and chest are associated with exposure to ammonia. Ingestion can cause gastritis and corrosive esophagitis. Exposure to high concentrations of ammonia gas can cause pulmonary edema or death. Ammonia has also been shown to cause negative effects to the respiratory tract, labored breathing, eye irritation, inflammatory lung changes, and death to many animal species.

Both the Integrated Risk Information System (IRIS-1989) and the Health Effects Assessment Summary Table (HEAST-1990) were used as sources for this contaminant toxicity data.

Risk Assessment

The carcinogenic risks associated with exposure to benzene by groundwater ingestion were computed for several potential exposure scenarios (See Table 1). These include off-site resident (5.5×10^{-4}), off-site industrial worker (current risk, 1.06×10^{-6}) for a quiescent scenario and 1.64×10^{-5})

for an aerated scenario (mixing of the water with associated volatilization of the benzene into the breathing space)), off-site industrial worker (future risk, using the upper 95% confidence interval for the groundwater plume, 6.83 x 10(-4) for a quiescent scenario and 7.35 x 10(-4) for an aerated scenario).

The non-carcinogenic risks associated with exposure to pyridine, pyridine derivatives, and ammonia by ingestion of groundwater, were computed for the same exposure scenarios as were used for the carcinogenic risks. Generally, total Hazard Indices (HI) are used to calculate non-carcinogenic risks and must be below a value of 1.0; otherwise CERCLA requires remedial action. Hazard Indices exceeded the 1.0 trigger for scenarios such as the off-site resident (HI=247), and off-site industrial worker (HI=277) (See Table 1).

During the RI, it was determined that there was no significant risk to the environment from site contamination. The absence of a suitable habitat for wildlife and the absence of any significant onsite surface water accumulations provided the justification for this conclusion. By implementation of the remedy in this ROD, impacts to the environment will also be minimized or eliminated.

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 human health, welfare, and the environment.

Description of Alternatives

The FFS identified four alternatives that could be used to address threats and/or potential threats to human health and the environment posed by the site. The alternatives evaluated are presented below.

Under each of the alternatives, the existing perimeter groundwater extraction system is assumed to be operating, containing groundwater at the facility boundary. Also, each of the alternatives contains a long-term groundwater quality monitoring program to assess the effectiveness of each alternative at cleaning up groundwater contamination in the OU 5 area.

The National Contingency Plan (NCP) requires that a **no-action alternative** be discussed as a basis for comparison with other cleanup alternatives. As defined in the NCP, a no-action alternative involving no action with no associated cost has been

evaluated in the FFS for the site, which is slightly different from the proposed Alternative 1, Natural Attenuation. Because the primary cleanup component of the no action alternative is natural attenuation, or the natural breakdown of contaminants in the groundwater, Alternative 1 from the FFS is more accurately characterized as natural attenuation for the purposes of this Record of Decision.

The FFS also evaluated another alternative, Alternative 5 - Provide Alternative Water Supply for Off-Site Users of Groundwater. The FFS describes an aquifer ban imposed by the Marion County Health Department (MCHD) in 1984. This aquifer ban ordered private well water users to connect to city water and to properly abandon and seal their private well. A survey was conducted at that time to characterize resident's concerns regarding industry in the area, in particular, Reilly Tar & Chemical. This survey was updated in 1996 to provide information regarding the effectiveness of the aquifer ban and to identify any current users of the aquifer who would be affected by groundwater contamination in the OU 5 area.

The results of this recent survey indicate that the aquifer ban imposed by the MCHD is effective in preventing exposure to groundwater contamination and contains provisions to allow the MCHD to effectively prevent future exposure to contaminated groundwater in the OU 5 area through implementation of the aquifer ban. Therefore, Alternative 5 was not evaluated in the FFS report as a potential remedial option.

Alternative 1: Natural Attenuation(with long-term groundwater monitoring)

This alternative involves natural attenuation and degradation of the groundwater contamination to reduce contaminant concentrations to acceptable levels. This alternative was evaluated with two scenarios - one with current pumping rates for the OU 1 groundwater extraction system and the off-site industrial pumping wells, and one without off-site industrial pumping. In the FFS, this alternative was called No Action. Because the primary cleanup component of Alternative 1 is natural attenuation, or the natural breakdown of contaminants in the groundwater, it is more accurately characterized as natural attenuation for the purposes of this Record of Decision.

Estimated Capital Cost: $0

Estimated Annual Operation and Maintenance Cost (15 years): $50,000

Estimated Timeframe to Implement: Immediate

Estimated Time to Achieve Cleanup Levels: 1.5 to 16 years (dependent on contaminant)

Alternative 2: Additional Extraction Wells Between OU 1 Wells and Off-Site Industrial Production Wells

This alternative involves installing two additional extraction wells at locations to the east/southeast of the Reilly property where the off-site groundwater would take the longest time to reach cleanup standards. The purpose of these additional wells would be to decrease the time for the contaminants to be removed from the aquifer and capture contaminants that would otherwise enter off-site production wells.

Estimated Capital Cost: $1,490,000

Estimated Annual Operation and Maintenance Cost (15 years): $331,000

Estimated Timeframe to Implement (including remedial design): 2 to 3 years

Estimated Time to Achieve Cleanup Levels: 1.5 to 15 years (dependent on contaminant)

Alternative 3: Increase Pumping Rates for the OU 1 Extraction Wells

This alternative involves two additional extraction wells along the eastern property boundary to supplement the existing groundwater extraction system. The goal of the additional extraction wells would be to increase the rate of capture of contaminants and to attempt to recover contaminants that have already migrated off-site.

Estimated Capital Cost: $855,000

Estimated Annual Operation and Maintenance Cost (15 years): $331,000

Estimated Timeframe to Implement (including remedial design): 2 to 3 years

Estimated Time to Achieve Cleanup Levels: 1.25 to 15.25 years (dependent on contaminant)

Alternative 4: Well Head Treatment at Off-Site Industrial Production Wells

This alternative would include well head treatment for benzene at an off-site industrial extraction well. The treatment would consist of air stripping to remove contaminants with activated carbon treatment for the treatment residuals. This alternative would only address benzene at the well head and would not have any impact on contaminants currently present throughout the OU 5 area.

Estimated Capital Cost: $243,500

Estimated Annual Operation and Maintenance Cost (15 years): $100,000

Estimated Timeframe to Implement (including remedial design): 2 to 3 years

Estimated Time to Achieve Cleanup Levels: Immediate (at well head only)

SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES FOR OPERABLE UNIT 5

The nine criteria used by U.S. EPA to evaluate remedial alternatives, as set forth in the NCP, 40 CFR Part 300.430, include: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements (ARARs); long-term effectiveness; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability; cost; state acceptance; and community acceptance. Based on evaluation of the alternatives with respect to these nine criteria, U.S. EPA has selected Alternative 1 - Natural Attenuation (with Long-Term Groundwater Monitoring) as the alternative for the cleanup for Operable Unit 5 at this Site.

THRESHOLD CRITERIA

Protection of Human Health and the Environment

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

All of the alternatives are protective of human health and the environment. All of the alternatives involve natural breakdown of contaminants through time. Alternative 1 provides protection from exposure to groundwater contamination primarily because water users are prohibited from using the groundwater by order of the MCHD which is considered an institutional control over the groundwater that is in place at present and in the future. Alternatives 2 and 3 utilize groundwater pumping to reduce the volume of contaminants; however, according to results of groundwater modeling, this does not accelerate the cleanup timeframes. However, they would provide an additional off-site control over easterly migration of contaminated groundwater from the site. Several off-site industrial wells provide off-site control at present. In addition, groundwater modeling was performed for two scenarios, one with current off-site pumping levels and one without. Cleanup timeframes of the aquifer were the same for both scenarios. Alternative 4 provides immediate protection at the industrial wellhead from any of the risks identified in this ROD for the off-site industrial worker, however, it does not address contamination in the groundwater plume throughout the OU 5 area.

Therefore, because all four alternatives provide protection from exposure to contaminated groundwater, Alternatives 1, 2, and 3 are considered functionally equivalent with respect to this threshold criterion and are superior to Alternative 4 because they address the entire off-site groundwater plume.

Compliance with ARARs

Addresses whether a remedy will meet all of the ARARs of other Federal and State environmental laws and/or justifies a waiver of those laws.

All of the alternatives are capable of meeting ARARs. ARARs are currently being met (regardless of the remedial alternative) for benzene, total pyridines, and ammonia at the off-site industrial production wells. Implementation of any of the four alternatives

will provide for compliance with all water quality and industrial discharge requirements. However, Alternatives 1, 2, and 3 are superior to Alternative 4 because Alternative 4 only provides for treatment at the wellhead for benzene, and does not achieve MCLs for benzene or any of the other contaminants in the off-site groundwater plume.

Therefore, it has been determined that Alternatives 1, 2, and 3 are functionally equivalent with respect to this threshold criterion and are superior to Alternative 4, because of their individual ability to meet the ARARs appropriate to each alternative.

BALANCING CRITERIA

Long Term Effectiveness

Addresses any expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup standards have been met.

Aquifer cleanup times are not sensitive to off-site industrial pumping and contaminants are predicted to never reach Eagle Creek. Alternatives 2, 3, and 4 will require additional equipment maintenance than Alternative 1. Alternative 4 is not entirely effective in the long term because it only addresses contamination at the industrial wellhead and not throughout the off-site contaminant plume.

Therefore, it has been determined that Alternatives 1, 2 and 3 are functionally equivalent with respect to this balancing criterion and are superior to Alternative 4.

Reduction of Toxicity, Mobility or Volume

Addresses the anticipated performance of the treatment technologies a remedy may employ.

Natural attenuation and degradation is the principal treatment process for the OU 5 area for all of the alternatives. This process is irreversible, satisfies the statutory preference for treatment and is predicted to completely destroy the contamination throughout the entire OU 5 area. All of the alternatives have the same benefit from the control on contaminant mobility provided by the off-site industrial production wells as well as the elimination of the source of the contamination to the OU 5 area by the OU 1 Groundwater Interim Remedial Measure (GWIRM) system. Alternative 4 differs from the others only at the off-site industrial wellhead

where benzene is transferred from the groundwater to the air and, if necessary, may be removed from the air stream using activated carbon. Also, Alternative 4 does not address this criterion for the entire groundwater plume, it only addresses the contamination at the well head.

Therefore, it has been determined that Alternatives 1, 2, and 3 are functionally equivalent with respect to this balancing criterion and superior to Alternative 4 because of the contaminant reduction capabilities throughout the off-site groundwater plume.

Short Term Effectiveness

Addresses the period of time needed to achieve protection and any negative effects on human health and the environment that may be posed during the construction and implementation period, until cleanup standards are achieved.

There would be no additional risks posed to the community, remedial workers, or the environment as a result of implementing any of the alternatives. The time predicted to complete the remedial action throughout the OU 5 area is the same for all of the alternatives and is approximately 9-16 years. Alternative 1 can be implemented immediately. Alternatives 2, 3, and 4 will require 2-3 years to obtain an approved remedial design and complete the system installation.

Therefore, it has been determined that Alternatives 1, 2, 3, and 4 are functionally equivalent with respect to this balancing criterion.

Implementability

Addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed for a particular option to be put in place.

Alternative 1 would pose no implementation problems as construction is not required and the groundwater monitoring program, engineering controls provided by the OU 1 GWIRM system, and the institutional controls provided by the Marion County Health Department (MCHD) are all currently in place. Additionally, the effectiveness of the MCHD aquifer ban has been verified with a new neighborhood well survey as previously reported. Alternative 4 will require coordination with off-site industries, however, conventional equipment and services are readily available. Alternative 2 would be the most logistically difficult to implement and would involve pilot testing, permitting with the City of Indianapolis POTW, and

purchasing or obtaining access to off-site property. Alternative 3 would pose the same implementability issues as Alternative 2 except off-site access will not be required.

Therefore, it has been determined that although Alternatives 1 and 3 are functionally equivalent with respect to this balancing criterion and are superior to Alternatives 2 and 4 due to potential difficulties with pilot testing, permitting for discharge of extracted water, and access.

Cost

Included are capital costs, annual operation and maintenance costs (assuming a 30 year time period), and net present value of capital and operation and maintenance costs.

The capital costs of Alternatives 1, 2, 3, and 4 are: $0 for Alternative 1, $1,490,000 for Alternative 2, $855,000 for Alternative 3, and $243,500 for Alternative 4. Operation and maintenance costs for Alternative 1 total $750,000 for 15 years, $1,500,000 for Alternative 2 for 15 years, $5,190,000 for Alternative 3 for 15 years, and $5,190,000 for Alternative 4 for 15 years.

Therefore, based on analysis of the costs associated with all of the alternatives analyzed in the FFS, it appears that Alternative 1 has the lowest capital cost and the lowest operation and maintenance costs of the four alternatives.

MODIFYING CRITERIA

State Acceptance

Addresses whether or not the State agency agrees to or objects to any of the remedial alternatives, and considers State ARARs.

The Indiana Department of Environmental Management (IDEM) has been intimately involved with the site throughout the RI/FS, has attended all technical progress meetings, has been provided the opportunity to comment on technical decisions, and concurs with the selection of Alternative 1 as the selected remedy for this operable unit groundwater cleanup at the site.

Community Acceptance

Addresses the public's general response to the remedial alternatives and proposed plan.

Throughout the RI/FS at the site, community involvement has been moderate. U.S. EPA has been accessible and responsive to community concerns throughout the study. At the public meeting for the proposed plan, the majority were in favor of Alternative 1 as the most appropriate choice for the OU 5 cleanup. There were a significant number of public comments received during the public comment period, however, the overwhelming majority were also in support of Alternative 1.

EPA has responded to substantive comments in a responsiveness summary, which is attached to this ROD as Appendix A.

In summation, Alternatives 1 and 3 fully satisfy the nine evaluation criteria for the OU 5 area. The estimated time to achieve cleanup levels under Alternative 1 is not significantly different from the time it would take to achieve cleanup levels under the other alternatives. Alternative 2 would be more difficult to implement than Alternatives 1 and 3, given the need to obtain access to off-site properties to install the necessary components of the remedy and the difficulties of installing an extraction system in a heavily industrialized area, while not providing better long term performance. Alternative 4 would not be effective in the long term because it only addresses contamination at the industrial wellhead and does not address the off-site groundwater contaminant plume. Alternative 4 would also be difficult to implement due to the need to negotiate access agreements with the off-site industries operating the off-site industrial production wells.

Alternative 1 is more cost effective than Alternative 3, while providing similar levels of protection to human health and the environment. This alternative will meet the appropriate cleanup standards in a timeframe that is similar to Alternative 3, while providing no short term risks associated with remedy construction.

Therefore, the best balance among the four alternatives is Alternative 1, Natural Attenuation (with Long Term Groundwater Monitoring).

SELECTED REMEDY

As was discussed in previous sections, EPA has chosen Alternative 1 - Natural Attenuation (with Long Term Groundwater Monitoring) as the selected remedy. The FFS contains a description of this alternative. In addition, U.S. EPA is finalizing the interim action decision for groundwater made in the OU 1 ROD.

At the Reilly Site, the unconfined aquifer below the site is a Class II aquifer which has been used in the past for drinking water by residents bordering the site, and could potentially be used as a drinking water source. Therefore, the cleanup objective for the OU 5 area is to restore groundwater to drinking water quality for future use and the remediation levels, as indicated below, are MCLs.

The OU 1 GWIRM system has been providing engineering controls since October 1994 and acts to prevent the additional degradation of groundwater in the OU 5 area by preventing the migration of on-site (OU 1) groundwater to off-site areas. Reilly is legally obligated, through the consent decree for OU 1, to maintaining the integrity of the GWIRM system and will continue to maintain, monitor, and report on the system. The GWIRM system continues to be considered as an engineering control for the site. The GWIRM system will be in operation until the cleanup and performance standards listed in Table 2 are met at the facility boundary.

The selection of Alternative 1, Natural Attenuation (with Long Term Groundwater Monitoring for the OU 5 area, when combined with the continued operation of the OU 1 GWIRM system will provide long term protection to human health and the environment from exposure to groundwater contamination from the Reilly site. The perimeter groundwater extraction system, selected as an interim remedy for OU 1, is an integral component of the final groundwater cleanup for the site and is being finalized through this action.

Through the RI/FS and the phased cleanup, the objective of U.S. EPA has been to protect human health and the environment from groundwater contamination while addressing sources of contamination on the Reilly site. The interim action selected in the OU 1 ROD was designed to prevent further off-site migration of groundwater contaminated by the Reilly site while onsite sources were addressed and remediated.

The remedies selected in the RODs for OU 2, 3, and 4, were intended to remediate sources of groundwater contamination located on the Reilly site. Thermal desorption of four hot spot areas and the stabilization of sludge with placement of a soil cover over a fifth

source area was the objective of OU 2 and will mitigate the contributions of these areas to the groundwater contamination problem.

Placement of a permeable cover over the OU 3 area will reduce the amount of contaminants leaching into the groundwater and the application of soil vapor extraction over two OU 4 areas and the placement of a concrete cover over a third OU 4 area will again, reduce the contributions from these areas to groundwater contamination.

The point of compliance for this action only, will be the property boundary, as is defined on Figure 2. Any groundwater at the point of compliance must meet the cleanup criteria mentioned above.

In determining the point of compliance for this final action, U.S. EPA considered the following factors: there are multiple sources of contamination on the Reilly site and through previous actions, U.S. EPA has left waste in place; as mentioned below, the Reilly site is subject to institutional controls, prohibiting the use of groundwater under the site unless approved in advance by U.S. EPA; the site is an active operating facility, regulated by RCRA, producing specialty chemicals.

Therefore, U.S. EPA has determined that the groundwater contamination at the site is caused by releases from several distinct sources that are in close geographical proximity and has considered the technical practicability of groundwater remediation under the site. U.S. EPA has also considered the vulnerability and future use of the groundwater and the likelihood of exposure in determining that the groundwater problem at the site should be addressed as a whole, rather than source by source. This is why the point of compliance has been established at the property boundary, as identified above.

In May 1984, the Marion County Health Department (MCHD) declared the industrial area in the vicinity of Reilly to be a threat to the safety of groundwater for use by humans for drinking and ordered all of the private water well users identified in the area to connect to the city water main and to properly abandon and seal their private wells. The MCHD declared that the use of well water in this area was a violation of the Code of the Health and Hospital Corporation of Marion County, Chapter 18, Section 18-803. A review of the MCHD files uncovered documentation regarding the 1984 survey in the OU 5 area, the identification of the well users resulting from the survey, and written directives from the MCHD to connect to the Indianapolis water supply system and to properly seal and abandon private wells.

At the direction of U.S. EPA, the MCHD recanvassed the survey area in August 1996. The survey results indicated that all properties in the survey area were connected to city water and that no existing wells were confirmed. Two residences in the Oak Park Addition identified unusual features. Both of these residences are connected to city water. A followup investigation shall be conducted on these two residences to confirm that these features are not old water wells. If they are identified as water wells, Reilly shall work with the residences to properly abandon these wells in accordance with all applicable regulations.

Groundwater flow and contaminant transport models were used to support the detailed analysis of Alternatives 1, 2, and 3. Alternative 1 was simulated with two scenarios; one with current pumping rates for the OU 1 GWIRM system and the off-site industrial pumping wells and one without off-site industrial pumping. Alternative 1 involves natural attenuation and degradation of the groundwater contamination to reduce contaminant concentrations to acceptable levels. Alternative 1 will also include a groundwater quality monitoring program for the OU 5 area.

The groundwater quality monitoring program will supplement the existing water quality monitoring program which is currently conducted on a quarterly basis. This monitoring program will be utilized to evaluate the performance of Alternative 1 over time.

In the FFS, it is estimated that groundwater in the OU 5 area will achieve cleanup standards in 1.5 to 16 years, depending on the contaminant. The cleanup standards to be met at the point of compliance for this action are listed in Table 2.

The remedy will be monitored on a continual basis over time to ensure that the selected remedy continues to be protective. If the off-site industrial water users modify their extraction rates significantly, or discontinue groundwater extraction at any point in the future, then the selected remedy shall be immediately reevaluated by U.S EPA to determine if it continues to provide the levels of protection to human health and the environment outlined in this ROD. If it is determined by U.S. EPA that the remedy is no longer protective, then U.S. EPA will take the appropriate steps necessary to provide protection of human health and the environment.

If the long term groundwater monitoring shows that contaminant decay is not occurring at the rates predicted in the groundwater modeling results presented in the FFS, then the selected remedy shall be immediately reevaluated by U.S. EPA to determine if it continues to provide the levels of protection to human health and the environment outlined in this ROD. If it is determined by U.S.

EPA that the remedy is no longer protective, then U.S. EPA will take the appropriate steps necessary to provide protection of human health and the environment.

Institutional controls currently in place at the site include a control that prohibits Reilly from using the groundwater underlying the property through ingestion or dermal contact. This control allows Reilly to use the groundwater under the site for industrial purposes (non-contact cooling water) only after obtaining the express written approval of U.S. EPA, or any successor federal governmental department or agency.

These controls shall continue in full force, prohibiting use of the groundwater underlying the site, until the Reilly site is deleted from the National Priorities List, all remedial action cleanup and performance standards have been met, and until such time as the U.S. EPA issues a determination in writing or the Court rules to either modify or terminate the restrictions in response to a petition from the owner(s) of the property.

Because hazardous substances will remain in place at the site, U.S. EPA will review the remedial action every five years to determine its effectiveness.

Documentation of Significant Changes

EPA published a proposed plan for this operable unit action on March 24, 1997, that proposed the selection of Alternative 1 - Natural Attenuation (with Long Term Groundwater Monitoring) as the final remedy for OU 5.

There were a significant number of public comments received during the public comment period, however, the overwhelming majority were in support of Alternative 1, and the remedy recommended in the proposed plan was not changed.

STATUTORY DETERMINATIONS

U.S. EPA's primary responsibility at Superfund sites is to undertake remedial actions that protect human health and the environment. Section 121 of CERCLA has established several other statutory requirements and preferences. These include the requirement that the selected remedy, when completed, must comply with all applicable, relevant and appropriate requirements ("ARARs") imposed by Federal and State environmental laws, unless the invocation of a waiver is justified. The selected remedy must

also provide overall effectiveness appropriate to its costs, and use permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable. Finally, the statute establishes a preference for remedies which employ treatment that significantly reduces the toxicity, mobility, or volume of contaminants.

The selected remedy for the operable unit addressed by this ROD will satisfy the statutory requirements established in Section 121 of CERCLA, as amended by SARA, to protect human health and the environment, will comply with ARARs (or provide grounds for invoking a waiver), will provide overall effectiveness appropriate to its costs, and will use permanent solutions and alternative treatment technologies to the maximum extent practicable.

1. Protection of Human Health and the Environment

Implementation of the selected remedy will protect human health and the environment because: (1) the contamination in the aquifer beyond the boundary of the property owned by Reilly Industries, Inc. does not currently affect human health or sensitive environmental receptors, (2) the perimeter pump and treat system established by the first operable unit action taken at the site will prevent further contamination from migrating beyond the boundary of the property owned by Reilly Industries, Inc., and (3) the contamination now present in the aquifer outside that property boundary is expected to diminish to the vanishing point over the next sixteen years through processes of attenuation occurring naturally in the affected aquifer.

Groundwater monitoring will be required to ensure that the expected attenuation does, in fact, take place; and if it does not, U.S. EPA retains authority to require additional measures to address whatever contamination may remain, if necessary.

Institutional controls have already been imposed by the Marion County Health Department which have already ensured that all residents in the area are connected to an uncontaminated city water supply and also that all wells in the affected aquifer have already been sealed and abandoned in compliance with existing State law and regulations. No unacceptable short term risks will be caused by implementation of the remedy.

2. Compliance with ARARs

The selected remedy will comply with all identified applicable or relevant and appropriate federal requirements and with those State or local requirements that are more stringent, unless a waiver is

invoked pursuant to Section 121(d)(4)(B) of CERCLA. The ARARs for the selected remedy are listed below:

A. Federal ARAR s

Chemical-Specific Requirements

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the standard for cleanup.

Resource Conservation and Recovery Act (RCRA)

The facility is an operating RCRA facility engaged in the management of hazardous wastes; therefore, the RCRA statute and its implementing regulations are applicable in some areas and relevant in other areas for purposes of Corrective Action.

Section 3004(v) of the Solid Waste Disposal Act as amended by RCRA, 42 USC 6924(v) requires a RCRA facility like Reilly Industries, Inc. to take corrective action beyond the facility boundary where this is necessary to protect human health and the environment. This requirement is applicable to this facility and will be enforced by U.S. EPA when necessary to protect human health and the environment.

The chemical-specific requirements of RCRA are also relevant and appropriate. 40 CFR 141 requires that ground water used as drinking water meet Maximum Contaminant Levels ("MCLs") for contaminants of concern.

RCRA groundwater protection standards are codified at 264.94. That regulation establishes the concentration levels which must be met for contaminants of concern in site ground water.

Safe Drinking Water Act

40 CFR 141

Federal Drinking Water Standards promulgated under the Safe Drinking Water Act ("SDWA") include both Maximum Contaminant Levels ("MCLs") and, to a certain extent, non-zero Maximum Contaminant Level Goals ("MCLGs"), that are applicable to municipal drinking water supplies servicing 25 or more people. At the Reilly Site, MCLs and MCLGs are not applicable, but are relevant and appropriate, because the unconfined aquifer below the site is a Class II aquifer which has been used in the past for drinking water

by residents bordering the site, and could potentially be used as a drinking water source.

The National Contingency Plan ("NCP") at 40 CFR 300.430 (e)(2)(I)(B) provides that MCLGs established under the Safe Drinking Water Act that are set at levels above zero shall be attained by remedial actions for ground waters that are current or potential sources of drinking water. Groundwater monitoring wells will be installed to ensure that the contribution to groundwater contamination beyond the facility boundary has ceased. Existing groundwater wells in the aquifer will also be monitored, and additional wells may also be drilled and monitored, if necessary to ensure compliance.

Location-Specific Requirements

Location-specific ARARs are those requirements that derive from the physical nature of the site's location and features of the local geology and hydrogeology such as wetlands and floodplains.

The physical nature of the site's location does not appear to implicate any additional ARARs for this selected remedy beyond those already identified above and below as specific to the chemical composition of the hazardous substances addressed and those specific to the action required by the selected remedy.

Action-Specific Requirements

OPERABLE UNIT 5 (OFF-SITE PLUME)

The remedy selected for OU 5 relies on processes of natural attenuation in conjunction with actions already taken at the site which include the installation of a perimeter pump and treat system to isolate groundwater beneath the property owned by Reilly Industries, Inc. from the surrounding aquifer (operable unit 1) as well as actions to prevent the leaching of additional contaminants to groundwater from contaminated soils on the Reilly property (operable units 2, 3 and 4). Furthermore, the remedy selected requires groundwater monitoring of the off-site plume to ensure effectiveness of the selected remedy as well as continued operation and maintenance of the pump and treat system already in place to ensure that the corrective measure effectively isolates the contamination in groundwater under the Reilly property from the surrounding aquifer.

The Federal and State ARARs for OU5 are presented below:

FEDERAL ARARs

Occupational Safety and Health Act

29 CFR 1910, 1926 and 1904

Resource Conservation and Recovery Act ("RCRA")

The Resource Conservation and Recovery Act ("RCRA") is applicable at some areas of this site and relevant at other areas. The site is an operating RCRA facility subject to Corrective Action and these RCRA Corrective Action obligations have been integrated into the ongoing Superfund investigation and remediation program for this facility, pursuant to a Consent Order amendment signed and issued in September of 1992. Section 3004(v) of the Solid Waste Disposal Act as amended by RCRA, 42 USC 6924(v) requires a RCRA facility like Reilly Industries, Inc. to take corrective action beyond the facility boundary where this is necessary to protect human health and the environment. This requirement is applicable to this facility and will be enforced by U.S. EPA when necessary to protect human health and the environment.

The chemical-specific requirements of RCRA are also relevant and appropriate. 40 CFR 141 requires that ground water used as drinking water meet Maximum Contaminant Levels ("MCLs") for contaminants of concern.

RCRA groundwater protection standards are codified at 264.94. That regulation establishes the concentration levels which must be met for contaminants of concern in site ground water.

Because some of the contamination present in soils on the site will remain in place and closure of the facility, when it takes place will not be clean closure, the facility will be subject to requirements for closure of a landfill. The requirements considered both relevant and appropriate in this area include, but are not necessarily limited to:

40 CFR 264.117-120

These regulations require 30-year post-closure care and groundwater monitoring.

Post-Closure Care

40 CFR 264.117(a)

The requirements for post-closure care are set forth at 40 CFR 264.117 through 40 CFR 264.120. The Regional Administrator may revise the length of the post-closure care period pursuant to 40 CFR 264.117(a)(2)(I) if he finds that a reduced period is sufficient to protect human health and the environment; or extend the length of the post-closure care period pursuant to 40 CFR 264.117(a)(2)(ii) if he finds that the extended period is necessary to protect human health and the environment.

40 CFR 264.117

The remedy selected for this site requires U.S. EPA to restrict post-closure use of this property as necessary to prevent damage to the cover systems.

NPDES Permit Regulations

Because the final remedy for groundwater at the site requires continued operation of the pump and treatment system required by operable unit 1, the ARARs listed in the ROD for that operable unit continue to apply. Because the remedy involves discharge to an off-site Publicly Owned Treatment Works ("POTW"), these ARARs include the National Pollutant Discharge Elimination System ("NPDES") requirement codified at 40 CFR 122.42(b). This requires notification to the issuing authority of a re-evaluation of POTW pretreatment standards (n.b., if the local POTW does not have a local limitation for a particular pollutant to be discharged from this Superfund site, then it must develop such a limitation to prevent interference, pass-through, or inhibition, from occurring as a result of the discharge).

NPDES National Pretreatment Standards, codified at 40 CFR 403.5 require that discharge to a POTW not result in interference, pass-through of pollutants to receiving water or contamination of sewage sludge. This requirement is also applicable to the remedial actions selected for this site.

STATE ARARs Identified for OU5

The State of Indiana has identified the following regulations as ARARs with which the selected remedy for OU 5 must comply:

The Indiana Department of Environmental Management ("IDEM") has developed water quality standards to prevent degradation of State waters. These standards are set forth at:

IAC Article 2, Rule 1-7: Indiana Water Quality Standards

327 IAC Article 5: NPDES Permits[1]

327 IAC Article 8; Rules 1 and 2: Public Water Supply

The waters in the aquifer at the site and all waters discharged therefrom in the course of remedial actions taken at the site must comply with the State standards referenced above.

Because these actions include reinjection, State ARARs for underground injection of pollutants apply here. The applicable regulations are set forth at:

327 IAC 5-4-2

State ARARs for pretreatment include 327 IAC 5-11, limiting discharges to POTWs, and 327 IAC 5-13, regarding the applicability of the Industrial Waste Pretreatment Program.

3. Cost Effectiveness

Cost effectiveness compares the effectiveness of an alternative in achieving environmental benefit in proportion to the cost required to achieve that benefit. The FS discusses the costs of the alternatives considered, and a comparison of those costs is presented in the section of this ROD summarizing the analysis of the relevant criterion, above.

The selected remedy for this operable unit action is cost effective because it provides the greatest overall effectiveness proportionate to the cost when compared to the other alternatives evaluated, the net present worth cost of the selected remedy is estimated to be $750,000.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource recovery to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a

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[1] See footnote 1, above.

cost-effective manner at this site. Of those alternatives that are protective of human health and the environment and that comply with ARARs, U.S. EPA has determined that the selected remedy provides the best balance in terms of long term effectiveness and

permanence, reduction of toxicity, mobility, or volume of contaminants, short term effectiveness, implementability, and cost, taking into consideration State and community acceptance.

5. Preference for Treatment as a Principal Element

The statutory preference for selection of remedial actions in which treatment is a principal element cannot be satisfied by this decision; however, EPA and IDEM believe that the selected remedy will satisfy the statutory requirements specified in Section 121 of SARA to protect human health and the environment, attain ARARs (or provide grounds for invoking a waiver) and utilize permanent solutions to the maximum extent practicable.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR
REILLY TAR & CHEMICAL SITE
INDIANAPOLIS, INDIANA

UPDATE #3
OPERABLE UNIT #5
JUNE 23, 1997

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	08/10/94	Bratina, J., Reilly Industries, Inc.	Novak, D., U.S. EPA	Letter Re: Schedule for Operable Unit #5 (OU#5) Feasibility Study (FS)	2
2	09/15/94	Giordano, M., ENSR	Novak, D., U.S. EPA	Letter re: ENSR's Response to U.S. EPA's Comments on the "Human Health Risk Assessment" for the Reilly Tar Site	11
3	10/00/94	ENSR Consulting & Engineering	U.S. EPA	Human Health Risk Assessment: Volume I of II (Text, Tables and Figures)	186
4	10/00/94	ENSR Consulting & Engineering	U.S. EPA	Human Health Risk Assessment (Volume II of II (Appendices)	586
5	10/17/94	Smith, P., CH2M Hill	Novak, D., U.S. EPA	Letter re: FS Scope of Work for OU#5	1
6	11/15/94	Novak, D., U.S. EPA	Bratina, J., Reilly Industries, Inc.	Letter re: U.S. EPA's Response to Reilly's August 10, 1994 Letter Concerning the Potential Schedule for OU#5	2
7	11/28/94	Bratina, J., Reilly Industries, Inc.	Novak, D., U.S. EPA	Letter re: Reilly's Response to U.S. EPA's November 15, 1994 Letter Concerning the Completion of the FS	4
8	02/27/95	Bratina, J., Reilly Industries, Inc.	Novak, D., U.S. EPA	Letter re: FS Schedule for OU#5 with Attached Drawings	8

9	04/05/95	Indiana Department of Natural Resources	Public	Water Well Drilling Regulations	18
10	12/12/95	Kress, T., Reilly Industries, Inc.	Novak, D., U.S. EPA	Letter re: Submittal of Focused Feasibility Study (FFS)	1

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12	02/22/96	Nash, T., U.S. EPA/ ORC	Novak, D., U.S. EPA	Memorandum re: ORC Comments on the FS for OU#5	3
13	03/05/96	Hansen, S., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the FFS for OU#5	2
14	03/18/96	Barnett, C., CH2M Hill	Novak, D., U.S. EPA	Letter re: CH2M's Comments on the FFS for OU#5	7
15	05/01/96	Novak, D., U.S. EPA	Kress, T., Reilly Industries, Inc.	Letter re: U.S. EPA's Comments on the FS Report for OU#5	11
16	05/17/96	U.S. EPA	File	Memorandum re: Summary of May 17, 1996 Meeting with Marion County Health Department	17
17	06/13/96	Kress, T., U.S. EPA	Novak, D., U.S. EPA	Letter re: Request for a Time Extension for the Preparation of the Revised FS Report for OU#5	1
18	06/17/96	Novak, D., U.S. EPA	Kress, T., Reilly Industries, Inc.	Letter Re: U.S. EPA's Approval of a Time Extension for Submission of the Revised FS Report for OU#5	1
19	06/19/96	Kress, T.,	Novak, D.,	Letter re: Reilly's	1

		Reilly Industries, Inc.	U.S. EPA	Request for a Three Week Extension for Preperation of the Revised FS Report for OU#5	
20	07/01/96	Weinreb, G., August Mack Environmental Inc.	Novak, D., U.S. EPA	Letter re: AME's Request for a Time Extension for Submittal of the Revised FFS Report for OU#5	2
21	07/10/96	Novak, D., U.S. EPA	Kress, T., Reilly Industries, Inc.	Letter re: U.S. EPA's Approval of an Extension for Resubmission of Revised FS Report	1
22	07/11/96	Haitjema, H., August Mack Environmental Inc.	Novak, D., U.S. EPA	Letter re: Revised FFS Report for OU#5	4

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24	08/13/96	Hansen, S., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Revised FFS for OU#5	2
25	08/14/96	Novak, D., U.S. EPA	Kress, T., Reilly Industries, Inc.	Letter re: U.S. EPA's Comments on the Revised FFS Report for OU#5	7
26	08/23/96	Kress, T., Reilly Industries, Inc.	Novak, D., U.S. EPA	Letter re: Reilly's Request for Meeting with U.S. EPA	1
27	09/12/96	Weinreb, G., August Mack Environmental Inc.	Novak, D., U.S. EPA	Letter re: Documentation of Issues Discussed and Agreements Reached at the September 14, 1996 Meeting Concerning the Revised FFS for OU#5	4
28	09/13/96	Weinreb, G., August Mack Environmental Inc.	Novak, D., U.S. EPA	Letter re: AME's Response to U.S. EPA's August 14, 1996 Letter Concerning the Revised FFS for OU#5	19
29	10/01/96	Barnett, C., CH2M Hill	Novak, D., U.S. EPA	Letter re: CH2M's Response to U.S. EPA 's Comments on the Revised FFS Report for OU5	3
30	10/24/96	Hansen, S., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Revised FFS for OU5 w/ Attached Letter Concerning TCLP Analytical Methods for Phase II	3
31	11/19/96	Novak, D., U.S. EPA	Kress, T., Reilly Industries, Inc.	Letter re: U.S. EPA's Comments to AME's Response to U.S. EPA's September 13, 1996 Letter Concerning the FS for OU#5	4

32	00/00/97	U.S. EPA/ORC	File	Memorandum re: ORC Comments on the Draft Record of Decision for OU#5 at the Reilly Tar Site	1

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33	02/06/97	Barnett, C., CH2M Hill	Novak, D., U.S. EPA	Letter re: CH2M's Comments on the PRP Response to U.S. EPA's Comments on the Revised FFS for OU#5	2
34	02/07/97	Hansen, S., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Ground-Water Well Survey for the FFS for OU#5	1
35	02/07/97	Hansen, S., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Revised FFS for OU#5	5
36	03/00/97	U.S. EPA	Public	Fact Sheet: Proposed Plan for Remedial Action (OU#5) at the Reilly Tar Superfund Site	4
37	03/26/97	Allison Engine Company	U.S. EPA	Public Comment (OU#5): Allison Engine Company's Statement in Support of Proposed U.S. EPA and IDEM Recommendation to Implement Alternative 1	1
38	03/26/97	U.S. EPA	File	Transcript of Proceed-ings re: Proposed Plan for Remedial Action for OU#5	43
39	04/16/97	Various Citizens	Novak, D., U.S. EPA/ OPA	Public Comments re: the Proposed Plan Received January 12 - April 16, 1997	59
40	04/21/97	Favero, D.,	Novak, D.,	Letter re: Favero's	2

		Favero Geosciences	U.S. EPA	Comments on the Proposed Plan for Remedial Action for OU#5	
41	04/22/97	Kress, T., Reilly Industries, Inc.	Novak, D., U.S. EPA/ OPA	Letter re: Reilly's Response to Allison Engine Company's Statement at the March 26, 1997 Public Meeting	2
42	04/22/97	Ellis, P., Allison Engine	Novak, D., U.S. EPA	Letter re: Allison Engine's Concern About Health Effects on Employees from Reilly Contaminants	2
43	06/16/97	Might, K., August Mack Environmental Inc.	Novak, D., U.S. EPA	Letter re: Final Addendum to the Revised FFS for OU#5	15

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44	06/18/97	Kleiman, J., U.S. EPA/ RCRA	Novak, D., U.S. EPA	Letter re: RCRA's Review of the Draft Record of Decision for OU#5 at the Reilly Tar and Chemical Site	1

APPENDIX A

Reilly Tar & Chemical
Indianapolis, Indiana

Responsiveness Summary

I. Responsiveness Summary Overview

In accordance with CERCLA Section 117, a public comment period was held from March 24, 1997 to April 22, 1997, to allow interested parties to comment on the United States Environmental Protection Agency's (EPA's) Feasibility Study and Proposed Plan for the Reilly Tar & Chemical Superfund site. At a March 26, 1997 public meeting, EPA and the Indiana Department of Environmental Management (IDEM) officials presented the Proposed Plan for remediation at the Reilly Tar & Chemical site, answered questions and accepted comments from the public. Written comments were also received through the mail.

II. Background of Community Concern

The Reilly Tar & Chemical site operated from the early 1920's to 1972 as a wood treatment facility. From 1941 to the present, Reilly has been in operation producing specialty chemicals. The earliest complaint about odors and disposal practices at the site was in 1955, which referenced the fact that a chemical produced at Reilly (alpha picoline) had been found in nearby residential wells. In 1964, three contaminants from Reilly were found in off-site groundwater samples. In 1987, 60,000 gallons of waste fuel, containing mostly pyridine and pyridine derivatives, benzene, xylene, and toluene, was accidentally spilled on the northern portion of the site.

Community involvement has increased over the years as more people became aware of activities at the site. Residents and interested citizens have formed several environmental activist groups to deal with problems associated with the Reilly site. These include a neighborhood group that meets quarterly with Reilly to address ongoing problems at the plant, known as the Neighborhood Involvement Committee, or NIC.

III. EPA's Proposed Remedy and its Relation to the Final ROD

In a Proposed Plan that was issued on March 24, 1997, EPA proposed Alternative 1 - Natural Attenuation (with Long-Term Groundwater Monitoring). This remedy was based on the information presented in the FS, prepared by Reilly and approved by EPA. During the public comment period, EPA received numerous comments regarding the selection of Alternative 1, most of which supported the proposal.

Almost all of the comments received during the public comment period were received from a group of students at the Lawrence Central High School. EPA will attempt to address the issues arising from these comments and demonstrate how they were factored into the final remedy selection for OU 5 at the Reilly site.

IV. Summary of Significant Comments Received During the Public Comment Period and EPA responses.

The comments are organized into the following categories:

A. Summary of general comments concerning site cleanup.

1. Comments were raised that indicated that Alternative 1 was the best remedy because it was the cheapest.

EPA response 1: Remedial alternatives are initially screened in the Feasibility Study using three criteria: effectiveness, implementability and cost. If an alternative fails any of these three, then it is excluded from further consideration. Remaining alternatives then go through a detailed screening in the Feasibility Study where their merits are compared to EPA's nine evaluation criteria. During the comparison, alternatives are evaluated against one another and the one that provides the best balance of the nine criteria is selected. Cost is one of the nine criteria, but not the only one. EPA does not select an alternative simply because it is cheaper-EPA selects the most effective alternative for site cleanup.

2. Comments were raised indicating that the nearby industry should be closed by EPA, which would benefit the groundwater cleanup.

EPA response 2: Closing the nearby industry would not benefit the groundwater cleanup. Reilly has contaminated the groundwater and, under this action and others, is responsible for cleanup activities. The nearby industry is not contributing to the overall groundwater contamination problem as identified by the remedial investigation. It is, therefore, not EPA's intent to close down industry as a result of this remedial action.

3. Comments were raised indicating that the City of Indianapolis should pay for the groundwater cleanup.

EPA response 3: As indicated above, the owner/operator is considered a potentially responsible party under CERCLA, responsible for the contamination problem at the site and is responsible for paying for the cleanup.

4. Comments were raised that expressed concern that the OU 1 extraction system is making the problem worse by drawing contamination into the off-site area and that its use should be discontinued.

EPA response 4: The OU 1 system is designed to prevent contaminants from moving into the off-site area. This system is not designed to cleanup the off-site area; however, because it is removing the source of contamination to the off-site area, the OU 1 system will assist in the off-site cleanup. Turning this system off would make the off-site situation worse and extend the time for off-site cleanup.

5. Comments were raised stating that local industry should not use groundwater in the future and should switch to city water.

EPA response 5: The nearby industry is aware of the groundwater contamination problem. Local industrial groundwater use for nondrinking water purposes does not present a risk to the community or to the industrial workers. No one is drinking the affected groundwater, which poses the highest risk from contamination.

B. Comments in support of the selection of Alternative 1 for cleanup.

6. Comments were raised in support of the selection of Alternative 1 because it is a natural process, works immediately, and has a low cost.

EPA response 6: EPA appreciates the support for the proposed remedy. EPA agrees that Alternative 1 is the most appropriate remedy for this action.

7. Comments were raised in support of Alternative 1, as it would remove contaminants immediately from the aquifer.

EPA response 7: This assumption is incorrect. None of the alternatives will remove the contaminants from the aquifer immediately-groundwater cleanup takes time.

C. Comments raising questions regarding the long term effectiveness of Alternative 1.

8. Comments were raised asking what would happen if the groundwater cleanup did not progress at the rate presented in the FS modeling.

EPA response 8: EPA has written a contingency into the ROD that requires that the remedy performance be monitored over time. If cleanup is not progressing as modeled, then the cleanup decision will be revisited and additional actions will be taken to accelerate the cleanup. Under the Superfund law, EPA is also required to revisit and reassess remedial actions every five years, to assure that the selected remedial action is continuing to provide protection to human health and the environment.

9. Comments were raised indicating that EPA is doing nothing by selecting this remedial option and will allow the groundwater contamination to move to the Blue Lake area.

EPA response 9: Natural attenuation with monitoring is an active cleanup option. Long term monitoring of groundwater will provide for continual updates on the progress of the cleanup. As

was presented in the FFS, groundwater extraction would not accelerate the cleanup times for groundwater. Therefore, because the different remedies discussed in the FFS provided the same levels of effectiveness, EPA selected the remedy that would provide the least amount of disruption to the surrounding area. Also, the OU 1 groundwater extraction system will be in operation until all groundwater meets the appropriate cleanup levels. The off-site industrial extraction wells are currently blocking the easterly movement of off-site groundwater. Modeling results from the FS indicate similar timeframes for cleanup if these wells discontinue pumping.

10. Comments were raised stating that Alternative 1 was leaving contaminants in the groundwater that other alternatives might address.

EPA response 10: None of the alternatives remove contaminants from the aquifer immediately. Through continual monitoring, EPA will evaluate the performance of the selected remedy and make appropriate adjustments over time.

11. Comments were raised stating that if you try to remediate the groundwater, you will worsen the problem.

EPA response 11: Only through active remediation can the groundwater contamination problem be addressed and corrected. EPA has taken steps to prevent additional contamination from entering the off-site area, and will monitor the aquifer in the off-site area while the processes of natural attenuation clean the aquifer..

D. Comments on other alternatives in the FS or ways Alternative 1 could be augmented.

12. Comments were raised stating that EPA should add more on-site extraction wells to speed up the cleanup.

EPA response 12: As indicated above, increasing the rate of groundwater extraction does not decrease the cleanup time. Reilly is installing additional on-site wells under OU 1 to provide further proof of containment at the property boundary. The purpose of OU 1 is to isolate the site from further groundwater contamination, which will accelerate the off-site cleanup by removing the contamination source.

13. Comments were raised stating that EPA should inject chemicals into the aquifer to accelerate the natural contaminant breakdown.

EPA response 13: Bioremediation is a proven treatment method for groundwater cleanup, however, in this situation it would not provide the levels of effectiveness needed to accelerate the cleanup. Strict controls on the treatment area are needed in order to implement bioremediation. At the Reilly site, the hydrogeologic conditions do not allow for the proper control measures to be put into place at the treatment area in order for the injected chemicals to work. The limitations on obtaining access and the implementability of this method preclude its use here.

14. Comments were raised stating that Alternative 3 would accelerate the cleanup through additional extraction.

EPA response 14: As is stated above, the groundwater modeling contained in the FFS indicated that groundwater cleanup was not accelerated by groundwater extraction, rather, the cleanup timeframe was similar to that of natural attenuation.

15. Comments were raised indicating support for Alternative 1 because the other alternatives would take 2-3 years to implement, would encounter off-site access problems, and would require excessive pump maintenance.

EPA response 15: EPA agrees with these conclusions and this information was factored into EPA's final cleanup decision.

16. Comments were raised indicating that Alternative 2 was inconvenient to area residents due to access requirements for implementation.

EPA response 16: EPA agrees with these conclusions and this information was factored into EPA's final cleanup decision.

17. Comments were raised indicating that NPDES requirements for the off-site industries did not address Reilly contaminants.

EPA response 17: EPA contacted IDEM's Water Management Section, which is responsible for setting industry discharge requirements. IDEM is aware of the Reilly contamination problem and has indicated that the current requirements for industrial discharge are adequate for protection of human health and the environment. If these standards change in the future, the discharge requirements will be revisited.

18. Comments were raised which indicated that if Reilly contamination caused problems for the surrounding area, that Reilly should be legally and financially responsible for correcting any problems.

EPA response 18: Reilly is responsible under CERCLA for correcting any site related contamination problems emanating from their facility and if any problems arise in the future, EPA will assist in ensuring that they are addressed by Reilly correctly and promptly. EPA's role is to ensure protection of human health and the environment.

These comments are paraphrased in order to effectively summarize them in this document. The reader is referred to the public meeting transcript which is available in the public information repository, located at the Indianapolis Public Library, 48 East St. Claire, Indianapolis, Indiana. Written comments received at EPA's regional office are on file in the Region 5 office. A copy of these written comments has also been placed in the Indianapolis Public Library.