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Declaration for the Record of Decision
Douglas Road Landfill
Groundwater Operable Unit

Site Name and Location

Douglas Road Landfill
Mishawaka, Indiana

Statement of Basis and Purpose

This decision document presents the selected remedial action for the groundwater operable unit at the Douglas Road Landfill Site (the Site) in Mishawaka, 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 action selected in this ROD, may present an imminent and substantial endangerment to human health, welfare, or the environment.

Description of the Selected Remedy

This final action is the last of three planned for this Site. It specifically outlines an action to address contaminated groundwater, 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:

- Groundwater extraction using extraction wells or collection drains to contain groundwater in the downgradient direction of the groundwater plume;
- Groundwater treatment through construction of an artificial wetland;
- Re-infiltration of a portion of the extracted groundwater that has undergone treatment in the constructed wetland;
- Discharge to Juday Creek of a portion of the treated groundwater, in compliance with NPDES substantive and administrative requirements developed for the site by IDEM;
- Groundwater and source area monitoring to ensure that the goals of this action are met

and that downgradient water supplies are not adversely impacted by groundwater contamination;

- Long term operation and maintenance of the remedy to ensure protection of public health and the environment;

Declaration

The selected remedy is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements for this final action, is cost effective, and consistent with achieving a permanent remedy. This final action utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. Because this action will result in hazardous substances remaining on-site 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 this remedial action.

Date

Valdas V. Adamkus
Regional Administrator

Decision Summary
Douglas Road Landfill
Mishawaka, Indiana

Site Name and Location

Douglas Road Landfill
Mishawaka, Indiana

The Douglas Road Landfill site (the Site) is located in St. Joseph County just north of Mishawaka, Indiana. The site is approximately 16 acres in size and is located near the northwest corner of Douglas and Grape Roads. The Site is bounded by the right-of-way for the Indiana State Toll Road to the north, a shopping center and an apartment complex to the east, residential properties and Douglas Road to the south, and agricultural land to the west (See Figure 1).

Site History and Enforcement Activities

In the early 1950s, the property was excavated and gravel from the Site was used for the construction of the interstate. Uniroyal Plastics, Inc. (Uniroyal) leased the gravel pit and used it as a repository for plant wastes between 1954 and 1979. From 1954 to 1971, solvents, fly ash, paper, wood stock, rubber and plastic scrap were disposed of at the landfill. Fly ash was the only material disposed of at the Site from 1971 to 1979. In December 1979, the Site was closed to avoid having to comply with impending RCRA regulations pertaining to the operation of a landfill.

According to the information provided by Uniroyal, about 302,400 gallons of hazardous waste were disposed of at the landfill. Liquid wastes included methyl ethyl ketone, acetone, tetrahydrofuran, toluene, hexane, and xylene. Historical aerial photographs of the landfill indicate several pits containing liquid that may have been used for disposal; the largest (and longest used) was in the central area of the landfill (See Figure 1).

The landfill was nominated for inclusion on the NPL on June 10, 1986, and placed on the NPL on March 31, 1989. In September, 1989, the State of Indiana and Uniroyal signed a consent decree,

Figure

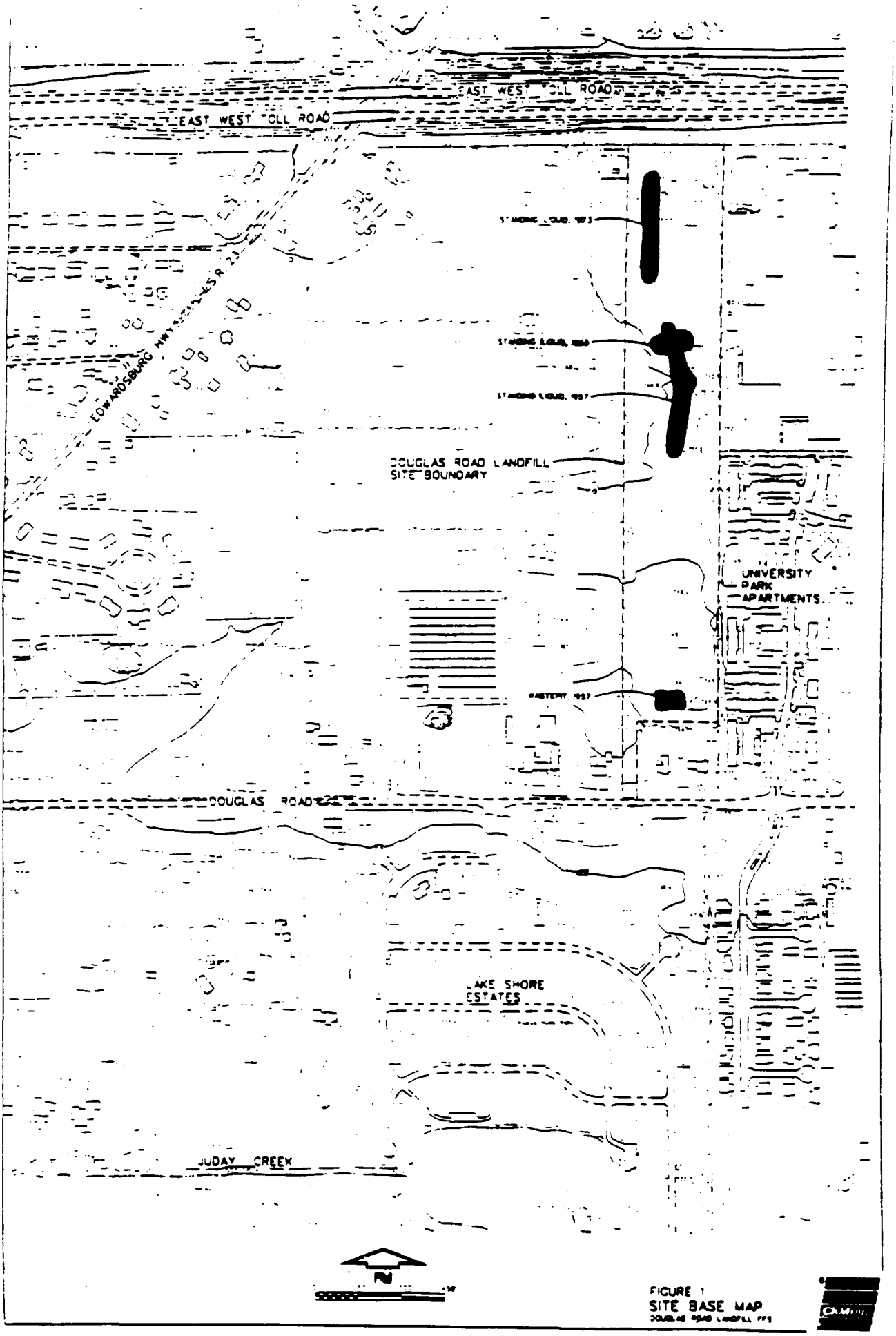

FIGURE 1
SITE BASE MAP

in which Uniroyal agreed to perform a RI/FS at the site. Before completion of this work, Uniroyal filed for bankruptcy and discontinued work at the site (November 1991).

Following the bankruptcy, it was determined that U.S. EPA should regain the site lead and the RI/FS was begun in early 1994, using Superfund money. These investigations were completed in the fall of 1994.

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 involvement 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 Involvement Plan was developed in 1994, to assess the community's informational needs related to the Site and to outline community involvement activities to meet these needs. Residents and community officials were interviewed and their concerns were incorporated into this plan.

- A public information repository was established at the Mishawaka-Penn public library, located at 209 Lincoln Way East, Mishawaka, Indiana.

- A mailing list of interested citizens, organizations, news media, and elected officials in local, 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 has been updated on a continual basis as more individuals have become aware of the contaminated residential well problem.

- A fact sheet was mailed to the public in April, 1994, that announced a public meeting to discuss the upcoming Remedial Investigation and answer site related questions from the public.

- A public meeting was held on April 20, 1994, at the Walt Disney School in Mishawaka, Indiana, that announced the beginning of the Remedial Investigation and provided details regarding its conduct.

- A fact sheet was mailed to the public in September 1994, that announced an availability session to be held on September

28, 1994, to discuss sampling results from the Remedial Investigation.

- An availability session was held on September 28, 1994 at the Walt Disney School to discuss RI progress and answer questions from the public regarding residential well contamination discoyered during the RI sampling.

- A fact sheet was mailed to the public in March 1995 that announced an availability session to be held on March 8, 1995, to discuss the solution to the residential well contamination problem.

- An availability session was held on March 8, 1995, at the Walt Disney School, to discuss the solution to the residential well contamination problem.

- A fact sheet was mailed to the public in April 1995 that summarized EPA's recommended alternative for the landfill capping portion of the cleanup in a proposed plan for the site. The EPA approved feasibility study for the landfill cap was also released at that time. This fact sheet announced a public comment period for the proposed remedial action and was accompanied by newspaper advertisements in local newspapers.

- A public meeting was held on April 5, 1995, at the Walt Disney School, to present EPA's proposed plan for the landfill capping phase of the site cleanup and to receive formal public comment.

- An availability session was held on September 13, 1995 at the Walt Disney School to assist homeowners in the completion of the paperwork necessary to receive hookup to the city waterline extension.

- A fact sheet was mailed to the public in November 1995 that summarized EPA's recommended alternative for the groundwater portion of the cleanup in a proposed plan for the Site. The EPA approved feasibility study for the groundwater portion of the cleanup was also released at that time. This fact sheet announced a public comment period for the proposed remedial action and was accompanied by newspaper advertisements in local newspapers.

- A request for an extension to the public comment period was received during the public comment period. The comment period was extended for an additional thirty days to January 25, 1996, making the comment period a total of sixty days.

A Responsiveness Summary addressing comments and questions received during the public comment period on the RI/FS and the proposed plan is included with this Record of Decision as Appendix A.

This Record of Decision presents the selected remedial action for the groundwater phase of the cleanup at the Douglas Road Landfill Site in Mishawaka, Indiana, chosen in accordance with CERCLA, as amended by SARA, and the National Contingency Plan. The decision for this Record of Decision at the Site is based on the Administrative Record.

Scope and Role of the Selected Remedy

As with many Superfund sites, the problems at the Douglas Road Landfill Site are complex. An RI/FS was performed including activities to determine the nature and extent of contamination at the Site and evaluating the feasibility of various remedial alternatives to clean up the Site. The RI/FS determined that soil and waste materials at the site and groundwater in the site area had become contaminated because of past disposal activities at the Site.

This Record of Decision (ROD) addresses the second operable unit, contaminated groundwater, at the Site. This was determined to pose risks to human health and the environment due to inhalation and ingestion of area groundwater.

This is the final of three planned response actions at the Site. Previous actions at the Site include the selection of a multi layer landfill cap (operable unit 1) to remediate contaminated surface soils and waste materials at the Site and the installation of a city waterline extension to residential properties affected by site contamination (performed as a time critical emergency removal action). This final action will be designed to be consistent with any and all previous cleanup actions at 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. 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 surface soil sampling;
- performance of a geoprobe survey to aid in the optimal placement of groundwater monitoring wells, by collection and field screening of selected groundwater samples;
- installation and sampling of groundwater monitoring wells, both on and off-site;
- identification and sampling of existing residential wells in the site area;
- preparation of a site-wide human health and ecological risk assessment;
- contaminant fate and transport modeling and analysis;

Site Geology

The Site is underlain by unconsolidated glacial deposits ranging from 30 to 200 feet thick. The glacial deposits consist of sand and gravel outwash, interbedded with clayey tills formed by the Saginaw Lobe of the Wisconsinan glacial event. In the Site area, an intermediate deposit of clay till separates the sand and gravel outwash into upper and lower units. This clay unit has an irregularly sloping scoured surface, dipping northwest, with a bottom elevation ranging from 600 feet msl near the Michigan state line to 675 feet msl near Mishawaka, Indiana.

A basal clay till unit is also observed throughout the area, directly overlying the bedrock. Soils on the landfill surface consist of a well drained sandy loam material, intermixed with areas of gravel, fly ash, coal and sand.

Site Hydrogeology

Within the St. Joseph River Basin, the sand and gravel outwash deposits described above form the St. Joseph aquifer system. Recharge to the aquifer is generally from direct precipitation and losses from surface water bodies. The intermediate clay till deposit separates the aquifer system into upper and lower zones.

South Bend and Mishawaka, Indiana, are the primary users of groundwater in the county, with a combined average of 34 million gallons per day (mgd). Private water supplies rely exclusively on the aquifer, with an estimated use of 3.7 mgd. Other uses,

such as industrial and agricultural, total about 2 mgd.

Groundwater at the Site was detected between 15 and 20 feet below ground surface with the intermediate clay till separating the aquifer into upper and lower zones across much of the site. Groundwater use in the Site vicinity is private residential, with the exception of a nearby nursery, which uses groundwater for irrigation.

Soil Contamination

Surficial soil samples collected at the Site were found to be contaminated with volatile organics up to levels of 20,000 parts per billion (ppb), semi-volatiles up to levels of 160,000 ppb, PCBs up to levels of 16,000 ppb, dioxin up to levels of 1.3 ppb, pesticides up to levels of 68 ppb, and metals up to levels of 1920 ppb. Risks associated with exposure to these contaminants were addressed in the selection of a remedial alternative for landfill capping, which is outlined in a July, 1995 ROD, that calls for the installation of a multi-layer cap at the site.

Groundwater Contamination

Groundwater samples collected at various locations during the RI at the Site were found to be contaminated with volatile organics up to levels of 15,000 ppb, semi-volatile organics up to levels of 29 ppb, and metals up to levels of 15 ppb. Groundwater samples collected from residential wells were found to be contaminated with volatile organics up to levels of 110 ppb.

Summary of Human Health Risks

This Record of Decision is written for an operable unit action to address the contaminated groundwater at the Site. The RI report contains a Risk Assessment, prepared by CH2M Hill 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.

Risks associated with exposure to contaminated groundwater at the site are as high as 3.8×10^{-3}. The principal carcinogenic contributors to this risk are bis(2 ethyl hexyl) phthalate, arsenic, dibenzo(a,h) anthracene, vinyl chloride and indeno (1,2,3-c,d) pyrene. Risks associated with exposure to contaminated groundwater off-site are as high as 3.2×10^{-4}. The principal carcinogenic contributors to this risk are vinyl chloride, arsenic and TCE.

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

Toxicity Assessment

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

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g. the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g. to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

The following hazardous substances were found to be of principal concern at the site.

Arsenic Short term exposures to arsenic or arsenic compounds may cause effects in the gastrointestinal tract, heart, vascular system, blood, nervous system, eye, nose and skin. Arsenic compounds are reported to act as skin allergens in humans. Exposure to arsenic has also been reported to cause depression of the bone marrow and disturbances in the blood cell and tissue forming system and has been associated with kidney and liver

disorders. Arsenic has been found to be a lung carcinogen when inhaled and to cause skin cancer when ingested. Arsenic and its compounds may have potential reproductive and developmental effects in humans. Teratogenic effects have been demonstrated in animal species exposed to arsenic via oral administration or intraperitoneal injection. Damage to genetic material has been reported in humans.,

Vinyl Chloride Acute occupational exposure to hign concentrations of vinyl chloride can produce symptoms of narcosis in humans. Respiratory tract irritation, bronchitis, headache, and memory disturbances may also occur. At high doses, excitement, contractions, convulsions, and an increase in respiration followed by respiratory failure precede death. Vinyl chloride is a known human carcinogen causing liver angiosarcomas and possibly increasing incidence of tumors of the brain and lung.

Trichloroethylene (TCE) Exposure to TCE can cause depression of the central nervous system, including dizziness, headaches, uncoordination similar to that induced by alcohol, nausea, vomiting, and unconsciousness. Long term inhalation exposure can affect liver and kidneys in animals. In humans, changes in liver enzymes have been associated with TCE exposure. Exposure of mice (orally and by inhalation) have produced increases in liver or lung or kidney tumors.

Bis(2-ethyl hexyl) phthalate Exposure to bis(2-ethyl hexyl phthalate can cause retarded growth and there is evidence that teratogenic and fetotoxic effects on animals can occur under chronic conditions. Reproductive effects, decreased fertility and testicular damage have been noted in rodents. Classified by EPA as a B2 carcinogen.

Dibenzo(a,h) anthracene There is sufficient evidence that dibenzo(a,h) anthracene is carcinogenic to laboratory animals. In lab experiments, oral doses have caused tumors in mice, lung tumors in rats by intratracheal distillation and skin cancer following dermal application. Higher doses in lab animals have produced fetal deaths.

Indeno (1,2,3-c,d) pyrene PAHs are absorbed through the skin gastrointestinally. There is very limited information on human toxicity for PAH. No information is available concerning the possible teratogenicity of PAH in humans. From numerous epidemiological studies of humans (primarily occupational exposure), a clear association has been found between exposure to

PAH containing materials and increased cancer risk. Indeno (1,2,3-c,d) pyrene has been classified as a B2 carcinogen.

Risk Assessment

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g. 1×10^{-6} or 1E-6). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site related exposure to a carcinogen over a 70 year lifetime under the specific exposure conditions at site, in addition to the chances of developing cancer in everyday life.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Carcinogenic risks described in the risk assessment for exposure to contaminated groundwater at the Site were computed for several potential exposure scenarios, including residential child, residential adult, teenage trespasser, and occupational adult exposures. The combined pathways carcinogenic risk for all groundwater exposure at the site exceeds 1×10^{-6} for all receptor groups, ranging from 1.3×10^{-3} for residential children to 3.8×10^{-3} for residential adults. The principal carcinogenic risk contributors are bis(2 ethyl hexyl) phthalate, arsenic, dibenzo(a,h) anthracene, vinyl chloride, trichloroethylene, and indeno (1,2,3-c,d) pyrene (See Table 1).

The non-carcinogenic risks associated with future exposure to contaminated groundwater at the site 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 U.S. EPA policy requires remedial action. The assessment of future non-carcinogenic risks shows a combined ingestion, dermal, and inhalation hazard index ranging from 2.06 for occupational adults to 11.72 for residential children. The most significant non-carcinogenic risk contributor is manganese for all receptor

Media	Land Use	Receptor	Exposure Route	Cancer Risk	Hazard Index	Major Chemical Contributors to Risk	
						Carcinogenic Risk	Noncarcinogenic Risk
Groundwater - From Landfill	Residential	Child	Ingestion & Inhalation	3E-04	10.8	Dibenzo[a,h]anthracene	Manganese
			Dermal	1E-03	0.9	Indeno[1,2,3-cd]pyrene	Arsenic
			TOTAL	1E-03	11.7	Arsenic	bis(2-Ethylhexyl)phthalate
Groundwater - From Landfill	Residential	Adult	Ingestion & Inhalation	7E-04	4.6	bis(2-Ethylhexyl)phthalate	
			Dermal	3E-03	0.6	Vinyl chloride	
			TOTAL	4E-03	5.2		
Groundwater - From Landfill	Occupational	Adult	Ingestion & Inhalation	2E-04	1.7		
			Dermal	2E-03	0.4		
			TOTAL	2E-03	2.1		

Groundwater - Current Residential Wells	Residential	Child	Ingestion & Inhalation	2E-04	5.0	Vinyl chloride	Manganese
			Dermal	2E-06	0.4	Arsenic	Arsenic
			TOTAL	2E-04	5.4	Trichloroethene	Di-n-octylphthalate
							Trichloroethene
Groundwater - Current Residential Wells	Residential	Adult	Ingestion & Inhalation	3E-04	2.1		
			Dermal	5E-06	0.3		
			TOTAL	3E-04	2.4		

groups (See Table 1).

Summary of Environmental Risks

An ecological risk assessment determined whether the contaminants present at the site can pose a potential threat to ecological receptors in the absence of any remedial actions.

The results of this assessment, as summarized in the risk assessment portion of the RI, determined that, due to exposure to site contaminants, ecological damage from groundwater contamination is likely in the absence of any remedial actions.

Description of Alternatives

A Feasibility Study (FS) was completed for this Site to evaluate potential remedial actions for addressing the groundwater contamination problem. During the FS, a list of alternatives was developed that could be used to address the threats and/or potential threats identified for the groundwater at the Site. The list of alternatives was screened based on criteria for effectiveness (i.e. protection of human health and the environment, reliability), implementability (i.e. technical feasibility, compliance with applicable Federal and State regulations) and relative costs (i.e. capital and operation and maintenance).

Following this initial screening, the list of alternatives was further evaluated and only alternatives that met the nine criteria, listed below in the comparative analysis section, were submitted for detailed analysis. The Quickflow groundwater model was used to estimate extraction rates necessary to contain the contaminated groundwater plume.

All of the alternatives include groundwater monitoring, both at the site and downgradient of the site, which will be designed to monitor area groundwater to assess the effectiveness of the alternatives.

Alternative 1 No Action

Under this alternative, no active remediation would occur and the site would remain in its present condition. This alternative will not reduce any potential public health or environmental risks currently associated with the site. The inclusion of the no action alternative is required by law to give U.S. EPA a basis for comparison.

Present Worth Cost: $949,000
Time to Implement: 2-3 weeks

Alternative 2 Institutional Controls

Under this alternative, a restrictive covenant would be placed on the property deeds of the areas currently affected by the groundwater contamination problem that would prevent future groundwater use until the groundwater meets regulatory standards. This will be determined by periodic groundwater monitoring. The restrictive covenants would be in effect for more than 30 years, perhaps even permanently. Groundwater contamination would be allowed to attenuate naturally.

Present Worth Cost: $1,552,000
Time to Implement: 2-3 months

Alternative 3 Oxygen Enhancement with Air Sparging for Onsite Plume

Under this alternative, air would be injected below the water table using a series of sparging wells or horizontal perforated pipes to increase groundwater oxygen concentrations to promote contaminant degradation and immobilization. Air sparging would not be used for the off-site plume because the depth of contamination is too deep for this technology to work effectively with appropriate control over the organics sparged from the groundwater. Remediation of the off-site plume will need to be accomplished by one of the other remaining alternatives.

Present Worth Cost: $4,200,000
Time to Construct: 2 months

Alternative 4 Groundwater Extraction and Discharge to Mishawaka POTW

Under this alternative, groundwater would be extracted via extraction wells or collection drains and sent directly to the Mishawaka Publicly Owned Treatment Works (POTW) for treatment. No pretreatment of the groundwater prior to discharge to the POTW is anticipated due to the low contaminant concentrations in samples collected during the RI.

Present Worth Cost: $13,300,000
Time to Construct: 3 months

Alternative 5 Groundwater Extraction, Air Stripping Treatment and Discharge to Juday Creek

Under this alternative, groundwater would be extracted via extraction wells or collection drains from both the on-site and off-site contaminated groundwater plume. Extracted groundwater would be treated via air stripping. Treated groundwater would meet NPDES substantive and administrative requirements and be discharged to Juday Creek. Air monitoring of the air stripper emissions will be performed to protect public health and the environment.

Present Worth Cost:	$6,000,000
Time to Construct:	3-4 months

Alternative 6 Groundwater Extraction, Constructed Wetland Treatment and Discharge to Juday Creek

Under this alternative, groundwater would be extracted via extraction wells or collection drains from both the on-site and off-site plume. Extracted groundwater would be treated in a constructed wetland. Treated groundwater would meet NPDES substantive and administrative requirements and be discharged to Juday Creek. Air monitoring of the wetland emissions will be performed to protect public health and the environment.

Present Worth Cost:	$6,100,000
Time to Construct:	3-4 months

Alternative 7 Groundwater Extraction, Fluidized Carbon Bed Treatment, and Discharge to Juday Creek for On-Site Plume

Under this alternative, groundwater would be extracted via extraction wells or collection drains from the on-site plume. Extracted groundwater would be treated via fluidized carbon bed treatment, which use biological and physical treatment processes to treat the contaminants. Treated groundwater would meet NPDES substantive and administrative requirements and be discharged to Juday Creek. This alternative will not be used for the off-site plume because it is not as effective at treating some of the higher levels of organic contaminants detected in the off-site groundwater to the appropriate cleanup levels as the other alternatives. Remediation of the off-site plume will need to be accomplished by one of the remaining alternatives.

Present Worth Cost:	$4,900,000
Time to Construct:	2-3 months

Summary of the Comparative Analysis of Alternatives

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 through treatment; short-term effectiveness; implementability; cost; State acceptance; and community acceptance.

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.

Alternative 1 would not protect human health and the environment because it does not reduce risks associated with exposure to contaminated media at the site. Therefore, since it has been determined that Alternative 1 would not be protective of human health and the environment or meet ARARs, it will no longer be considered in the nine criteria evaluation.

All of the other alternatives would reduce the threats to human health and the environment to varying degrees. Alternatives 3, 4, 5, 6, and 7 are superior to Alternative 2 due to their ability to reduce the contaminant concentrations. Alternatives 4, 5, and 6 are superior to Alternatives 3 and 7 because of their ability to remediate the entire plume, rather than portions of the plume.

Therefore, Alternatives 4, 5 and 6 are functionally equivalent with respect to this threshold criterion and are superior to Alternatives 2, 3, and 7 due to increased protection from site contaminants and more complete remediation of the 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 remaining alternatives are capable of meeting their respective ARARs (See Table 2). Alternative 2 may meet Federal and State ARARs regarding groundwater quality after an extended

Table 3-2
Potential Federal ARARs for the DRL
Groundwater Operable Unit

Law, Regulation, or Standard	Description	Comment
Executive Orders 11988 and 11990 40 CFR 6, Subpart A	Requires federal agencies to avoid whenever possible, adversely affecting flood plains or wetlands and to evaluate potential effects of actions in these designated areas.	Applicable to Juday Creek and associated wetlands
Endangered Species Act 50 CFR 402	Requires remedial agency to consult with Fish and Wildlife Service if action may affect endangered species or critical habitat.	Applicable if Fish and Wildlife Service deems area a critical habitat. Juday Creek is not known to be a critical habitat.
Clean Air Act		
Section 101	Calls for development and implementation of regional air pollution control programs	Section 101 of the Clean Air Act delegates primary responsibility for regional air quality management to the states. The rules for implementation of regional air quality plans are contained in 40 CFR 52. Regulations promulgated under the Clean Air Act may apply to possible actions at the site that generate air emissions, but are most applicable to stationary sources such as air strippers.
Federal Water Pollution Control Act as amended by the Clean Water Act of 1977		
Section 208(b)	The proposed action must be consistent with regional water quality management plans as developed under Section 208 of Clean Water Act.	Substantive requirements adopted by the state pursuant to Section 208 of the Clean Water Act would be applicable to direct discharge of treatment system effluent or other discharges to surface water.
Section 304	Establishes water quality criteria for specific pollutants for the protection of human health and for the protection of aquatic life. These federal water quality criteria are non-enforceable guidelines used by the state to set water quality standards for surface water.	Water quality criteria may be relevant and appropriate to groundwater or treatment system effluent or other discharges to surface water.

Table 2

Table 3-2
Potential Federal ARARs for the DRL
Groundwater Operable Unit

Law, Regulation, or Standard	Description	Comment
U.S. EPA Regulations on Approval and Promulgation of Implementation Plans		
40 CFR 52	Requires the filing of a notice with the state regarding intent to install a new stationary source of air pollution.	40 CFR 52 concerns the installation of stationary sources of air emissions, including air strippers. Provisions enforceable by the state follow the federal Prevention of Significant Deterioration (PSD) program with modifications to conform with regional and local ambient air quality standards. A CERCLA response action is not required to obtain permits under the PSD program, but must comply with the substantive requirements of a PSD review.
Clean Air Act 40 CFR 50 and 52	Implements and sets rules for a regional air pollution control program. Establishes Ambient Air Quality Standards.	Applicable to discharges of toxic substances to the atmosphere during waste handling or treatment.
U. S. EPA National Pollutant Discharge Elimination System (NPDES) Permit Regulations		
40 CFR 122.44	Federally approved state water quality standards. These may be in addition to or more stringent than federal water quality standards under the CWA.	All substantive requirements under the cited sections of 40 CFR 122 would be applicable to the direct discharge of effluent to an onsite or offsite surface water body. Administrative requirements, such as permitting and reporting procedures, would be applicable only for effluent discharged to an offsite location (such as a discharge into a stream flowing offsite). Therefore, at the DRL site these requirements would be applicable to proposed discharges to Juday Creek.

Table 3-2 (cont.)

Table 3-2 Potential Federal ARARs for the DRL Groundwater Operable Unit		
Law, Regulation, or Standard	**Description**	**Comment**
40 CFR 122.44(a)	Requires the use of the Best Available Technology (BAT) for toxic and nonconventional wastewaters or the Best Conventional Technology (BCT) for conventional pollutants. The nature of the wastewater and the technology-based limitations will be determined by the state on a case-by-case basis.	
40 CFR 122.44(e)	Discharge limits must be established for toxics to be discharged at concentrations exceeding levels achievable by the technology-based (BAT/BCT) standards. The limitations would be evaluated on a case-by-case basis depending on the proposed treatment system and the receiving water.	
40 CFR 122.41(i)	Requires monitoring of discharges to ensure compliance. Monitoring programs shall include data on the mass, volume, and frequency of all discharge events.	Administrative requirement applicable only for discharges to offsite surface water (Juday Creek).
40 CFR 122.21	Permit application must include a detailed description of the proposed action, including a listing of all required environmental permits.	Administrative requirement applicable only for discharges to offsite surface water (Juday Creek).
U.S. EPA Regulations on Criteria for the NPDES		
40 CFR 125.100	The site operator shall develop a best management practice (BMP) program and shall incorporate it into the operations plan or the NPDES permit application if required.	Substantive requirements of 40 CFR 125 would be applicable to the direct discharge to treatment system effluent to an onsite or offsite surface water body. The permitting requirements would be applicable only if the effluent is discharge to Juday Creek.

Table 2 (cont)

Table 3-2
Potential Federal ARARs for the DRL
Groundwater Operable Unit

Law, Regulation, or Standard	Description	Comment
U.S. EPA Procedures for Approving State Water Quality Standards		
40 CFR 131	States are granted enforcement jurisdiction over direct discharges and may adopt reasonable standards to protect or enhance the uses and qualities of surface water bodies in the state.	Applicable to direct discharge of treatment system effluent or other process waters. Such a discharge into Juday Creek would activate the administrative requirements of this rule because it would affect offsite surface waters.
U.S. EPA Regulations on Test Procedures for the Analysis of [Water] Pollutants		
40 CFR 136.1-136.4	These sections require adherence to sample preservation procedures including container materials and sample holding times.	Applicable to direct discharge of treatment system effluent.
Safe Water Drinking Act		
40 CFR 141	Establishes maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) for specific chemicals to protect drinking water quality.	MCLs and nonzero MCLGs may be applicable or relevant and appropriate as groundwater contaminant concentration goals depending on whether the water in question is to be used for drinking water supply. MCLs are applicable if the water is or will be used for drinking. MCLs are relevant and appropriate if the water could be used for drinking. MCLGs set above zero levels are relevant and appropriate for current or potential sources of drinking water.
Resource Conservation and Recovery Act (RCRA)		
Subtitle D, 40 CFR 257	Sets standards for land disposal facilities for nonhazardous waste.	Applicable to groundwater treatment residuals and to transport and disposal of any nonhazardous waste offsite.

9/12 2 (cont.

Table 3-2 Potential Federal ARARs for the DRL Groundwater Operable Unit		
Law, Regulation, or Standard	**Description**	**Comment**
Subtitle C, 40 CFR 260 through 264	Regulates the generation, transport, storage, treatment, and disposal of hazardous wastes generated in the course of a remedial action. Regulates the construction, design, monitoring, operation, and closure of hazardous waste facilities.	Requirements under these regulations may be relevant and appropriate to storage of certain non-hazardous wastes or treatment system residuals if the risk they present are similar to those associated with hazardous wastes. The criteria and limitations used to identify wastes as being hazardous or nonhazardous are applicable to groundwater treatment residuals.
40 CFR 262 and 263, 49 CFR 100 through 199	Establishes responsibilities for transporters of hazardous waste in handling, transportation, and management of the waste. Sets requirements for manifesting, recordkeeping, and emergency response action in case of a spill.	Applicability depends on waste classification of groundwater treatment residuals.
U.S. EPA Pretreatment Standards		
40 CFR 403	Establishes pretreatment standards for controlling pollutants discharged to a publicly-owned treatment works (POTW).	Applicable to groundwater or treatment system effluent that is conveyed to a local POTW.

Table 2 (cont)

period of time. Alternative 3 may meet Federal and State ARARs regarding groundwater quality for the on-site plume only. Alternative 7 would meet Federal and State ARARs for the on-site plume and would meet NPDES requirements. Alternatives 4, 5, and 6 would comply with all Federal and State ARARs for groundwater quality.

Therefore, Alternatives 4, 5, and 6 are functionally equivalent with respect to this threshold criterion and are superior to Alternatives 2, 3, and 7, due to their addressing the entire contamination plume.

PRIMARY 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.

Alternative 2 has the greatest long term risk for exposure to contaminated groundwater for those residences not hooked up to the water line extension. Alternatives 3 and 7 do not provide for complete remediation of the groundwater plume, therefore, their effectiveness in the long term is low. Alternatives 4, 5, and 6 provide similar levels of permanence with respect to groundwater containment. However, Alternatives 4 and 6 provide for greater removal of the organic contamination present (are more effective at treating the high levels of tetrahydrofuran and methyl ethyl ketone, several major components of the plume) in the groundwater plume than Alternative 5.

Therefore, Alternatives 4 and 6 are functionally equivalent with respect to this balancing criterion, are slightly more effective in the long term than Alternative 5, and are superior to Alternatives 2, 3, and 7.

All of the alternatives require long term operation and maintenance to ensure complete groundwater containment and to maximize the contaminant treatment efficiency.

Reduction of Toxicity, Mobility or Volume (TMV) through Treatment

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

All of the treatment alternatives will reduce the toxicity of groundwater contamination to varying degrees. Alternative 2 will

not reduce TMV through treatment. Alternatives 3 and 7 will not treat the entire groundwater plume therefore, they do not fully satisfy this criterion.

Alternatives 4, 5 and 6 will reduce TMV through treatment. Alternatives 4 and 6 will more completely remove the organic contamination than Alternative 5, as described previously.

Therefore, Alternatives 4 and 6 have been determined to be functionally equivalent with respect to this balancing criterion are slightly better than Alternative 5, and are superior to Alternatives 2, 3, and 7.

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.

All of the remaining alternatives include site fencing to restrict site access to effectively prevent or reduce risks to potential trespassers. None of the alternatives create significant risks to the community while they are constructed.

Alternative 2 prevents exposure to contaminated groundwater and is primarily an administrative action. No environmental impacts from construction activity are expected for Alternatives 3 and 4. No significant additional risk to the community is anticipated from Alternative 5's air stripper emissions due to low contaminant concentrations in air stripper emissions. No environmental impacts are expected from construction activities or the discharge of treated groundwater to Juday Creek. Alternative 6 would result in the creation of a valuable wetland habitat for wildlife.

Alternative 6 would also result in less of an impact to the local community through its construction and operation, resulting in less noise and greater aesthetic impacts on the surrounding areas than the other alternatives. Also, the construction of this alternative, when combined with the multi-layer landfill cap already proposed for the site, will result in much lower amounts of truck traffic along Douglas Road, which will again benefit the local community and lower the impacts of its construction on the surrounding area.

Therefore, it has been determined that all of the alternatives are functionally equivalent with respect to this balancing

criterion, however, Alternative 6 is slightly better because of the tangible environmental and community benefits resulting from the creation of a wetland.

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 2 may be difficult to implement because of individual negotiations with landowners and unfavorable public opinion regarding deed restrictions. Alternative 4 requires a permit from the Mishawaka POTW, which may involve delays in obtaining the necessary approvals. Alternatives 5-7 require discharge authorization from IDEM in order to meet the substantive requirements of a NPDES permit. Potential delays may occur in obtaining the necessary approvals. Alternative 6 will also require the acquisition of land to construct the wetland, which may involve delays due to negotiations with landowners. Services and materials are available for all alternatives. Alternatives 3 and 7 would need to be combined with another action to completely address the contaminated groundwater plume.

Therefore, it has been determined that Alternatives 2, 4, 5, and 6 are functionally equivalent with respect to this balancing criterion and are superior to Alternatives 3 and 7.

Cost

Included are capital costs, annual operation and maintenance costs

The FS presented net present worth cost estimates for each of the seven alternatives brought forward for detailed analysis. These estimates were derived from literature, vendor quotations, actual costs from similar projects, and standard cost information sources. Cost estimates are provided primarily for the purpose of conducting a comparative assessment between remedial options, in order to assess the economic feasibility of the different alternatives.

Where limited or insufficient information was available regarding site-specific hydrogeological characteristics or contaminant

specific treatability efficiencies, assumptions were made based on literature and professional judgment where necessary to develop costs associated with different processes. The cost estimates provided in the FS are expected to provide an accuracy of +50/-30 percent (See Table 3).

Therefore, based on an analysis of the costs associated with all of the alternatives analyzed in the FS, Alternative 2 is the least expensive of all of the alternatives and Alternative 4 is the most expensive. Alternatives 3, 4, 5, 6, and 7 have costs which are moderate and range from approximately four to six million dollars.

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 opportunity to comment on all technical decisions, and concurs with the selection of Alternative 6 as the selected remedy for 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 increased significantly as the extent of the contamination problem in area residential wells was identified. U.S. EPA has been accessible and responsive to community concerns throughout the study. This has been accomplished by a community relations program consisting of periodic fact sheets highlighting site progress and availability sessions with the community to communicate site information and to answer questions regarding site progress.

At the public meeting and subsequent meetings, the majority of those in attendance, as well as the majority of those who submitted formal written comments regarding the proposed plan, did not support the proposed Alternative 6 as the most appropriate choice for this action. However, the main objections to this selection were for the proposed Juday Creek discharge,

Table 3

Table 6-2 Relative Cost				
Alternative		Capital Cost	Annual Operation and Maintenance	Total Present Worth (@ 4% discount rate over 30 years maximum)
1		$117,000	$49,000	$949,000
2		$720,000	$49,000	$1,552,000
3A	Onsite	$1,211,000	$150,000	$3,849,000
3B	Onsite	$1,954,000	$150,000	$4,591,000
4A	Onsite	$818,000	$325,000	$6,600,000
	Offsite	$1,248,000	$325,000	$7,030,000
4B	Onsite	$1,811,000	$308,000	$6,233,000
	Offsite	$2,311,000	$353,000	$6,834,000
5A	Onsite	$1,045,000	$79,000	$2,494,000
	Offsite	$895,000	$86,000	$2,294,000
5B	Onsite	$2,034,000	$115,000	$3,530,000
	Offsite	$2,134,000	$115,000	$3,630,000
6A	Onsite	$1,113,000	$86,000	$2,200,000
	Offsite	$1,513,000	$86,000	$2,695,000
6B	Onsite	$2,303,000	$81,000	$3,654,000
	Offsite	$2,503,000	$81,000	$3,854,000
7A	Onsite	$2,028,000	$153,000	$4,600,200
7B	Onsite	$2,721,000	$140,000	$5,237,000

Alternative 3 Option A: Air Sparging Wells
Alternative 3 Option B: Air Sparging Perforated Pipe
Alternatives 4-7 Option A: Extraction Wells
Alternatives 4-7 Option B: Collection Trenches

not for the proposed constructed wetlands treatment component. U.S. EPA has made several modifications to the proposed remedy in response to these comments, as outlined in the Section of this ROD entitled Explanation of Significant Differences. Specific comments on the proposed cleanup plan are addressed in Appendix A, the Responsiveness Summary.

Comparative Analysis of the Alternatives

In summation, Alternative 1 is unacceptable for protection of human health and the environment. Alternative 2 does not completely satisfy the criterion of protection of human health and the environment because it does not remediate the groundwater plume, nor does it prevent its migration from the site. Alternatives 3 and 7 are not fully protective of human health and the environment because they do not remediate the entire groundwater plume and would have to be combined with another alternative to completely address the groundwater contamination problem.

Alternatives 4, 5 and 6 fully satisfy the nine evaluation criterion. Alternatives 4 and 6 are slightly more effective in the long term and at reducing the toxicity, mobility and volume of contaminants through treatment than Alternative 5 because they remove more of the organic contamination present (principally tetrahydrofuran-due to the high levels detected at the site, and methyl ethyl ketone) in the groundwater plume. Alternatives 4, 5 and 6 are similar at protecting the community and on-site workers during the remedy construction, however, because Alternative 6 provides the tangible environmental benefit of construction of a wetland habitat, those environmental benefits make Alternative 6 slightly better with respect to short term effectiveness. Alternatives 4, 5 and 6 are equivalent with respect to implementability. Finally, Alternative 6, while providing similar levels of effectiveness, is more cost effective than Alternative 4.

Therefore, the best balance among the seven alternatives, while providing for protection of human health and the environment and attainment of Federal and State requirements and long term effectiveness and permanence, is Alternative 6, Groundwater Extraction, Constructed Wetland Treatment, and Discharge to Juday Creek.

Selected Remedy

U.S. EPA has selected Alternative 6 - Groundwater Extraction, Constructed Wetlands Treatment, and Discharge to Juday Creek, as

the appropriate groundwater cleanup remedy at the Douglas Road Site. This alternative was selected because it is the most appropriate alternative for this final action and is compatible with the operable unit remedy selected for the landfill cap, because the soil excavated for the wetland construction can be used for cover material for the landfill cap, saving the expense and disturbance to the community from bringing the material to the site from an off-site location, and the time required to import this material to the Site.

The objective of this final action is to remediate contaminated groundwater, both on-site and off-site. The FS contains a detailed description of Alternative 6. The components of this alternative include site preparation, institutional controls, groundwater monitoring, groundwater extraction, construction of an artificial wetland for groundwater treatment, re-infiltration of the majority of the extracted groundwater, and discharge of a small portion of the treated groundwater to Juday Creek.

Constructed wetlands are a proven technology for polishing of municipal wastewater effluent and for adsorption of trace metals from mining operations. However, minimal data exists regarding the effectiveness of constructed wetlands at removing trace organics. Although there is minimal data regarding trace organics removal, removal mechanisms are thought to be similar to the mechanisms that make constructed wetlands effective at polishing municipal wastewater effluent and water contaminated during mining operations. A constructed wetland would provide an environment in which organics and inorganics are adsorbed by, and the organics oxidized by microorganisms attached to plant roots and stems, and soil deposits. This process will be designed to achieve similar results at the Site. The wetlands would be constructed to operate with a free water surface at depths of 2 feet in the emergent marsh zones and 4 to 6 feet in the open water zones (See Figures 2 and 3).

The constructed wetland would consist of a 1/4 inch bentonite liner, modified to include the provision for re-infiltration of extracted groundwater, 1 foot of soil to support plant roots, influent distribution piping, and effluent piping. Plants such as cattails would be seeded to expedite plant development (See Figures 2 and 3).

Discharge to Juday Creek would comply with NPDES substantive and administrative requirements. Indiana water quality criteria would dictate discharge limits for the Site. The treated groundwater is expected to meet Indiana effluent discharge water quality criteria. IDEM has established effluent limits for the discharge of treated water to Juday Creek for this Site (See

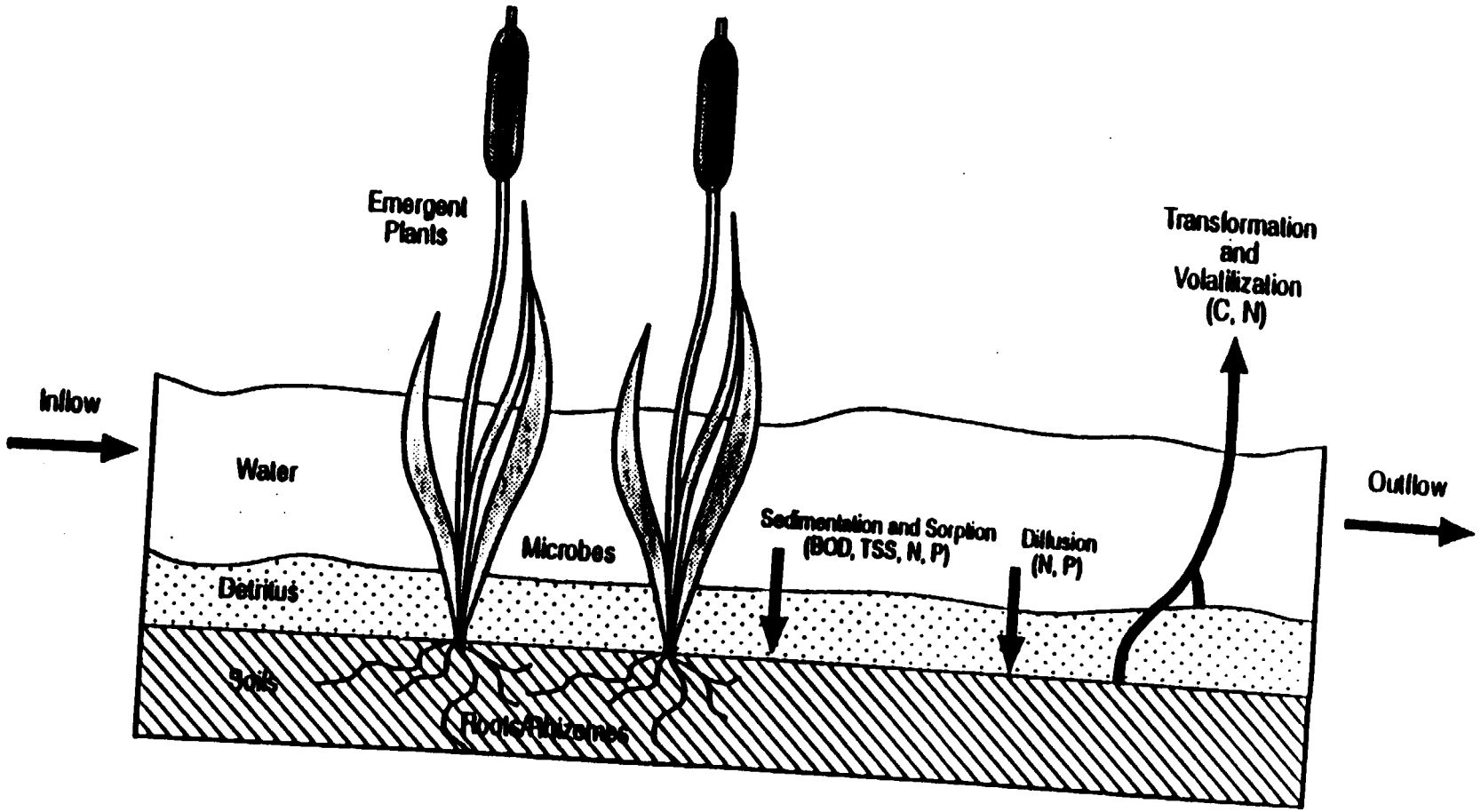

Figure 2

Wetland Treatment Processes

Figure 2

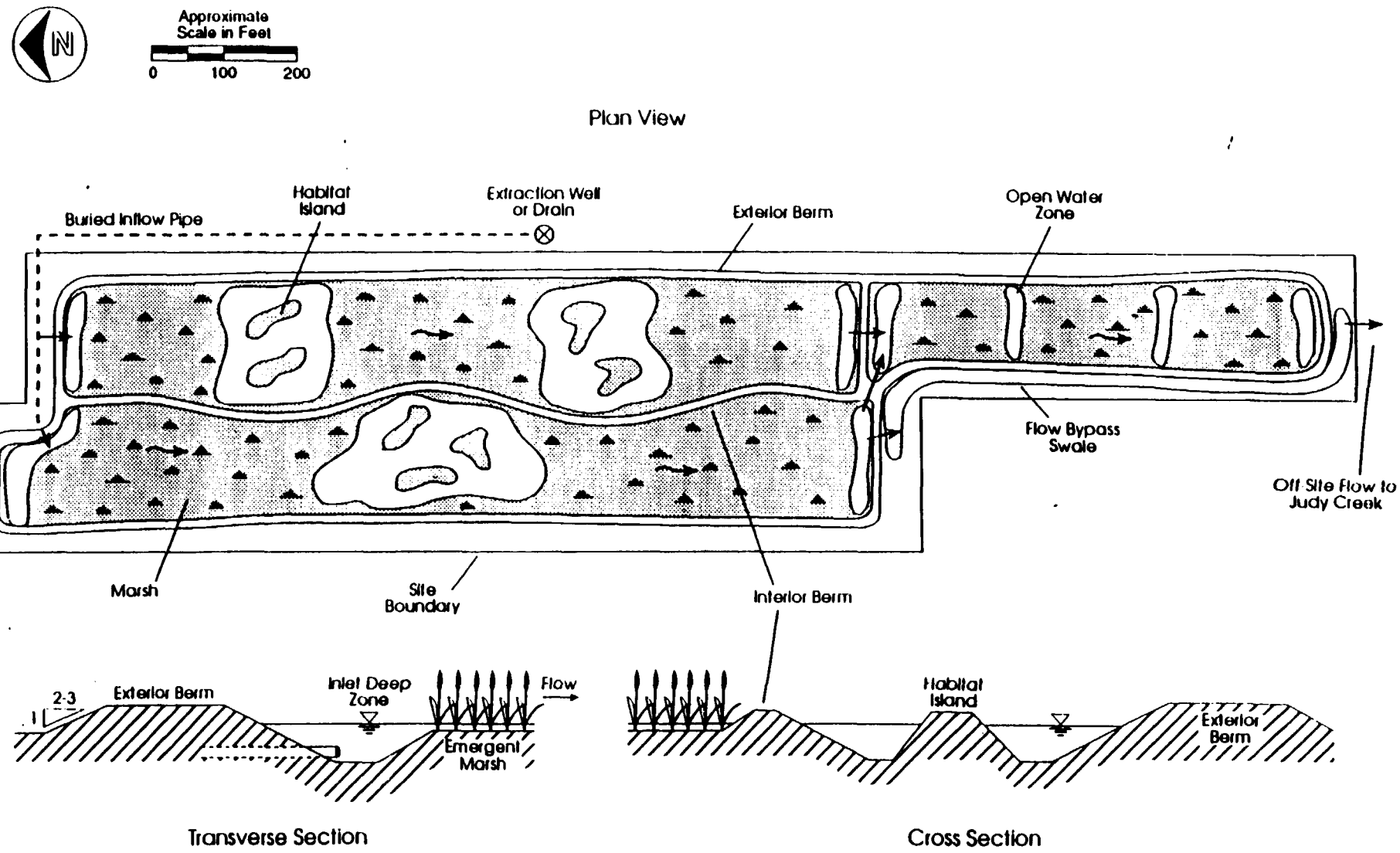

Figure 3. Douglas Road Landfill Constructed Treatment Wetland Conceptual Plan.

Table 4

Table 5-1 Effluent Discharge Criteria				
Parameter	Onsite Influent Conc. (µg/L)	Offsite Influent Conc. (µg/L)	Combined Influent Conc. (µg/L)	Effluent Discharge Criteria (µg/L)
CA	15.8	ND	7.9	NA
Acetone	35.9	ND	17.95	109
Isophorone	0.2	ND	0.1	50
THF	2,351.20	ND	1,175.6	25
Benzene	10.2	ND	5.1	5
4 Methyl-2-pentanone	40.6	ND	20.3	15
Toluene	93.8	ND	46.9	50
Chlorobenzene	2.8	ND	1.4	50
Ethylbenzene	20.3	ND	10.15	700
Xylenes	31.3	ND	15.65	10
1,1 DCA	0.03	ND	0.015	90
1,2 DCA	2.5	ND	1.25	5
4-Methylphenol	2.8	ND	1.4	296
BEP	5.2	ND	2.6	343.8
1,3-DCB	1	ND	0.5	NA
2-Methylphenol	0.8	ND	0.4	420
Iron	7,062.7	10.7	3,536.7	1,000
Arsenic	12.7	1.4	7.05	BG (1-5)
di-n-butlyphthalate	0.8	ND	0.4	12.7
VC	ND	3.6	1.8	2
TCE	ND	8.7	4.35	5
c-1,2 DCE	ND	0.2	0.1	70
Manganese	ND	13.3	6.65	NA
Total flow = 832 gpm (wells option) or 560 gpm (drains option) BG = Background concentration				

Table 4). Monthly monitoring of the effluent from the wetland will be performed to ensure compliance with the NPDES substantive and administrative requirements developed for the Douglas Road Site.

Arsenic removal before discharge to Juday Creek may be necessary for the on-site plume based on the RI data. However, the landfill cap proposed for the Site is expected to reduce the quantity of arsenic leaching into the groundwater. The arsenic concentration in the extracted groundwater will be monitored for a 6 month period to determine if arsenic control measures are required. If they are required, then this remedy will be modified to include these measures.

Groundwater monitoring would be conducted as a part of this alternative. This monitoring shall consist of semi-annual monitoring of existing monitoring wells, new monitoring wells to be installed, and selected residential wells. Semi-annual monitoring would be conducted for the first two years after which the wells would be sampled annually until preliminary remediation goals (PRGs) are met, unless site conditions indicate that a more frequent sampling program is necessary. This will be determined during the remedial design process, as data is collected to support the wetlands design.

Long term operation and maintenance of the extraction system would consist of monthly inspections and routine maintenance of the system, including routine pump maintenance. Long term operation and maintenance of the constructed wetland would consist of monthly inspections and annual fertilizer applications. It would also consist of daily to weekly checking of water depths and conveyance structures. Replacement of wetland materials is not anticipated to be necessary but would be performed, if determined to be necessary. Occasional burning of growth would control plant/peat accumulation.

In addition, the long term operation and maintenance plan would outline procedures for monitoring these issues as well as issues such as insect control and the need for dredging of the wetland to maintain the proper water depths and provisions for disposal of the dredged sediments.

During remedial design of the constructed wetland, the need for biological monitoring will be assessed. If biological monitoring of the wetland discharge to Juday Creek is determined to be necessary, plans for this monitoring will be developed as a part of the design of the wetland.

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

The Proposed Plan for this final action was released for public comment on November 27, 1995. At the public meeting and in written comments on the proposed remedy, numerous commentors objected to the quantity of water to be discharged into Juday Creek as a result of implementation of this alternative. The FS estimated that approximately 830 gallons per minute of treated groundwater would be discharged to Juday Creek under the proposed alternative. This amount of discharged water was a concern to area residents. The main reasons for the concern expressed to U.S. EPA was that the volume of discharged water would adversely impact the ecological balance in the Creek.

It was communicated to U.S. EPA that area residents are attempting to re-establish trout population in the Creek and that existing surface drainage was adversely impacting this effort by increasing bank erosion, sediment load, and water temperature in the Creek. The concern was that the discharged water would amplify these adverse impacts because of the greatly increased volume of water in the Creek.

U.S. EPA understands these concerns and will modify the proposed remedy to address these concerns, as was communicated to the public at the proposed plan meeting. U.S. EPA will modify the treated groundwater discharge component of Alternative 6. Instead of discharging all of the treated groundwater to Juday Creek, U.S. EPA will design the wetland so that the majority of the treated water will be allowed to reinfiltrate into the aquifer rather that being discharged to Juday Creek. The contaminated groundwater will still be contained at the Site so that migration away from the Site is eliminated. It is estimated that approximately 90% of the water can be dealt with in this manner with the rest being discharged to Juday Creek. This will significantly reduce the amount of discharged water so that the aforementioned detrimental impacts on the Creek can be avoided. The conveyance structures for the discharge to Juday Creek will be designed so as to minimize or eliminate any adverse impacts to the Creek associated with the greatly reduced discharge.

A pump test will be performed as a part of remedial design so that the amount of water actually required to be discharged can be determined.

If it is determined during the remedial design of the constructed

wetland that the amount of discharge to Juday Creek is significantly higher than currently anticipated, U.S. EPA will reassess discharge options for the treated groundwater. This reassessment process will include all options evaluated during this remedy selection process.

Statutory Determinations

In accordance with the statutory requirements of Section 121 of CERCLA, as amended, remedial actions taken pursuant to Sections 104 and 106 must satisfy the following:

1. Be protective of human health and the environment.

2. Comply with all ARARs established under federal and state environmental laws (or justify a waiver).

3. Be cost effective.

4. Utilize permanent solutions and alternative technologies or recovery technologies to the maximum extent practicable.

5. Satisfy the statutory preference for remedies that utilize treatment and also significantly reduce the toxicity, mobility and volume of the hazardous substances, pollutants, or contaminants.

In addition, CERCLA § 121(c) requires five year reviews to determine if adequate protection of human health and the environment is being maintained where remedial actions result in hazardous substances remaining on-site above health-based levels. The selected remedy for the Douglas Road Landfill Site achieves these requirements as discussed in detail below.

A. Protection of Human Health and the Environment

The selected remedy will eliminate risks posed by the contamination of the groundwater through the collection and treatment system and the removal action that placed local residents on municipal water supply for home water needs. Baseline cancer risks from the site exceed the 10(-4) to 10(-6) acceptable risk range established by EPA in the NCP. Deed restrictions will ensure that future land use of the source area will not impose an unacceptable risk. Non-carcinogenic risks will be reduced to levels less than the EPA standard of 1.0, through institutional and source control measures.

Short-term risks from the groundwater treatment system are minimal and relate to construction site risks that will be

addressed in the Site Health and Safety Plan.

B. **Compliance with ARARs**

The selected response action for the groundwater involves the long term treatment of the groundwater in a wetland with reinfiltration of the majority of the treated water at the Site. It also involves a small amount of surface water discharge. Surface water discharge from the Site will meet chemical specific effluent discharge criteria developed for the Site by the State of Indiana. These effluent discharge criteria were developed to be protective of Juday Creek (See Table 4).

The Agency has not identified any location specific ARARs for this final action at the Site.

Action Specific ARARs will be met for the Site. The list of Action Specific ARARs which apply to this Site are listed in Table 2.

C. **Cost Effectiveness**

The selected remedy is cost effective. It is protective of human health and the environment, attains ARARs and provides long-term protectiveness. The long-term effectiveness is achieved by the treatment of the contaminated groundwater. The selected remedy is less expensive than Alternative 4, while achieving comparable results. The selected remedy is the same cost as Alternative 5, achieves a slightly better result, and creates a beneficial wetland. The selected remedy is somewhat more costly than Alternatives 3 and 7, but the selected remedy achieves better results, treats the entire contaminated groundwater plume rather than a portion of it, and creates a beneficial wetland. The selected alternative is more expensive than Alternatives 1 and 2, but achieves substantially superior results in terms of speed of cleanup and reaching cleanup objectives. The selected remedy minimizes the long-term operation and maintenance costs that will be borne by the State.

D. **Utilization of Permanent Solutions, and Alternative Treatment Technologies to the Maximum Extent Practicable**

The selected remedy was determined to be the most appropriate solution to remediate the contamination at the Site. Groundwater collection and treatment will eliminate risks posed to the public within 20 to 60 years, eliminate toxicity, mobility and volume of the contamination in the groundwater and will maximize protection of human health and

the environment. The time frame of 20 to 60 years to treat the groundwater is based on the estimated time to collect the contamination in the current groundwater plume.

The selected remedy uses an alternative treatment method by treating the collected contamination in a created wetland. This treatment approach not only effectively treats the contaminants, but adds an important habitat to the Juday Creek ecosystem. While this treatment approach is a unique alternative, implementation should not pose any substantive difficulties.

E. Preference for Treatment as a Principle Element

The selected remedy uses treatment as a principal element to remediate risks posed by the groundwater contamination. The groundwater will be collected using wells or collection drains into the aquifer and a pumping system will transport it to the wetland where it will be treated. Following treatment, the water will be returned to the ecosystem through direct infiltration, with a portion being discharged into Juday Creek.

APPENDIX A

Douglas Road Landfill
Mishawaka, Indiana

Responsiveness Summary

I. Responsiveness Summary Overview

In accordance with CERCLA Section 117, a public comment period was held from November 27, 1995 to January 25, 1995, to allow interested parties to comment on the United Stated Environmental Protection Agency's (U.S. EPA's) Feasibility Study (FS) and Proposed Plan for the Douglas Road Landfill Superfund site. At a December 5, 1995, public meeting, EPA and Indiana Department of Environmental Management (IDEM) officials presented the Proposed Plan for remediation at the Douglas Road site, answered questions and accepted comments from the public. Written comments were also received through the mail.

II. Background of Community Concern

The Douglas Road Landfill operated from 1954 to 1979 as a repository for Uniroyal plant wastes. From 1954 to 1971, solvents, fly ash, paper, wood stock, rubber and plastic scrap were disposed of at the landfill. Only fly ash was disposed of from 1971 through 1979.

The Site was nominated for inclusion of the NPL on June 10, 1986 and placed on the NPL on March 31, 1989. In September, 1989, the State of Indiana and Uniroyal signed a consent decree in which Uniroyal agreed to perform a Remedial Investigation/Feasibility Study (RI/FS) at the Site. Before completion of this work, Uniroyal filed for bankruptcy and discontinued work at the Site. Following the bankruptcy, it was determined that U.S. EPA would implement and finance an RI/FS which was begun in early 1994, using Superfund money.

During the RI, it was discovered that residential wells in the vicinity of Douglas Road and State Route 23 were contaminated with vinyl chloride and trichloroethylene (TCE), contaminants that had been identified as coming from the Site. These residents received the following temporary measures to provide protection until a permanent remedy could be implemented for the affected wells: for those with vinyl chloride contamination, residents received portable air strippers and for those with TCE contamination, residents received in-line filters.

Community involvement has increased as the extent of the off-site groundwater plume and the number of wells impacted by site

contamination has been determined. This has led to more people becoming aware of activities at the Site and attending the informational meetings.

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

In a Proposed Plan that was issued on November 26, 1995, U.S. EPA (EPA) proposed Alternative 6, Groundwater Extraction, Constructed Wetland Treatment, and Discharge to Juday Creek for the groundwater phase of the cleanup. This remedy was based on the information presented in the FS, prepared by CH2M Hill and reviewed and approved by EPA. During the public comment period, EPA received numerous comments regarding the proposal of Alternative 6, most of which objected to the Juday Creek portion of the proposal. The majority of the comments recommended that EPA either discharge to the Mishawaka POTW or to the St. Joseph River.

As a result of the public comments, EPA has modified the portion of Alternative 6 that involved discharge of waters treated by the wetland, as is outlined in the Record of Decision (ROD).

EPA will attempt to provide information relative to these modifications that the ROD contains, demonstrating that public concerns play a large role in Superfund remedy selection, as well as answering the concerns that the public has voiced regarding the components of this ROD.

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 comments concerning the overall effectiveness of the proposed remedy and its impacts on Juday Creek.

1. Comments were raised concerning the effectiveness of the constructed wetland at treating the contaminated groundwater.

U.S. EPA response 1: U.S. EPA understands the concerns regarding the effectiveness of the wetland to treat the contaminants in the groundwater. This remedial technology has been used with good results by wastewater treatment plants to effectively polish the water, or to remove contaminants. Additionally, the wetland can be designed so that retention time, or the amount of time spent in the wetland which is where the actual biological breakdown of the contaminants occurs, can be increased to a point where maximum contaminant treatment can occur.

2. Comments were raised concerning the construction of the wetland and the desire not to create a "bathtub" by lining the bottom of the wetland.

U.S. EPA response 2: U.S. EPA understands the intent of this comment as being the concern that a completely lined wetland would seem to have the potential to overflow during rain events, which could detrimentally impact the surrounding area. As is explained in the ROD, the design of the wetland will include a liner as a component, which will allow the water to remain in the wetland long enough to allow sufficient treatment. However, the wetland will also be designed to allow direct re-infiltration of water at one end. This will accomplish the objective of limiting the amount of treated water discharged to Juday Creek. Also, the wetland will be designed so that the height of the sidewalls will allow the wetland to store excess rainwater without overflowing.

3. Comments were raised supporting the selection of Alternative 6 as the most appropriate alternative for the groundwater treatment, provided Juday Creek was protected.

U.S. EPA response 3: U.S. EPA appreciates the positive comments regarding the selection of Alternative 6. U.S. EPA believes that this remedy is the most appropriate for this cleanup phase, and has made modifications so that Juday Creek is protected to the maximum extent possible. EPA will continue to involve the interested citizens in the design and construction of the wetland by meeting frequently with the groups trying to protect Juday Creek.

4. A commentor raised the concern that the wetland design not include standard design retention ponds that discharge warmer waters from the top of the pond. The commentor suggested a design that would discharge cooler waters from the bottom, which would not impact creek temperatures as drastically.

U.S. EPA response 4: U.S. EPA will factor this concern into the design of the wetland. It is U.S. EPA's intent to minimize the impacts of this remedy on Juday Creek.

5. A commentor stated that the proposed wetland should be placed on 25 acres of property located south of Douglas Road. The commentor stated that this was an appropriate location for the wetland.

U.S. EPA response 5: U.S. EPA appreciates the suggested wetland location. During the remedial design process, this location and others like it in the area, will be closely studied and the most appropriate location will be selected. U.S. EPA appreciates the commentor's information and any other information to assist U.S. EPA in selecting the most appropriate site.

6. Several commentors expressed concern that, during periods of heavy precipitation if discharge to Juday Creek was halted with some type of shutoff mechanism, that water would overwhelm the

containment structures, resulting in flooding of nearby areas.

U.S. EPA response 6: U.S. EPA understands this concern. There are several alternatives for dealing with this problem. The sidewalls for the wetlands currently being contemplated would easily be able to accommodate storm events. They will be at least several feet high. During storm events, the extraction rate could be slightly decreased so that the total amount of water in the wetland remains at a manageable level. Also, the design of the wetland will include sufficient size so that excess water from storms could easily be accommodated.

7. Several commentors raised the issue of whether a subsurface flow wetland would be more appropriate for this site than a surface flow wetland because they felt that it would be less weather dependent, thus allowing for better groundwater treatment.

U.S. EPA response 7: U.S. EPA understands the concerns raised by this comment. While the surface water in the wetland may freeze during longer periods of colder weather, the lower portions will not. The reason for this is that there will be continual water flow through the wetland, this will prevent freezing. Because the bottom of the wetland is where the majority of groundwater treatment occurs, freezing should not adversely impact groundwater treatment.

8. A commentor asked whether the design of the wetland could include extra aeration of the treated water before discharge.

U.S. EPA response 8: This concern will be investigated during remedial design and, if appropriate, incorporated into the design of the wetland.

9. A commentor asked for an additional monitoring location be added to the area near State Road 23 and McErlain Street to assist in off-site monitoring.

U.S. EPA response 9: This concern will be investigated during remedial design and, if appropriate, incorporated into the design of the wetland.

B. Summary of comments regarding discharge of treated groundwater to Juday Creek.

10. Comments were raised with concern that the discharged water would be contaminated.

U.S. EPA response 10: The water that is discharged from the wetland to Juday Creek is required to meet stringent NPDES discharge criteria developed and regulated by the Indiana Department of Environmental Management. These criteria are

listed in the FS. There will be procedures for monitoring the discharged water to ensure that these standards are met. If the discharge exceeds these standards, then U.S. EPA and IDEM will take the appropriate steps to correct the exceedance. These may include stopping the discharge until it can be assured that the criteria can be met. Other measures may also include increasing the amount of time that the water spends in the wetland, thus increasing the treatment efficiency.

11. Comments were raised regarding potential detrimental impacts on Juday Creek because of discharge from the wetland (large discharge volume, increased temperature, increased bank erosion, increased sedimentation).

U.S. EPA response 11: U.S. EPA understands these concerns and has modified the proposed remedy so that only a small percentage of the water would need to be discharged to Juday Creek. The design of the wetland, as was outlined at the proposed plan meeting, will include an area where water can be recharged directly to the aquifer. The water that is recharged would continue to be collected and retreated in the wetland, so the entire system would contain the contaminated groundwater at the site. The outfall on Juday Creek can be designed so that erosion problems from discharge can be avoided. This can be done with the installation of rip rap, or rocks and stones, to help to decrease the discharge velocity. The water being discharged into the Creek will be relatively sediment free, because groundwater typically contains limited sediment. The temperature of the discharged water will be similar to the Creek temperature, as both will be standing bodies of water.

12. Comments were raised concerning the potential discharge of the treated water directly to the St. Joseph River, instead of Juday Creek.

U.S. EPA response 12: U.S. EPA will look into this possibility during remedial design. The St. Joseph River is approximately 4 miles from the site. The cost of installing piping and pumping the water to the River would be approximately $1.5 to $2 million over the estimated $6 million currently estimated for the wetland. It appears that this option would significantly increase the cost of the remedy without a commensurate gain in remedy effectiveness.

13. Comments were raised that the discharged water should be sent to the Mishawaka POTW instead of Juday Creek, and that cost was no object when it came to cleaning up the site and protecting Juday Creek.

U.S. EPA response 13: Cost effectiveness is a statutory requirement for the remedy selection process. Costs for sending the water to the POTW were more than twice as expensive as any of

the Juday Creek discharge options. If two remedies provide similar levels of protection, then EPA is required to select the most cost effective one. Another consideration is whether the POTW treatment efficiency will be detrimentally impacted by this discharge. Historically, treated (or clean) water is not usually accepted for treatment at local POTWs because it would affect their ability to treat wastewater. The Mishawaka POTW has indicated this to EPA as well as to the Juday Creek Task Force at a recent meeting.

EPA has investigated the idea of sending the reduced amount of discharge to the POTW. Based on the estimated surcharge that Mishawaka is applying to the site discharge, it would cost over $1 million to send this water to the POTW. Also, the POTW does not have the current capacity to be able to accept this discharge without potentially violating portions of their operating permit.

14. Comments were raised concerning the potential on-site treatment of contaminated water, if the POTW option proved too costly.

U.S. EPA response 14: EPA investigated this possibility during the early stages of the FS. Because of the levels of contaminants present in Site groundwater and the size of the Site, it was determined that the zone of treatment wasn't large enough to treat the contaminants effectively. This would result in much greater treatment costs which would drive the overall remedy costs to a level where they would not be cost effective.

Please keep in mind that the construction of wetlands is a viable groundwater treatment technology that will remove the contaminants from the groundwater.

15. Comments were raised that asked whether the water could be completely contained in the on-site wetland with no discharge to Juday Creek.

U.S. EPA response 15: The system that the commentors are asking about is called a closed loop system and it is impossible to construct. If the only water that was entering the system was the extracted groundwater, then this would be possible. In a closed loop system, the only water being recirculated or treated would be the extracted groundwater. But, rainwater and other unpredictable sources of surface water runoff will add additional volume to the system. Consequently, the system would have to accommodate an unspecified amount of water.

An analogy would be two 5 gallon buckets of water, one full and one empty. If the contents of one bucket was poured into the other, you'd completely fill it. If you tried to pour 6 gallons into the empty five gallon bucket, it would overflow -you need to find another place for the extra 1 gallon.

This concept applies at the site. It is impossible to completely contain all water onsite without some requirements for discharge of the excess water.

16. A commentor raised the issue of several local groups that are currently voicing objection to the proposed Juday Creek discharge and that these local groups did not object to previous projects that used Juday Creek in a similar fashion.

U.S. EPA response 16: U.S. EPA cannot comment on previous decisions allegedly made by these groups. These local groups have made their concerns known regarding this project and U.S. EPA is responding to them in this responsiveness summary. U.S. EPA thanks the commentor for this information.

17. Several commentors asked if the discharge to Juday Creek could be stopped during periods of heavy rains so that creek flooding could possibly be circumvented.

U.S. EPA response 17: U.S. EPA understands the concerns raised by this comment. The design of the wetland can include provisions that will prevent discharge to the Creek if the water level in the Creek rises above a certain level. The design can also include provisions for lowering the extraction rate for short periods of time so that actual discharge needs are lessened temporarily. The design will contain options such as these to ensure that any impacts to the Creek are minimized.

18. A commentor raised the issue that during periods of heavy rains, rainwater will be allowed to "shoot through the wetland" and discharge directly into Juday Creek without any treatment by the wetland.

U.S. EPA response 18: The design of the constructed wetland is forthcoming. Any rainwater that falls into the wetland will be much cleaner than what is present in the wetland. This will serve to further dilute any contaminant concentrations present in the wetland, further increasing treatment efficiency. The wetland will be designed with sufficient space to accommodate temporary storm surges. Also, the accumulated rainwater will remain in the wetland long enough to allow the sediment to drop out, thus decreasing the impacts on the Creek. The retention time can also be increased, ensuring that the commentor's concerns are adequately addressed.

19. Several commentors stated that at the Amoco site in Granger, Indiana, the State had initially proposed a remedial option that included discharge to Juday Creek and after public input, had instead opted for on-site treatment of the site contaminants. These commentors stated that they wanted a similar remedy at Douglas Road.

U.S. EPA response 19: U.S. EPA has contacted Mr. Ken Gill, the IDEM Project Manager for the Amoco site, to discuss Amoco's remediation plan. These discussions indicated that the Amoco remedial plan is different from the one proposed for Douglas Road. Mr. Gill stated that retention ponds are currently being used for reinfiltration of treated groundwater. According to Mr. Gill, the location of these retention ponds is OUTSIDE of the contaminated plume. This is a situation which is different than at the Douglas Road site where treatment would be occurring inside the plume. At Douglas Road, the plan is to have treatment occur within the groundwater plume by extracting groundwater at the downgradient end of the plume-west of the site and reinjecting it at the upgradient end -east of the site. By doing this, some of the extracted water will not be able to be reinjected because of added volume to the system from rainwater.

At the Amoco site, treated groundwater is reinjected outside of the plume, as a result, containment of treated water is not a concern. However, during remedial design, U.S. EPA will investigate the possibility of reinjecting downgradient of the extraction wells so that the amount of excess water to be discharged may be minimized. One potential limiting factor is that the NPDES limits provided by IDEM may preclude this option for this site.

20. Several commentors raised concerns that the wetland treatment would not be completely effective at removing the contaminants present in the contaminated groundwater.

U.S. EPA response 20: U.S. EPA acknowledges these concerns. Please be assured that the quality of the discharged groundwater, before it is discharged, will consistently meet the NPDES discharge limits set by the State of Indiana. The means for accomplishing this lies in the retention time for treatment in the wetland. The retention time for treatment can be increased so that contaminant levels are further reduced to meet NPDES levels.

21. Several commentors asked for biological monitoring in addition to the NPDES monitoring in order to assess the impacts of this discharge on aquatic life in the Creek.

U.S. EPA response 21: U.S. EPA will investigate this issue during remedial design. If discharging to Juday Creek remains necessary, biological monitoring both up and downstream of the discharge point can be done.

22. A commentor raised concerns regarding PCBs and dioxin and their detrimental impact as a discharge to Juday Creek. The commentor also asked for monitoring for these compounds to ensure that these contaminants are not being discharged into Juday Creek.

U.S. EPA response 22: U.S. EPA understands these concerns and will investigate this issue during remedial design. It will be determined during remedial design if long term monitoring is appropriate for these chemicals.

23. A commentor asked that the accumulated sediment in the wetland be sampled for PCBs and dioxin, as these were present in the landfill surface soils. The commentor was concerned that these contaminants might adversely impact discharge to Juday Creek.

U.S. EPA response 23: PCBs and dioxin were detected in the surface soil samples taken from the landfill. However, these contaminants were not detected in any groundwater samples collected at or near the site. This demonstrates that they are not presently leaching into the groundwater. The wetland is treating groundwater, not soils. By placing a cap over the landfill, any contact with surface soils or extensive leaching of contaminants into groundwater will be eliminated. Thus, it is not anticipated that these contaminants will pose a future problem inhibiting wetland performance. Groundwater will be monitored for these contaminants during operation and maintenance activities at the Site so that the remedy's performance can be continually evaluated.

C. Summary of comments regarding other remedial alternatives.

24. A commentor raised the issue that in all the years that the landfill has been around, that there were no instances where anyone had suffered because of dumping at the site. This commentor further stated that Alternative 1 was the most appropriate because "the problem does not exist."

U.S. EPA response 24: U.S. EPA disagrees with the commentor. A problem DOES exist, there is contamination in the groundwater. Samples of wells that residents were using for their water supply are contaminated with chemicals that cause cancer. This is a serious problem that U.S. EPA is addressing with its actions at the Site. Without any further action to clean up the contamination, the potential exists for the contamination to migrate further away from the Site, perhaps into or past Juday Creek, or potentially to the St. Joseph River. The proposed wetland will prevent this from happening and actually treat the water to remove the dangerous chemicals.

25. A commentor stated at the public meeting that Alternative 2 should be selected. They stated that the land should be restricted somewhat, with the contaminated plume being allowed to migrate unrestricted, and city water continuing to be extended indefinitely.

U.S. EPA response 25: U.S. EPA disagrees with this approach.

The current city water extension was very difficult to fund in these uncertain budget times. In fact, it was delayed for months until funding was obtained. Additionally, extending city water to local residents does not solve the problem of cleaning up contaminated groundwater. EPA will conduct monitoring of the groundwater after the remedy is implemented. At this time, it is difficult to predict where the groundwater will migrate to once the residential wells are no longer used. The commentor is asking for EPA to continually extend city water indefinitely, which is not the most effective way to deal with contaminated groundwater. The most effective method is to clean up the source, which is what this action will do. Not doing so will potentially endanger residential wells to the south and west. Area residents have indicated that their biggest concern is the potential for drinking water to become contaminated. With Alternative 2, this concern is not met.

These comments have been 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, which is located at the Mishawaka-Penn Public Library, 209 Lincoln Way East, Mishawaka. 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 aforementioned repository.

U.S. EPA ADMINISTRATIVE RECORD
REMEDIAL ACTION
DOUGLAS ROAD LANDFILL
MISHAWAKA, INDIANA
UPDATE #1
04/17/96

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	00/00/00	U.S. EPA	File	Figures: Hydrographs from the Creek and Well #2 at the Lake Inflow and Notre Dame Sites w/Attached Handwritten Notes	3
2	00/00/94	U.S. EPA	File	Excerpts from SJRBC's FY 1992-1994 Juday Creek Summary Report (HANDWRITTEN ANNOTATIONS)	5
3	02/24/95	Novak, D. and M. Fonte, U.S. EPA	Residents	Letter re: Construction of a City Waterline Extension	2
4	05/15/95	Concerned Citizen	Roemer, T., U.S. Congress	Letter re: Installation of City Water to Areas Affected by Contaminated Water (HANDWRITTEN)	3
5	06/02/95	Concerned Citizen	Novak, D., U.S. EPA	Letter re: Proposed Boundaries of the Douglas Road Site	2
6	06/05/95	Novak, D., U.S. EPA	Ploeb, D., CH2M Hill	Letter re: U.S. EPA's Comments on the Feasibility Study Report for the Groundwater Operable Unit	6
7	07/31/95	Likins, A., IDEM	Novak, D., U.S. EPA	Letter re: Discharge Limitations for Treated Groundwater from the Douglas Road Landfill Site	2
8	08/01/95	Novak, D., U.S. EPA	Addressees	Cover Letter re: Review of the Draft Proposed Plan	1
9	08/08/95	Likins, A., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Draft Proposed Plan for Operable Unit #3	2
10	08/16/95	Ploeb, D., CH2M Hill	Novak, D., U.S. EPA	Letter re: CH2M Hill's Responses to U.S. EPA's Comments on the Agency Review Draft of the Feasibility Report	11
11	08/22/95	Mackiewiak, K., St. Joseph River Basin Commission	Novak, D., U.S. EPA/OPA	Letter re: Discharge of Water into Juday Creek	3
12	08/23/95	Likins, A., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Feasibility Study for the Ground Water Operable Unit	5

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
13	08/29/95	Novak, D. and D. Gawlinski, U.S. EPA	Property Owners	Letter re: Extension of Water Supply to Those Residents Currently Affected by Ground Water Contamination	2
14	09/00/95	CH2M Hill	U.S. EPA	Public Comment Feasibility Report w/August 9 and September 25, 1995 Cover Letters	204
15	09/06/95	Novak, D., U.S. EPA	Concerned Citizen	Letter re: Extension of City Water South of Juday Creek	2
16	09/28/95	Rose, J., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Proposed Plan	2
17	11/00/95	U.S. EPA	Public	Proposed Plan for Remedial Action (Ground Water) at the Douglas Road Superfund Site	6
18	11/23/95	U.S. EPA	Public	Public Notice: Announcement of December 5, 1995 Public Meeting and the November 27-December 26, 1995 Public Comment Period (Mishawaka Enterprise)	1
19	11/28/95	Novak, D., U.S. EPA	Property Owners	Letter re: Construction of the Waterline Extension	2
20	12/05/95	Runnel Reporting Service	U.S. EPA	Transcript of December 5, 1995 U.S EPA Public Hearing	82
21	12/14/95	Davis, D. and J. Sporleder, Izaak Walton League of America	Novak, D., U.S. EPA/OPA	Letter re: Request for a 30-Day Extension to the Public Comment Period	2
22	12/15/95	Novak, D., U.S. EPA/OPA	Novak, D., U.S. EPA	Memorandum re: Request for a 30-Day Extension to the Public Comment Period	1
23	12/17/95	U.S. EPA	Public	Public Notice: Announcement of an Extension to January 25, 1996 of the Public Comment Period (Mishawaka Enterprise)	1
24	12/20/95	Plain, G., St. Joseph County	South Bend Resident	Letter re: Connection to the New Water System (UNSIGNED)	1
25	12/29/95	Ralston, P., IDNR/Division of Fish and Wildlife	Novak, D., U.S. EPA/OPA	Letter re: IDNR's Comments on the Proposed Cleanup	2
26	01/10/96	Davis, D., Juday Creek Task Force	Novak, D., U.S. EPA/OPA	Letter re: JCTF's Comments on the Proposed Plan	5

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
27	01/22/96	Concerned Citizens	U.S. EPA	Fifteen Letters/One Petition re: Public Comments on the Proposed Plan Received September 9, 1995-January 22, 1996	27
28	01/22/96	Wright, L., St. Joseph County Drainage Board	Novak, D., U.S. EPA/OPA	Letter re: Discharge of Water into Juday Creek	1
29	01/25/96	Studer, S., Studer & Associates	Novak, D., U.S. EPA/OPA	Letter re: Public Comments on Alternative Use #6-Groundwater Extraction, Constructed Wetland Treatment and Discharge to Juday Creek	4
30	01/25/96	Plain, G. et al.; St. Joseph County Health Department	Novak, D., U.S. EPA/OPA	Letter re: SJCHD's Comments on the Proposed Plan	3
31	03/12/96	Kleiman, J., U.S. EPA	Novak, D., U.S. EPA	Memorandum re: RCRA's Review of the Draft Record of Decision for ARARs	1
32	03/15/96	Likins, A., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Draft Record of Decision for the Ground Water Operable Unit	4
33	03/15/96	Marrero, J., U.S. EPA	Novak, D., U.S. EPA	Memorandum re: Review of the Draft Record of Decision for Operable Unit #2	1
34	03/28/96	Lovelace, K., U.S. EPA/ARC	Novak, D., U.S. EPA	Memorandum re: ARC's Review of the February 28, 1996 Draft Record of Decision for Operable Unit #2	4
35	04/11/96	Likins, A., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments to the Revised Record of Decision	2