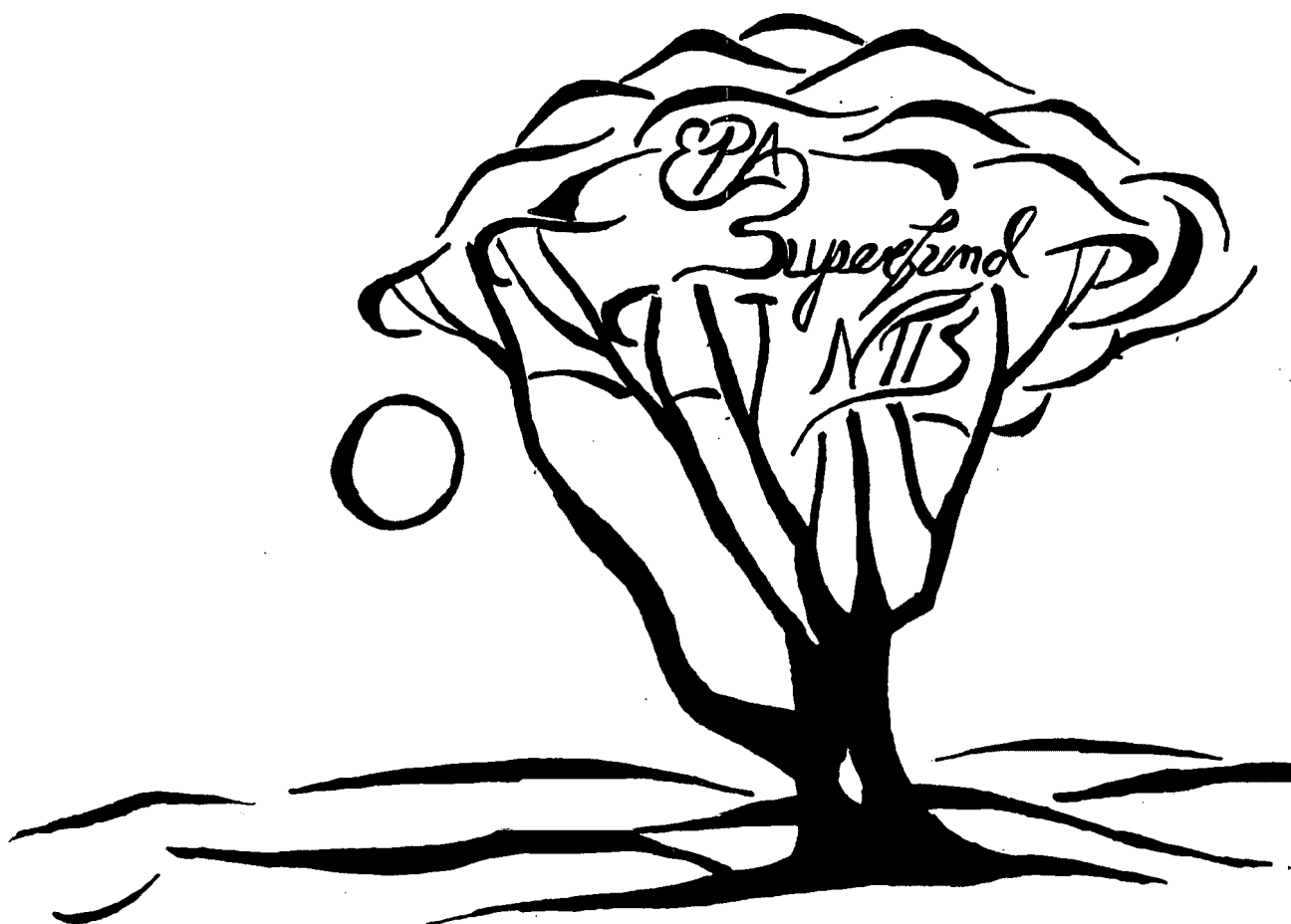


PB94-964132
EPA/ROD/R05-94/249
September 1994

EPA Superfund Record of Decision:

**Waste Inc. Landfill Site,
Michigan City, IN,
8/18/1994**



Declaration for the Record of Decision
Waste, Inc. Landfill

Site Name & Location

Waste, Inc. Landfill
Michigan City, Indiana

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Waste, Inc. Landfill Site (the Site) in Michigan City, 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 action is the final action planned for the Site. It specifically outlines an action to address on-site soil and groundwater contamination, which have been determined by the Remedial Investigation to pose unacceptable risks to human health and the environment.

The major components of the selected remedy include:

- Installation of a Subtitle D Cap, meeting the requirements of 329 IAC 2-14-19(3)(b) and 329 IAC 19(3)(a)-(c).
- Leachate and shallow groundwater collection via a leachate collection trench, installed along the southern site boundary.
- Installation and operation of groundwater extraction wells to contain deep groundwater at the site boundary.
- Discharge of collected groundwater and leachate to the Sanitary District of Michigan City via direct discharge.
- Collection and disposal of landfill gas.
- Rerouting or abandoning the on-site sewer line.

- Removal of the on-site underground fuel storage tank.
- Posting of fish advisory signs along Trail Creek.
- Proper abandonment of the on-site groundwater well

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 operable unit action, is cost effective, and consistent with achieving a permanent remedy. This final action fully addresses the statutory mandate for permanence and treatment to the maximum extent practicable. This action also satisfies the statutory preference for remedies that employ treatment that reduces the toxicity, mobility, or volume as a principal element. Because this remedy will result in hazardous substances remaining 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 the remedial action.

August 18, 1994
Date

Valdas V. Adamkus
Valdas V. Adamkus
Regional Administrator



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We make Indiana a cleaner, healthier place to live

Evan Bayh

Governor

Kathy Prosser

Commissioner

100 North Senate Avenue

P.O. Box 6015

Indianapolis, Indiana 46206-6015

Telephone 317-232-8603

Environmental Helpline 1-800-451-6027

August 11, 1994

Mr. Valdas Adamkus
Regional Administrator
U.S. Environmental Protection Agency
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Adamkus:

Re: Record of Decision
Final Site Remedy
Waste, Inc. Landfill Site
Michigan City, Indiana

The Indiana Department of Environmental Management has reviewed the U.S. Environmental Protection Agency's Record of Decision for the Waste, Inc. Landfill Superfund site. IDEM fully concurs with the major components of the selected remedy for this site, which includes:

- Site preparation
- Institutional control (fencing, deed restrictions, groundwater monitoring)
- Two separate collection extraction systems - groundwater and leachate collection trench and groundwater extraction wells to capture and prevent any potential future off-site migration of contaminants
- Collection trench keyed into the olive grey clay layer
- Extraction wells to contain contaminated groundwater at the site boundary
- Groundwater collected to be pumped to the Michigan City Wastewater Treatment facility. Facilities for on-site storage of collected water to be used if effluent does not meet the requirements of the POTW, or if overflow/bypass situation exists at the POTW
- Subtitle D cap
- Gas collection

Mr. Valdas Adamkus
Page 2

- Information to be gathered on the storm sewer to determine if it can be rerouted or grouted and sealed
- Removal of an underground tank
- Fish consumption advisory signs.

We also agree that this action attains Federal and State requirements that are applicable, or relevant and appropriate to this final site remedy. We will work with EPA to determine the levels which will be achieved at the site boundary for groundwater. Because this remedy will result in hazardous substances remaining on the site above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure the remedy continues to provide adequate protection of human health and the environment.

IDEM staff have been working closely with Region V staff in the selection of an appropriate final remedy for the Waste Inc., site and are satisfied that the selected alternative adequately addresses the risk to human health and the environment posed by the site.

Please be assured that IDEM is committed to accomplish cleanup of all Indiana sites on the NPL and intends to fulfill all obligations required by law to achieve that goal.

Sincerely,



Kathy Prosser
Commissioner

PEC:mg

cc: Pat Carrasquero, IDEM
Dion Novak, U.S. EPA, Region V

Decision Summary
Waste, Inc. Landfill
Michigan City, Indiana

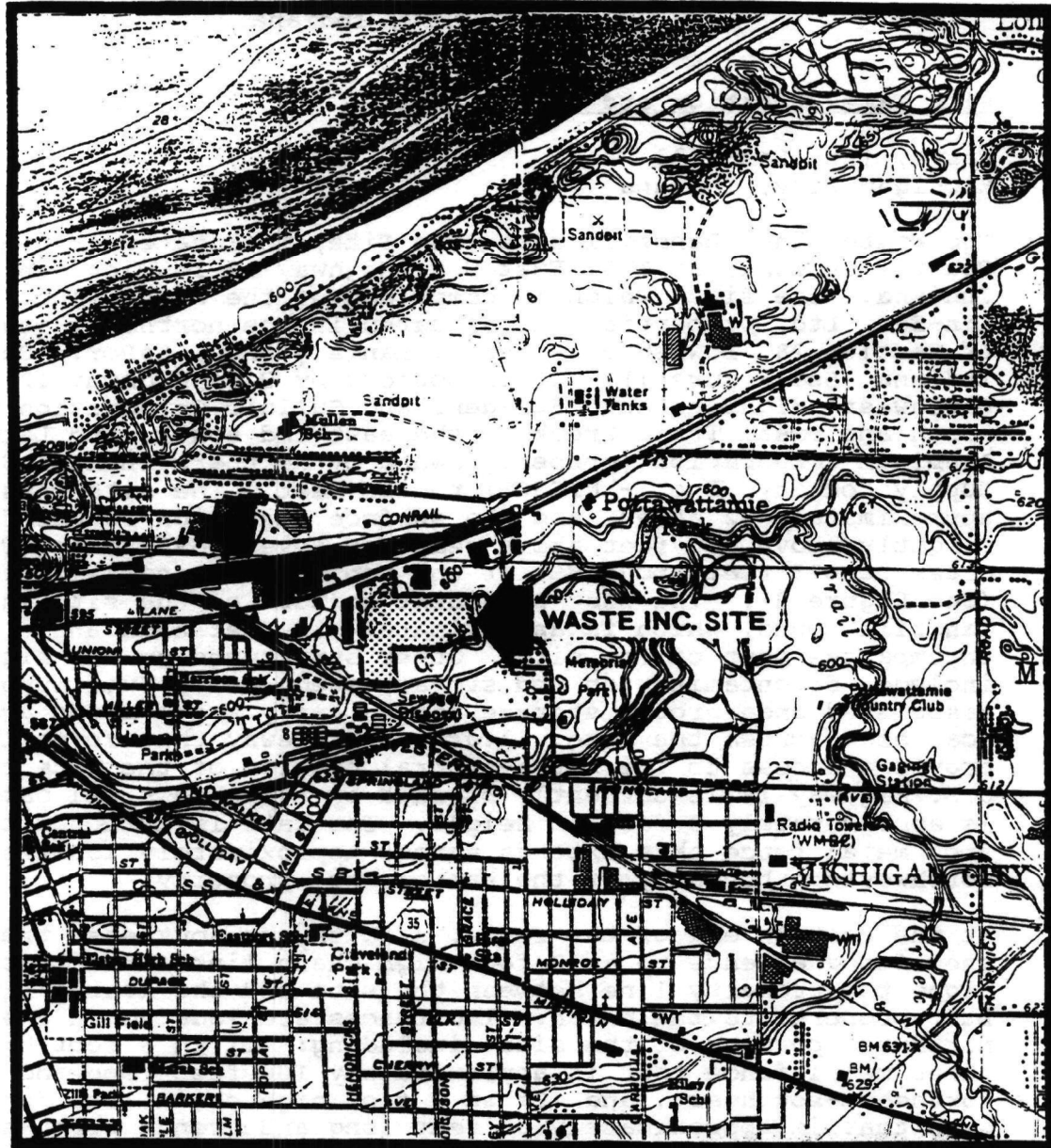
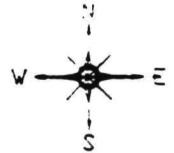
Site Name, Location and Description

Waste, Inc. Landfill
Michigan City, Indiana

The Waste, Inc. Landfill site (The Site) is located in LaPorte County, Indiana, at 1701 East U.S. Highway 12 in Michigan City, Indiana. The site, which is comprised of the Waste, Inc. and Lin-See, Ltd. properties, is situated in the northeast quadrant of Section 28, Township 38 North, Range 4 West, LaPorte County, Indiana (See Figure 1). It is bounded by U.S. Highway 12 to the northwest, Michiana Auto Builders and Sullair Corporation to the north and east, Trail Creek to the east and south, and Lake Aluminum Corporation (property owned by Northern Indiana Steel Supply Company, Inc. - NISSCO) to the west. The site consists of approximately 32 acres, and the surface elevation ranges from slightly above 580 feet above mean sea level (MSL) along Trail Creek to 625 feet above MSL at the top of the landfill mound (See Figure 2). The most prominent feature of the site is the landfill mound, which is approximately 35 feet high and encompasses most of the site. Other structures on the site include: decontamination and storage shed, and a fuel pump and associated underground storage tank. Empty steel drums are also scattered across the site. A gravel driveway that formerly provided access to the north-central portion of the site from U.S. Highway 12 is currently blocked by a locked steel gate that is approximately 8 feet in height. The gate is attached to an 8-foot metal fence that extends across approximately 155 feet of northwestern boundary of the Waste, Inc. property.

At the eastern end of the fence, a northwest-southeast trending snow fence extends to an 8 foot high chain link fence that runs along the property line between the site and the leased Lin-See, Ltd. property to the north. Two fences are located in the northwest portion of the site, including: (1) an 8 foot high sheet metal fence that is approximately 100 feet long and trends northeast-southwest, and (2) an 8 foot high chain link fence and gate that is approximately 30 feet long and trends north-south. A 10 foot high corrugated metal fence separates the site from the Lake Aluminum Corporation property. The entire northern border of the Lin-See, Ltd. property is separated from the leased Lin-See, Ltd. to the north by an 8 foot high chain link fence with a gate. The southern and eastern boundaries of the site along Trail Creek are not fenced, and a large opening exists in the fencing along the northern boundary of the site. The locations of these various fences are shown on Figure 3.

MICHIGAN CITY QUADRANGLE
INDIANA - LA PORTE COUNTY
7.5 MINUTE SERIES (TOPOGRAPHIC)
1969
PHOTOREVISED 1980

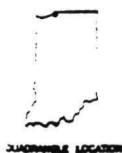


SCALE 1:24000

1 MILE

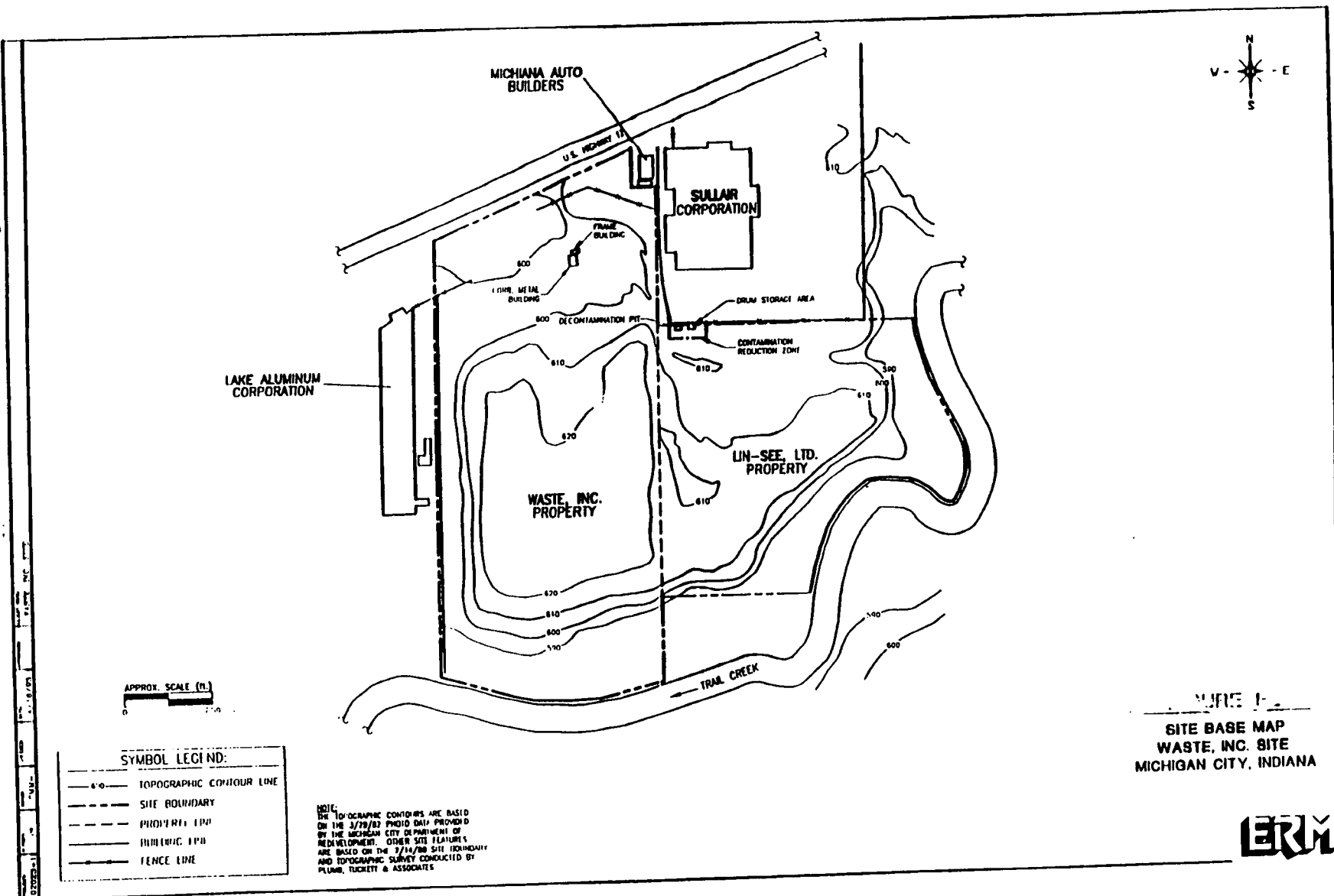
CONTOUR INTERVAL 10 FEET

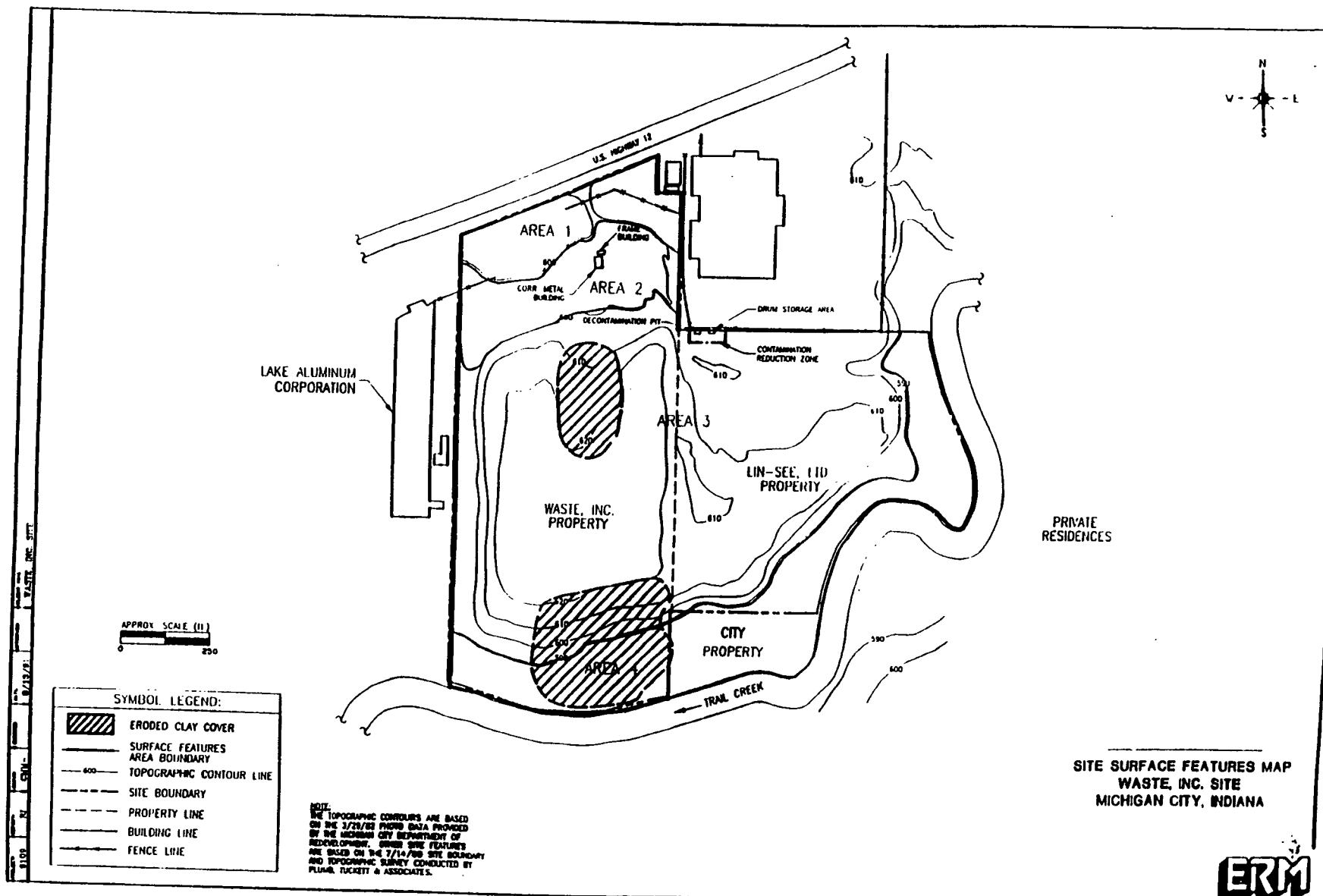
PROJECT: 92023-1
REPORT: FS
DATE: 1/24/92
DESIGN: CHM
CHECKED: CHM
APPROVED: WASTE, INC.
CLEAN AND



ERM

Figure 2





SITE SURFACE FEATURES MAP
 WASTE, INC. SITE
 MICHIGAN CITY, INDIANA



Site History and Enforcement Activities

The Waste, Inc. site consisted of agricultural land with some lowlands in 1939 prior to its development as a landfill. A small disposal mound was located in the north-central portion of the site in 1954, and an abandoned meander appeared to contain debris. The metal salvage and reclamation facility on the west side of the site covered most of the wetland area prominent in 1939. A long mound that may consist of debris, fill, and scrap metal wastes was located along the site's western perimeter. As time passed, these mounds expanded and additional mounding occurred in the southeast and southwest portions of the site. In 1961 and 1965, portions of the site were cleared to provide parking areas. In 1980, a fence was constructed along the site's northeast perimeter, and a wall was built near the northwest corner that limited traffic access from the highway.

From 1965 to 1972, the Waste, Inc. site was operated as an unpermitted landfill by Dis-Pos-all Services Division, a division of NISSCO. In 1972, NISSCO sold its disposal operations to Waste, Inc., which continued operating the landfill at the site until August 5, 1982.

In November, 1970, Dis-Pos-All Services submitted a proposal to the Indiana Stream Pollution Control Board (Board) for the operation of their existing landfill. Under this proposal, the site would be limited to accepting only wood, paper and cardboard and would use foundry sand as cover material. The Board issued a non-objection letter to this proposal in July, 1971. However, several subsequent inspections by the Indiana State Board of Health determined that the site was accepting unapproved materials for disposal and was not properly covering combustible materials. Therefore, in a letter dated August 28, 1974, the Board's technical secretary ordered the site closed and covered with clay.

In May, 1975, Waste, Inc. submitted an application to the Board for construction and operation permits. This application was denied; however, no hearing was held on the Waste, Inc. appeal of this denial, and the site continued to operate. In May, 1981, an Agreed Order was executed between Waste, Inc. and the Board, which set conditions for the continued operation of the landfill. In August, 1982, a Consent Order was signed, effectively closing the site except for allowing the acceptance of foundry sand for disposal and permitting the owner/operator (Waste, Inc.) to begin covering the site with clay. In 1983, in response to the State of Indiana enforcement actions, a Court Order demanded proper closure of the site.

In January, 1985, a hazard ranking system evaluation of the site by the U.S. EPA resulted in an overall hazard ranking score of 50.63.

A Consent Order was signed between the participating Waste, Inc. site Respondents (i.e. PRPs) and U.S. EPA Region 5 in March, 1987. This Consent Order contained requirements for the PRPs to perform a Remedial Investigation/Feasibility Study at the site.

Highlights of Community Participation

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

- A Community Relations Plan was developed in November 1987 to assess the community's informational needs related to the Waste, Inc. site and to outline community relations activities to meet these needs. Residents and community officials were interviewed and their concerns were incorporated into this plan.
- Public information repositories were established at the Michigan City Public Library, the Bethany Bible Baptist Church, and the Michigan City Branch Office of the LaPorte County Health Department.
- A mailing list of interested citizens, organizations, news media, and elected officials in local, county, State and Federal government was developed. Fact Sheets and other information regarding site activities were mailed periodically to all persons or entities on this mailing list. This mailing list was also updated from time to time as persons approached EPA for information about the site.
- A Fact Sheet was mailed to the public in November 1987, that announced a public meeting to discuss the upcoming Remedial Investigation and answer site related questions from the public.
- A public meeting on November 18, 1987, at the City Hall Chambers announced the initiation of the Remedial Investigation and provided details about its conduct.
- A Fact Sheet was mailed to the public in early 1988, that announced the results of Phase 1 sampling of Trail Creek, which was done in accordance with the EPA approved Phase 1 RI/FS workplan. This fact sheet also announced the availability of two technical memoranda, approved by the EPA, that described in detail the procedures and results of the Trail Creek samples.

- A Fact Sheet was mailed to the public in July 1988, that announced a revision in the reporting of results of Phase 1 sampling of Trail Creek.
- A Fact Sheet was mailed to the public in June 1989, that announced EPA approval of the RI/FS workplan for the site and summarized the proposed sampling activities.
- An Availability Session was held on June 29, 1989, at the Michigan City Public Library which allowed EPA to answer questions and concerns of residents regarding the planned RI/FS and other site related issues.
- A Fact Sheet was mailed to the public in December 1989, updating the public on the status of the RI/FS at the site and reporting on the tasks that were completed at that time.
- Two Availability Sessions were held on February 28, 1990, at the Michigan City Public Library, to answer questions and concerns of residents regarding the progress of the RI/FS at the site.
- An Availability Session was held on April 19, 1990, at the City Hall Council Chambers, to answer questions and concerns of residents regarding the progress of the RI/FS at the site.
- A Fact Sheet was mailed to the public in December 1990, that summarized the results of Technical Memorandum #4.
- An Availability Session was held on December 13, 1990, at the Michigan City Library to answer questions regarding Technical Memorandum #4.
- An Availability Session was held on April 1, 1992 to answer questions regarding Technical Memorandum #5.
- A Fact Sheet was mailed to the public in January 1994, that summarized EPA's recommended remedial alternative in a proposed plan for the Site. The EPA approved Feasibility Study was also released at that time. This fact sheet also announced a public comment period for the proposed remedial action and was accompanied by newspaper advertisements in the Michigan City News Dispatch.
- A public meeting was held on February 9, 1994, at the City Hall Council Chambers to present EPA's proposed plan for the Waste, Inc. site and to receive formal public comment.
- Paid newspaper advertisements announced the RI public meeting, the availability sessions, and the FS and proposed plan public meetings.

- Periodic news releases announced results of studies at the site.
- A public comment period of thirty days was originally planned, running from January 24, 1994, to February 22, 1994. Based on several written requests during the comment period, the comment period was extended twice, until April 22, 1994, for a total comment period of 90 days. The extensions were announced by in newspaper advertisements in the Michigan City News Dispatch.

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 Waste, Inc. site in Michigan City, 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 Site are complex. A RI/FS was performed by several Potentially Responsible Parties (PRPs) pursuant to a March 1987 Administrative Order on Consent. Activities performed under this Order included determining the nature and extent of contamination at the site and evaluating the feasibility of various remedial alternatives to clean up the site.

This Record of Decision (ROD) addresses contaminated soil and waste materials and contaminated groundwater and leachate on the site. These areas were determined to pose risks to human health and the environment due to dermal contact or incidental ingestion of site surface soils, ingestion of groundwater, and ingestion of fish from Trail Creek. Groundwater was not found to be contaminated immediately downgradient of the site; however, the potential exists for migration of contaminated groundwater from the site. This is the first and only planned response action 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
- installation and sampling of ground water monitoring wells, both onsite and offsite
- off-site surface-water sampling
- identification of existing ground-water wells in the site vicinity
- installation and sampling of soil borings
- a storm water and leachate study
- a water-level monitoring program, both onsite and offsite, including the installation of piezometers
- hydraulic conductivity testing
- preparation of a site-wide human health and ecological risk assessment
- contaminant fate and transport modeling and analysis

Site Geology:

The Waste, Inc. site is underlain by unconsolidated sediments of the Calumet Lacustrine Plain. These deposits consist of silty glacial till overlain by a combination of beach and dune sands, lacustrine silts and clays, and paludal deposits of muck and peat. The following geologic facies were defined at the site during RI activities: fill, foundry sand and metal debris, foundry sand, clay cap, olive-grey sand, brown sand, olive-grey clay, interbedded sand and clay, and clay till.

The interbedded sand and clay facies overlies the clay till facies in all portions of the site except along the eastern boundary. This facies is overlain by the olive-grey facies across the southern two-thirds of the site and by the olive-grey sand facies in the northern one-third of the site.

Site Hydrogeology:

The principal sources of groundwater in the site area are the unconsolidated deposits of Quaternary glacial drift. These deposits can be subdivided into four units, including two sand and gravel aquifers and two confining glacial tills. At the site, only the two shallowest units (Units 1 & 2) are present.

Unit 1 consists primarily of dune sand, sandy lacustrine material, and sandy beach and shoreline deposits. Unit 1 is an unconfined aquifer capable of yielding more than 500 gallons per minute where its saturated thickness is greater than 50 feet. At the site, the top of the surficial aquifer ranges from 0 to 17 feet below the ground surface. Stratigraphic and water level data indicate that all of the geologic facies that comprise the surficial aquifer, with one exception, are hydraulically interconnected, both vertically and laterally. The one exception occurs in the southern two-thirds of the site where the olive-grey clay facies divides the aquifer into two discrete water-bearing units.

Unit 2 is a calcareous silty till that acts as a basal aquiclude for the surficial aquifer and is approximately 100 feet thick in the vicinity of the site.

Soil Contamination:

Surface and subsurface soil sampling was conducted in all areas of the site except the main landfill area to determine the nature and extent of potential sources of contamination. Because of the heterogeneous nature of the landfill contents, the nature of contamination within the landfill was assessed by characterizing its impacts on the surrounding soil. An initial soil screening program was conducted to identify suspected areas of near surface soil contamination and to direct the analytical sampling effort toward areas with the highest probability of being contaminated or clean, depending on the purpose of the sample.

Soil samples collected at the site were found to be contaminated with volatile organics up to levels of approximately 890,000 parts per billion (ppb), semi-volatile organics up to levels of approximately 6200 ppb, polychlorinated biphenols (PCBs) up to levels of 4400 ppb, and inorganics up to levels of 191,000 ppb.

Ground Water Contamination:

Groundwater samples collected at the site were found to be contaminated with volatile organics up to levels of 47 ppb, semi-volatile organics up to levels of 53 ppb, and inorganics up to levels of 1900 ppb.

Summary of Site Risks

This Record of Decision is written for a final action. The RI report includes a risk assessment, prepared by Environ 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.

The risk assessment determined that the majority of risks associated with exposure to contamination at the site were attributed to carcinogenic PAHs, PCBs, cadmium, arsenic and antimony.

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

Exposure Assessment

The exposure assessment conducted as a part of the RI concluded that several media are impacted by the contaminants at the site, and that there are several potential exposure routes for contamination. These routes of exposure were identified for both current and future scenarios (as is commonly done in EPA risk assessments) so that all potential pathways can be evaluated. Due to the proximity of the site to the surrounding neighborhood, and its size, the following potential receptors were identified in the risk assessment, and risks were computed for their exposure.

Under the current land-use scenario, on-site trespassers could potentially be exposed through **dermal contact** or **incidental ingestion** of site surface soils. Recreational adult fishermen could potentially be exposed through **ingestion** of fish caught from Trail Creek.

Under the future-use scenario, on-site residents could potentially be exposed through **ingestion** of groundwater, and **dermal contact** and **incidental ingestion** of site surface soils. Recreational adult fishermen could potentially be exposed through **ingestion** of fish caught in Trail Creek.

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.

Polynuclear Aromatic Hydrocarbons Animal studies indicate that PAHs may be potentially harmful to the gastrointestinal tract, liver and kidneys and may suppress the immune system after both short and long term exposure. Birth defects and decreased body weight have been reported in laboratory animals, although reproductive toxicity associated with PAH exposure has not been demonstrated in humans. Lung and skin cancer in humans have been associated with chronic exposure by inhalation and dermal contact, respectively, to mixtures of compounds including carcinogenic PAHs.

Arsenic Short term exposure 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.

Polychlorinated Biphenols (PCBs) The principal toxicological effects observed in humans exposed to PCB mixtures include effects of the skin and the liver. Results from experimental studies in animals indicate that PCBs may also cause effects on the thyroid gland and immune system. Liver tumors have been observed in animals exposed to high concentrations of PCBs. Epidemiological studies of PCB exposed populations have not demonstrated a causal relationship between PCB exposure and any form of human cancer. Reproductive toxicity has been reported in

animals exposed to PCBs prior to and during gestation. Adverse developmental effects have been reported in the newborn of women exposed during pregnancy to PCBs and other chemicals in an occupational setting or from ingestion of contaminated fish.

Manganese Long term exposure to manganese by inhalation may cause effects in the lungs, including pneumonia and bronchitis. Inhalation and oral exposure to manganese for long periods of time may result in "manganism," a potentially irreversible disease characterized by growth retardation, nonspecific anemia, "metal fume fever," and psychological and neurological disorders. No reports of carcinogenic effects, reproductive and developmental toxicity, and mutagenicity of manganese were found in the available literature.

Chromium Direct contact with chromium compounds may be irritating to the skin, with chromium VI being much more corrosive than chromium III. Occupational exposure to chromium VI has been reported to cause adverse effects in the respiratory tract and lungs. Both chromium III and VI compounds are reported to cause kidney toxicity in animals; however, some reports indicate that they may also cause effects in the liver and nervous system. Chromium compounds have been found to cause developmental effects in hamsters and mice and testicular effects in rabbits when administered by injection. Epidemiological studies indicate that occupational exposure to chromium VI may cause lung cancer. Reports of workers exposed to chromates provide evidence of damage to genetic material.

Cadmium Short term oral or inhalation exposures to high levels of cadmium compounds may produce gastrointestinal, central nervous system, lung, liver, kidney, and immune system effects. Longer term exposure to lower cadmium levels results in effects similar to those observed following acute exposures. In addition, effects of the bones and the blood and blood forming system have been reported in humans, while nervous system and heart effects have been observed in animals orally exposed to cadmium for long periods of time. There is limited evidence that cadmium causes reproductive toxicity in male workers. Cadmium has been found to be a reproductive and developmental toxicant and a teratogen in several animal species exposed by various routes of administration. Lung cancer has been associated with inhalation of cadmium in cadmium exposed workers. There is insufficient evidence that cadmium is a prostrate carcinogen in humans; however, testicular tumors have been found in animals. Results of lab assays for mutagenic potential indicate a potential for cadmium to cause genetic damage.

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

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

Mercury Symptoms associated with ingestion of ionizable salts include effects in the esophageal and gastrointestinal tracts, kidneys, and liver. Elemental mercury orally administered in experimental animals has produced few effects other than diarrhea. In contrast, short term inhalation of mercury vapors may effect the lungs and the central nervous system. Chronic exposure to mercury vapor affects primarily the central nervous system and the kidneys. Inorganic mercury is not known to be a human carcinogen. There is no conclusive evidence that inorganic mercury causes reproductive or developmental toxicity.

Antimony Short term exposure to antimony or inorganic compounds of antimony may produce eye and skin irritation, vomiting, heart problems, and lung damage. Exposure to inorganic antimony compounds has also been reported to cause effects of the intestinal tract such as abdominal pain, diarrhea, and stomach ulcers in workers. Effects in the liver and kidneys and a decrease in red blood cells have been reported in animals. There is no conclusive evidence linking antimony exposure to human cancer; however, lung tumors have been reported in animals exposed by inhalation to inorganic compounds of antimony. Antimony may have potential reproductive and developmental effects in humans.

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 a site.

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

Table 1

Lifetime Cancer Risks Associated with Current Potential Exposures at and near the Waste, Inc. Site		
Current Use Exposure Scenario	Exposure Medium and Route	Estimated Lifetime Cancer Risk to an Individual from a Reasonable Maximum Exposure
Trespasser (Sum of intakes by a 6- to 14-year old child and a 15- to 36-year old adult)	Leachate Seeps	
	Dermal contact	2×10^{-7}
	Incidental ingestion	4×10^{-8}
	Subtotal	2×10^{-7}
	Surface Soil	
	Dermal contact	2×10^{-5}
	Incidental ingestion	3×10^{-6}
	Subtotal	2×10^{-5}
	Grand Total (Trespasser)	2×10^{-5}
Recreational Swimmer in Trail Creek (Sum of intakes by a 6- to 14-year old child and a 15- to 36-year old adult)	Surface Water	
	Dermal contact	6×10^{-8}
	Incidental ingestion	1×10^{-7}
	Subtotal	2×10^{-7}
Recreational Fisherman, Adult	Fish Ingestion	5×10^{-4}
Note: Cancer risks are not summed across all scenarios, because the scenarios are assumed to principally involve different populations. Such a sum would be practically indistinguishable from the risk due to fish ingestion, however.		

Table 2

Lifetime Cancer Risks Associated with Hypothetical Future Exposures at and Near the Waste, Inc. Site		
Future Use Exposure Scenario	Exposure Medium and Route	Estimated Lifetime Cancer Risk to an Individual from a Reasonable Maximum Exposure
On-site Resident (Sum of intakes by a 1 to 6-year old child and a 7 to 30-year old adult)	Leachate Seeps	
	Dermal contact	2×10^{-6}
	Incidental ingestion	4×10^{-7}
	Subtotal	2×10^{-6}
	Surface Soil	
	Dermal contact	2×10^{-4}
	Incidental ingestion	1×10^{-4}
	Subtotal	3×10^{-4}
	Ground Water	
	Ingestion*	7×10^{-4}
	Grand Total (Resident)	1×10^{-3}
Recreational Swimmer in Trail Creek (Sum of intakes by a 1 to 6-year old child and a 7 to 30-year old adult)	Surface Water	
	Dermal contact	6×10^{-8}
	Incidental ingestion	1×10^{-7}
	Subtotal	2×10^{-7}
Recreational Fisherman, Adult	Fish Ingestion	5×10^{-4}
<p>Notes:</p> <p>Cancer risks are not summed across all scenarios, because the scenarios are assumed to principally involve different populations. Such a sum would be indistinguishable from the total risk to a hypothetical on-site resident.</p> <p>* Ground water ingestion risks are based upon intakes by an adult only, consistent with EPA supplemental risk assessment guidance (USEPA 1991e), because the exposures should be comparable to or greater than those to children.</p>		

Table 3

Noncancer Risks Associated with Hypothetical Future Exposures at and Near the Waste, Inc. Site			
Future Use Exposure Scenario	Exposure Medium and Route	Estimated Noncancer Hazard Index from a Reasonable Maximum Exposure	
		6- to 14-year old Child	15- to 36-year old Adult
Resident	Leachate Seeps		
	Dermal contact	0.09	0.07
	Incidental ingestion	0.006	0.001
	Subtotal	0.09	0.07
	Surface Soil		
	Dermal contact	0.8	0.4
	Incidental ingestion	2.7	0.3
	Subtotal	3.5	0.7
	Ground Water		
	Ingestion	ND*	12
	Grand Total (Resident)	ND	13
Recreational Swimmer in Trail Creek	Surface Water		
	Dermal contact	0.0015	0.0003
	Incidental ingestion	0.0008	0.0001
	Subtotal	0.0023	0.0004
Recreational Fisherman	Fish		
	Ingestion	ND*	6.6
<p>Notes:</p> <p>The risk index values are not summed across all exposure scenarios, because different populations are assumed to be involved.</p> <p>ND = Not determined.</p> <p>* The risks due to ground water and fish ingestion are based upon intakes by adults only, consistent with supplemental EPA guidance (USEPA 1991e), because their exposures should be comparable to or greater than those to children.</p>			

Table 4

Noncancer Risks Associated with Current Potential Exposures at and Near the Waste. Inc. Site			
Current Use Exposure Scenario	Exposure Medium and Route	Estimated Noncancer Hazard Index from a Reasonable Maximum Exposure	
		6- to 14-year old Child	15- to 36-year old Adult
Trespasser	Leachate Seeps		
	Dermal contact	0.009	0.005
	Incidental ingestion	0.0004	0.0002
	Subtotal	0.009	0.005
	Surface Soil		
	Dermal contact	0.08	0.06
	Incidental ingestion	0.04	0.02
	Subtotal	0.1	0.08
	Grand Total	0.1	0.09
Recreational Swimmer in Trail Creek	Surface Water		
	Dermal contact	0.0015	0.0003
	Incidental ingestion	0.0008	0.0001
	Subtotal	0.0023	0.0004
Recreational Fisherman	Fish Ingestion	ND*	6.6
<p>Notes:</p> <p>The risk index values are not summed across all exposure scenarios, because different populations are assumed to be involved. Such a sum would be practically indistinguishable from the HI-value for fish ingestion, however.</p> <p>ND = Not determined.</p> <p>* The risks due to fish ingestion are based upon intakes by adults only, consistent with supplemental EPA guidance (USEPA 1991e), because the exposures to adults are expected to be comparable to or greater than those to children.</p>			

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 soil** at the site were computed for several potential exposure scenarios. These include on-site trespasser (current risk - 2×10^{-5}) (See Table 1)) and on-site resident (future risk - 3×10^{-4}) (See Table 2)). The chemical classes causing the majority of the estimated cancer risks were carcinogenic PAHs, PCBs and arsenic.

The non-carcinogenic risks associated with **exposure to contaminated soil** 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. Hazard Indices exceeded the 1.0 trigger for the on-site resident (future non-carcinogenic risk - $HI = 3.5$ for 6 to 14 year old child (See Table 3)). The chemical classes causing the majority of the estimated non-cancer risks were PCBs, antimony, arsenic and cadmium.

The carcinogenic risks described in the risk assessment for **ingestion of contaminated groundwater** were computed for several potential exposure scenarios. These include on-site resident (future risk - 7×10^{-4}) (See Table 2)). The chemical class causing the majority of the estimated cancer risks were carcinogenic PAHs.

The non-carcinogenic risks associated with **ingestion of contaminated groundwater** at the site were computed for the same exposure scenarios as were used for the carcinogenic risks. Hazard Indices exceeded the 1.0 trigger for the on-site resident (future non-carcinogenic risks - $HI = 12$ for a 15 to 36 year old adult (See Table 3)). The chemical class causing the majority of the estimated non-cancer risks was antimony.

The carcinogenic risks described in the risk assessment for **ingestion of fish caught from Trail Creek** were computed for several potential exposure scenarios. These calculations did not include results from actual fish samples from Trail Creek. In such instances, it is common to estimate the potential concentrations of the chemicals of concern in the fish using an equilibrium model, the details of which are contained in the site-wide risk assessment. These include recreational fisherman (current and future risk - 5×10^{-4}) (See Tables 1 & 2)).

The non-carcinogenic risks described in the risk assessment for **ingestion of fish caught from Trail Creek** were computed for several potential exposure scenarios. These include recreational

fisherman (current and future non-carcinogenic risks - HI = 6.6 for 15 to 36 year old adult (See Tables 3 & 4)).

Description of Alternatives

During the Feasibility Study (FS), a list of alternatives was developed that could be used to address the threats and/or potential threats identified for the soil, surface water, sediment, and 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, operation and maintenance).

Following this initial screening, the list of alternatives was evaluated and only alternatives that met the nine criteria, listed below in the comparative analysis section, were submitted for detailed analysis.

Alternative 1: No Action

Under this alternative, no remediation would occur and the site would remain in its present condition. All contamination would remain in the ground water, with continued off-site movement at unacceptable levels. Although this alternative does not address the ground-water contamination problem, its inclusion in the detailed alternatives analysis is required by CERCLA as a baseline for comparison to the other alternatives developed.

Present Worth Cost:	\$ 0
Time to Implement:	none

Alternative 2: Vegetated Soil Cap

This alternative consists of site preparation, institutional controls, groundwater monitoring, groundwater and leachate collection/treatment/disposal, surface water diversion/collection, and the placement of a vegetated soil cover consisting of the placement of 6 inches of topsoil covered by a vegetative layer, such as grass.

Present Worth Cost:	\$ 9,700,000
Time to Implement:	6 months

Alternative 3: Subtitle D Cap

This alternative consists of site preparation, institutional controls, groundwater monitoring, groundwater and leachate collection/treatment/disposal, surface water diversion/collection, and the placement of a Subtitle D cap

consisting of 2 to 4 feet of compacted clay and 12 inches of topsoil. The layer thicknesses proposed for the alternative will meet the technical requirements for capping solid waste landfills contained in 329 IAC 2-14-19(3)(b).

Present Worth Cost: \$ 15,700,000
Time to Implement: 9 months

Alternative 4A: Shallow Slurry Wall and Vegetated Soil Cap

This alternative consists of site preparation, institutional controls, groundwater monitoring, groundwater and leachate collection/treatment/disposal, surface water diversion/collection, placement of a vegetated soil cover consisting of the placement of 6 inches of topsoil covered by a vegetative layer, such as grass, and the installation of a shallow slurry wall (approximately 15-25 feet deep) from the end of the collection trench at the northeastern corner of the site to other end of the collection trench at the southwestern corner of the site, keyed into the olive-grey clay facies located beneath a majority of the site.

Present Worth Cost: \$ 11,100,000
Time to Implement: 9 months

Alternative 4B: Deep Slurry Wall and Vegetated Soil Cap

This alternative consists of site preparation, institutional controls, groundwater monitoring, groundwater and leachate collection/treatment/disposal, surface water diversion/collection, placement of a vegetated soil cover consisting of the placement of 6 inches of topsoil covered by a vegetative layer, such as grass, and the installation of a deep slurry wall (approximately 40-50 feet deep) from the end of the collection trench at the northeastern corner of the site to other end of the collection trench at the southwestern corner of the site, keyed into the clay till beneath the site.

Present Worth Cost: \$ 11,900,000
Time to Implement: 9 months

Alternative 5A: Shallow Slurry Wall and Subtitle D Cap

This alternative consists of site preparation, institutional controls, groundwater monitoring, groundwater and leachate collection/treatment/disposal, surface water diversion/collection, placement of a Subtitle D cap consisting of 2 to 4 feet of compacted clay and 12 inches of topsoil. The layer thicknesses proposed for the Subtitle D cap meet the requirements of 329 IAC 2-14-19(3)(b). The installation of a slurry wall encircling the site is also included in this alternative.

Present Worth Cost: \$ 17,100,000
 Time to Implement: 12 months

Alternative 5B: Deep Slurry Wall and Subtitle D Cap

This alternative consists of site preparation, institutional controls, groundwater monitoring, groundwater and leachate collection/treatment/disposal, surface water diversion/collection, placement of a Subtitle D cap consisting of 2 to 4 feet of compacted clay and 12 inches of topsoil. The layer thicknesses proposed for the Subtitle D cap meet the requirements of 329 IAC 2-14-19(3)(b). The installation of a deep slurry wall, connected to the clay till layer underlying the site, encircling the site is also included in this alternative.

Present Worth Cost: \$ 17,900,000
 Time to Implement: 12 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; 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.

Alternatives 2, 3, 4A, 4B, 5A, and 5B would reduce the threats to human health and the environment by placement of a cover material over the contaminated materials.

However, Alternatives 3, 4A, 4B, 5A, and 5B offer greater protection than Alternative 2 because of greater protection

against potential future groundwater migration. Alternatives 3, 5A and 5B offer greater protection than Alternatives 2, 4A and 4B due to reduced infiltration rates which increases long term effectiveness. Alternative 2 does not provide protection of human health and the environment against potential groundwater contamination. Alternatives 3, 5A, and 5B are slightly better than Alternatives 4A and 4B due to the increased protectiveness of the cover materials resulting in lower levels of infiltration.

Alternative 2, due to lower levels of long term effectiveness and increased short term infiltration rates is not as effective as the other alternatives. Alternatives 3, 4A, 4B, 5A, and 5B are functionally equivalent with respect to this threshold criterion, however, Alternatives 3, 5A and 5B are slightly more effective due to increased protectiveness of the cover materials which translates into slightly higher levels of long term effectiveness and permanence.

The groundwater modeling performed during the FS indicated that due to the fact that a portion of the underlying aquifer is unconfined, the reduction of mounding of the groundwater would be more effective than installation of a slurry wall at containing the off-site movement of groundwater. Groundwater mounding occurs as a result of increased permeability of landfill materials and causes the groundwater to collect under the landfill. The water table directly under the landfill is higher than it is in areas surrounding the landfill, thus distorting the regional groundwater flow. The aforementioned reduction in groundwater mounding would allow groundwater affected by landfill contents to respond to regional constraints and flow toward Trail Creek, where it would be collected in the collection trench, instead of collecting directly under the landfill. Therefore, Alternative 3 is slightly more effective than Alternatives 5A and 5B due to more effective groundwater flow management, which provides for the most groundwater capture of the alternatives screened and the greatest collection to recharge ratio.

COMPLIANCE WITH ARARS

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

All of the alternatives are capable of meeting their respective ARARS. Alternatives 2, 4A and 4B include the installation of a vegetated soil cap and do not meet the Subtitle D capping ARAR, nor can a waiver of these requirements be justified. ARARS for Alternatives 3, 5A and 5B can be more easily met because a waiver from State landfill closure requirements is not a requirement due to the expectation that they will meet Federal and State landfill closure requirements.

ARARs for the alternatives include groundwater and surface water protection standards, floodplain protection standards and POTW discharge standards. Alternatives 3, 5A and 5B will meet or exceed the action and chemical specific ARARs. Because Alternatives 2, 3, 4A, 4B, 5A and 5B include the construction of a cap that may impinge on a portion of the floodplain or a wetland, these alternatives may require a waiver for some of the location specific ARARs listed under 40 CFR 6 Appendix A and 40 CFR 230 and 231. Alternatives 2, 4A and 4B will not meet the action specific ARARs for landfill caps and may require a waiver. Table 6 of this ROD contains a complete list of potential ARARs for all of the alternatives.

Therefore, it has been determined that Alternatives 3, 5A and 5B are functionally equivalent with respect to this threshold criteria and are superior to Alternatives 2, 4A and 4B, because the latter alternatives do not fully meet all of the ARARs relative to landfill cap placement.

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.

All of the alternatives involve leaving wastes in place and the long term effectiveness and permanence is entirely dependent on the durability and maintenance of the covers and caps and the ability to direct groundwater to the subsurface drainage trench. Alternatives 3, 5A and 5B offer the greatest long term effectiveness and permanence, due to their ability to more effectively control infiltration and groundwater migration. Long term reliability of the slurry wall components could be impacted by periodic flooding of Trail Creek, with the effectiveness of the wall potentially detrimentally impacted.

The FS contained groundwater modeling that demonstrated that Alternatives 3 and 5A would result in the lowest residual groundwater risk. Alternative 3's reliability for preventing off-site migration of contaminated groundwater is slightly higher than for Alternative 5A and Alternative 5B. Also, with the additional requirement that on-site groundwater be fully contained with this action as is stated in the Documentation of Significant Changes section of this ROD, Alternative 3's long term reliability will be further enhanced.

Therefore, it has been determined that Alternatives 3, 5A and 5B are functionally equivalent with respect to this balancing criterion and are superior to Alternatives 2, 4A and 4B because of

long term reliability and reduction of infiltration and leachate generation.

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

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

All of the alternatives will reduce the mobility of groundwater contamination at the site by causing changes in the direction of flow of leachate and groundwater towards the collection trench where contaminants would be collected for treatment. The collection of groundwater and leachate at the site will reduce the volume of contaminated groundwater under the site. The removal of the collected groundwater and leachate will significantly reduce the toxicity of contaminated groundwater and leachate at the site and, when combined with landfill cap materials, will reduce contaminant mobility. None of the alternatives provides reduction of toxicity, mobility or volume through treatment, though Alternatives 3 and 5A do the most to reduce mobility and volume by containment and removal of contaminated groundwater and leachate.

Alternative 3 collects the highest percentage of recharge and therefore, provides the best reduction of TMV, slightly higher than for Alternatives 5A and 5B. Therefore, although it has been determined that Alternatives 2, 3, 4A, 4B, 5A and 5B are functionally equivalent with respect to this balancing criterion, Alternative 3 shows a slightly higher level of effectiveness.

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 alternatives include fencing to restrict site access to effectively prevent or reduce risks to potential trespassers. Alternatives 2 and 3 result in higher short term exposures over no action as a result of workers being involved in grading and other capping activities at the site. Alternative 2 could be completed in approximately 6 months and Alternative 3 could be completed in approximately 9 months.

Alternatives 4A, 4B, 5A and 5B would result in significant increases in risks in the short term, primarily associated with the construction of the slurry wall component, when compared to Alternatives 2 and 3. Short term risks associated with the slurry wall construction include increased air emissions from excavation activities that will disturb foundry sand and some metal debris and management and disposal of excavated soils (depending on the hazardous nature of the soils). Other short term impacts from the

construction of these alternatives include site grading and capping activities and their potential to disturb surface soils and subsurface wastes. Potential impacts on the surrounding area could be minimized through the application of vapor suppressing foam and other similar means, such as dust suppressants. The slurry wall alternatives could be constructed in 9-12 months.

All of the alternatives could potentially increase risks in the short term due to the potential disturbance of surface soils and subsurface wastes during the installation of the landfill cap materials. Other short term impacts include the increase in truck traffic as landfill cap materials are brought onto the site. The potential for this to impact the surrounding area can be minimized by using engineering controls such as dust suppression and by frequent monitoring so that potential impacts can be addressed promptly and completely.

Therefore, it has been determined that Alternatives 2 and 3 are superior to Alternatives 4A, 4B, 5A and 5B, primarily because the construction of the slurry wall component would significantly increase risks associated with exposure to site contaminants for site workers and the nearby community.

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.

All of the alternatives are demonstrated technologies and will be readily implemented at the site. Alternatives 2 and 3 are easiest to implement technically and the slurry wall alternatives are the most difficult due to the steep slopes on the landfill, access problems on the western perimeter, the need for extra equipment and specialists, and the trucking distance of the slurry materials. Alternatives 3, 5A and 5B are potentially the easiest to implement administratively because of the use of a compliant landfill cap, which would preclude the necessity of obtaining waivers from the landfill capping ARARs.

Therefore, although Alternatives 2, 3, 4A, 4B, 5A, and 5B have been determined to be functionally equivalent with respect to this balancing criterion, Alternative 3 is slightly easier to implement, both technically and administratively.

Cost

Included are capital costs, annual operation and maintenance costs (assuming a 30 year time period), and net present value of capital and operation and maintenance costs. The selected remedy must be cost effective.

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 hydrogeologic characteristics or contaminant specific treatability efficiencies, assumptions were made based on literature and professional judgement 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 7).

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 Alternatives 5A and 5B are the most expensive.

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 technical decisions, and concurs with the selection of Alternative 3 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 from moderately to extremely interested. 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, the majority of those in attendance, as well as the majority of those who submitted written comments regarding the proposed plan, were in favor of Alternative 5B as the most appropriate choice for this action. The primary reason given for this choice was potential future off-site migration of groundwater contamination.

Table 5

CONCENTRATIONS (ug/L)									
PARAMETER	CRDL	BACKGROUND			MEAN LCH	MEAN GW	EST. DISCH. LEVEL	POTW DISCH. LIMIT	PROB. NPDES LIMIT
		MW13S	MW13D	MEAN					
Inorganics									
Aluminum	-	277,000	9,930	143,465	240	41,000	20,620	NL	551
Antimony	40	-	-	-	-	30	-	NL	76
Arsenic	-	12.2	U	6.1	7.3	30	19	290	0.02
Barium	-	1,570	102	836	420	410	415	NL	706
Beryllium	5	16.4	U	9.5	U	14	6.3	NL	0.05
Cadmium	5	3.6	U	5.6	U	5.7	-	500	-
Calcium	-	68,900	151,000	109,950	70,000	150,000	110,000	NL	NL
Chromium	10	507	3.0	260	U	77	41	500	3420
Cobalt	-	285	U	148	6.5	30	18	NL	NL
Copper	25	539	U	276	31	290	161	3,400	40
Iron	-	800,000	16,900	458,480	15,000	81,000	48,000	NL	54.8
Lead	3	569	10.6	290	5.5	280	143	500	353
Magnesium	-	88,400	82,100	74,250	81,000	58,000	69,800	NL	NL
Manganese	-	25,000	719	12,868	480	2,300	1,348	NL	35.3
Mercury	0.2	1.1	U	0.6	U	0.19	U	60	0.66
Nickel	40	553	U	287	86	88	87	3,000	2860
Potassium	-	34,400	5,680	20,030	82,000	21,000	51,800	NL	NL
Silver	10	U	U	U	U	2.7	U	50	9.55
Sodium	-	6,220	12,300	9,280	380,000	83,000	231,500	NL	NL
Vanadium	5	868	22.9	446	U	77	40	NL	NL
Zinc	20	2,220	U	1115	180	870	525	4,200	240
Cyanide	10	U	U	U	49	5.6	27	1,000	19
Volatiles									
Benzene	5	U	U	U	U	2.8	U	NL	NL
Chloroethane	10	U	U	U	U	5.4	U	NL	NL
1,2-Dichloroethane	5	U	U	U	U	2.0	U	NL	NL
Methylene Chloride	5	U	U	U	U	3.4	U	NL	NL
Toluene	5	U	U	U	U	2.0	U	NL	NL
Xylenes	5	U	U	U	U	3.1	U	NL	NL
1,1,1-Trichloroethane	5	U	U	U	U	2.7	U	NL	NL
Semivolatiles									
Acenaphthene	10	U	U	U	U	5.1	U	NL	NL
Anthracene	10	U	U	U	U	3.0	U	NL	NL
Benzoic Acid	50	U	U	U	2.0	8.0	U	NL	NL
Benz(a)anthracene	10	U	U	U	U	5.0	U	NL	NL
Benz(a)pyrene	10	U	U	U	U	4.0	U	NL	NL
Benz(b)fluoranthene	10	U	U	U	U	5.1	U	NL	NL
Benz(g,h,i)perylene	10	U	U	U	U	3.0	U	NL	NL
Benz(k)fluoranthene	10	U	U	U	U	5.1	U	NL	NL
Bis(2-ethylhexyl)phthalate	10	U	U	U	4.0	6.4	U	NL	NL
Chrysene	10	U	U	U	U	5.1	U	NL	NL
Dibenzofuran	10	U	U	U	U	5.1	U	NL	NL
1,4-Dichlorobenzene	10	U	U	U	U	3.0	U	NL	NL
Diethylphthalate	10	U	U	U	U	3.0	U	NL	NL
Di-n-butylphthalate	10	U	U	U	2.0	U	U	NL	NL
Fluoranthene	10	U	U	U	U	5.2	U	NL	NL
Fluorene	10	U	U	U	U	5.1	U	NL	NL
2-Methylnaphthalene	10	U	U	U	U	5.4	U	NL	NL
4-Methylnaphthalene	10	U	U	U	U	3.0	U	NL	NL
Naphthalene	10	U	U	U	U	5.1	U	NL	NL
N-Nitrosodimethylaniline	10	U	U	U	U	5.4	U	NL	NL
Phenanthrene	10	U	U	U	U	5.6	U	NL	NL
Pyrene	10	U	U	U	U	5.2	U	NL	NL
General									
pH	-	-	-	-	NA	NA	-	5-10	-
Oil & Grease	-	-	-	-	NA	NA	-	100,000	-
Phenol	10	U	U	U	U	5.0	U	500	-
PCBs(Aroclor1254)	1	U	U	U	U	0.54	U	U	-

CRDL = Contract Required Detection Limit

POTW = Publicly Owned Treatment Works

NPDES = National Pollutant Discharge Elimination System

LCH = Leachate

GW = Ground Water

NA = Not Applicable

NL = No Limit Established

U = Not detected (i.e., below the CRDL)

MW13S = Shallow Monitoring Well 13

NOTE:

Shaded parameters may require the revision of the NPDES permit for the POTW and/or the establishment of discharge limits.

Bolted parameters would require treatment for discharge to Trail Creek.

The estimated discharge is an equal blend of leachate and shallow ground water.

In summation, Alternative 1 is unacceptable for protection of human health and the environment. Alternatives 3, 5A and 5B fully satisfy the nine evaluation criteria with the exception of reduction of toxicity, mobility and volume through treatment. However, these three alternatives would provide reduction in the toxicity of contaminants through groundwater treatment and reduction in the mobility of contaminants through capping. Alternatives 2, 4A and 4B are not as protective of human health and the environment nor are they as effective in the long term at preventing exposure to site contaminants in the soil and groundwater and leachate.

Alternative 3 is more effective in the short term than Alternatives 5A and 5B due to the absence of the slurry wall component and its associated implementation problems. Alternatives 5A and 5B would significantly increase short term risks to the community due to dust and the potentially contaminated soils removed in the slurry trench excavation process, which could potentially impact the air quality in the surrounding areas. Alternative 3, with the added requirement for total groundwater containment at the site boundary, provides for long term assurances that groundwater will not migrate away from the site, which was the primary concern identified in comments from the public. Finally, Alternative 3, while providing similar levels of effectiveness, is more cost effective than Alternatives 5A and 5B.

Therefore, the best balance among the seven alternatives, while providing for protection of human health and the environment and long term effectiveness and permanence, is Alternative 3, Subtitle D Cap.

Selected Remedy

U.S. EPA has selected Alternative 3 - Subtitle D Cap, as the appropriate cleanup remedy for the Waste, Inc. site. This alternative was selected because it is the most appropriate alternative for this final action.

The FS contains a description of this alternative. The components of this alternative are site preparation, institutional controls, groundwater monitoring, groundwater and leachate collection, treatment and disposal, and placement of cap materials.

Site preparation will include grubbing, upgrading and installing roadways, as needed; supplying electricity to sumps and pumping stations; supplying natural gas if needed; and providing support trailers and services.

Institutional controls such as fencing, deed restrictions, and groundwater monitoring will be implemented. Deed restrictions on both the Waste, Inc. and Lin-See, Ltd. properties will be sought that will limit the use of the site for construction or other

POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
(Page 1 of 10)

Action	Requirement	Citation
Air Stripping	Design system to provide odor-free operation.	CAA Section 101 ^(b)
	File an Air Pollution Emission Notice (APEN) with the State of Indiana to include estimation of emission rates for each pollutant expected.	40 CFR 52 ^(b) ; 326 IAC 2-1-2
	Verify through emission estimates and dispersion modeling that hydrogen sulfide emissions do not create an ambient concentration greater than or equal to 0.10 ppm.	40 CFR 61 ^(b) ; 326 IAC 1-4
	Verify that emissions of mercury, vinyl chloride, and benzene do not exceed levels expected from sources in compliance with hazardous air pollution regulations.	40 CFR 61 ^(b) ; 326 IAC 1-4
Capping	Placement of a cap over a landfill requires a cover designed and constructed to: <ul style="list-style-type: none"> • Provide long-term minimization of infiltration of liquids through the capped area. • Function with minimum maintenance. • Promote drainage and minimize erosion or abrasion of the cover. • Accommodate settling and subsidence so that the cover's integrity is maintained. • Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present. 	40 CFR 264.310(a); 329 IAC 3-5.3-5(a)
	Install a final cover system that is designed to minimize infiltration and erosion. The cover system must be designed and constructed to: <ul style="list-style-type: none"> • Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/s, whichever is less. • Minimize infiltration by the use of an infiltration barrier layer containing a minimum of 18" of earthen material. • Minimize erosion by the use of an erosion layer that contains a minimum of 6" of earthen material capable of sustaining plant growth. 	40 CFR 258.60(a)

Table 6

POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
(Page 2 of 10)

Action	Requirement	Citation
Capping (continued)	The maximum projected erosion rate shall be 5 tons per acre per year.	329 IAC 2-14-19(3)(A)
	Apply and compact no less than 2 feet of final cover, apply 6" of topsoil on top of the final cover to establish vegetation.	329 IAC 2-14-19(3)(B)
	The final cover shall have a slope not less than 2% and not greater than 33%.	329 IAC 2-14-10(3)(C)
	Post-closure care performance standard.	329 IAC 2-15-1
	Record a notation on the deed to the facility property to notify any potential purchaser that the land has been used as a disposal facility.	40 CFR 258.60 (i)(1); 329 IAC 2-15-5(2)
	Post-closure duties.	329 IAC 2-15-7
	Responsibility to correct nuisance.	329 IAC 2-15-10
	Elimination of threats to human health or the environment after post-closure.	329 IAC 2-15-11
	Ground water monitoring devices.	329 IAC 2-16-1
	Ground water sampling procedures.	329 IAC 2-16-2
	Ground water monitoring requirements.	40 CFR 258.50
	Restrict post-closure use of property as necessary to prevent damage to the cover.	40 CFR 264.117(c); 329 IAC 3-46-8(d)
	Prevent run-on and run-off from damaging cover.	40 CFR 264.310(b); 329 IAC 3-53-5(b)
	Protect and maintain surveyed benchmarks used to locate waste cells.	40 CFR 264.310(b); 329 IAC 3-53-5(b)
	Disposal or decontamination of equipment, structures, and soils.	40 CFR 264.114; 329 IAC 3-46-5
	Installation of final cover to provide long-term minimization of infiltration.	40 CFR 264.310; 329 IAC 3-53-5
	Stabilize wastes, if necessary, to support cover.	40 CFR 264.228; 40 CFR 264.258
	Post-closure care and ground water monitoring.	40 CFR 264.310; 329 IAC 3-53-5

1a b/c G/C (cont)

**POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
(Page 3 of 10)**

Action	Requirement	Citation
Clean Closure (Removal)	<p>General performance standard requires minimization of need for further maintenance; control, minimization, or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products.</p> <p>Disposal or decontamination of equipment, structures, and soils must meet both State and Federal requirements.</p> <p>Removal or decontamination of all waste residues, contaminated containment system components (e.g., liners, dikes), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and management of them as hazardous waste.</p> <p>Removal of PCB waste must meet health based levels and disposal in accordance with the State and Federal regulations.</p>	<p>40 CFR 264.111; 329 IAC 3-46-2</p> <p>40 CFR 264.114 and 268; 329 IAC 3; 329 IAC 3-46-5</p> <p>40 CFR 264.258; 329 IAC 3-51-6; see Excavation in this Table for additional ARARs.</p> <p>329 IAC 4-1-4(c); 329 IAC 4-5; 329 IAC 4-10; 40 CFR 761.75</p>
Direct Discharge of Treatment System Effluent	<p>Applicable Federal water quality criteria for the protection of aquatic life must be complied with when environmental factors are being considered.</p> <p>Applicable Federally approved state water quality standards must be complied with. These standards may be in addition to or more stringent than other Federal standards under the CWA.</p> <p>The discharge must be consistent with the requirement of a Water Quality Management plan approved by the USEPA under Section 208(b) of the CWA.</p> <p>Use of best available technology (BAT) economically achievable is required to control toxic and nonconventional pollutants. Use of best conventional pollutant control technology (BCT) is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis. In some cases, the permit limit for a conventional pollutant may be more stringent than BCT.</p> <p>Discharge limitations must meet the standards set in Section 307(a) of the CWA.</p>	<p>50 FR 30784</p> <p>40 CFR 122.44 and State regulations approved under 40 CFR 131; 327 IAC 5-2-10; 327 IAC 2 CWA Section 208(b); 327 IAC 5-2-10(c)(4)</p> <p>40 CFR 122.44(a) 327 IAC 5-5-2</p> <p>40 CFR 122.44(b); CWA Section 307(a)</p>

Table 6 (CONT)

TABLE 2.3

**POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
(Page 4 of 10)**

Action	Requirement	Citation
Direct Discharge of Treatment System Effluent - (continued)	<p>Effluent must meet all State water quality standards, including narrative criteria. If a specific pollutant causes or contributes to an excursion above a narrative criterion and a water quality criterion has not previously been set, the State may establish effluent criteria.</p> <p>Discharge limitations must be established for all toxic pollutants that are or may be discharged at levels greater than those that can be achieved by technology-based standards.</p> <p>Discharge must be monitored to assure compliance. Discharger will monitor:</p> <ul style="list-style-type: none"> • The mass of each pollutant discharged. • The volume of effluent discharged. • Frequency of discharge and other measurements as appropriate. <p>The following records must be maintained:</p> <ul style="list-style-type: none"> • Date, place, and time of measurements, • Person(s) who performed sampling or measurement, • Date(s) analyses were performed, • Person(s) who performed analyses, • Analytical techniques or methods used, and • Results for measurements and analyses. <p>The discharge monitoring reports (DMRs) must be submitted to IDEM (at least annually).</p> <p>Approved test methods for waste constituents to be monitored must be followed. Detailed requirements for analytical procedures and quality controls are provided.</p>	<p>40 CFR 122.44(d)</p> <p>40 CFR 122.44(e)</p> <p>40 CFR 122.44(i); 327 IAC 5-2-13</p> <p>327 IAC 5-2-14; 40 CFR 122.44(i); 327 IAC 5-2-15</p> <p>40 CFR 122.44(i); 40 CFR 136; 327 IAC 5-2-13(c)</p>

Table 6 (cont)

POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
 (Page 5 of 10)

1951-6 (Cont)

**POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
(Page 6 of 10)**

Action	Requirement	Citation
Discharge to POTW ⁽²⁾ - (continued)	<ul style="list-style-type: none"> • Create a fire or explosion hazard in the POTW. • Are corrosive (pH<5.0) • Obstruct flow resulting in interference. • Are discharged at a flow rate and/or concentration that will result in interference. • Increase the temperature of wastewater entering the treatment plant that would result in interference, or raise the POTW influent temperature above 104°F (40°C). <p>Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants, spill prevention program requirements, and reporting and monitoring requirements.</p> <p>The POTW can deny or condition discharge of pollutants to the POTW if applicable pre-treatment standards or requirements are not met, or would result in a violation of the POTW's NPDES permit. The POTW can require compliance, control the contribution through permit, order, or similar means or require the development of a compliance schedule.</p> <p>RCRA permit-by-rule requirements must be complied with for discharges of RCRA hazardous wastes to POTWs by truck, rail, or dedicated pipe.</p>	<p>327 IAC 5-12-2(b)</p> <p>40 CFR 403.5 and local POTW regulations</p> <p>40 CFR 403.8(f)</p> <p>40 CFR 264.71; 40 CFR 264.72; 329 IAC 3-41; 329 IAC 3-44-3</p>
Gas Collection	<p>Meet Clean Air Act requirements, and meet state ambient air quality standards.</p> <p>Design system to provide odor-free operation.</p> <p>Establish procedures for review for construction and operation of any source that has the potential to emit criteria air pollutants. File an APEN with state to include estimation of emission rates for each pollutant expected.</p> <p>Verify through emission estimates and dispersion modeling that hydrogen sulfide emissions do not create an ambient concentration greater than or equal to 0.10 ppm.</p> <p>Verify that emissions of mercury, vinyl chloride, and benzene do not exceed levels expected from sources in compliance with hazardous air pollution regulations.</p> <p>Meet established limits for VOC emissions. Best Available Control Technology (BACT) is required if emissions exceed 25 tons/year.</p>	<p>CAA; 326 IAC 1-3</p> <p>CAA Section 101^(b); 40 CFR 52^(b)</p> <p>40 CFR 52^(b); 326 IAC 2</p> <p>40 CFR 61^(b); 326 IAC 14</p> <p>40 CFR 61^(b); 326 IAC 14</p> <p>326 IAC 8-1</p>

Table 6/10a

**POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
(Page 7 of 10)**

Action	Requirement	Citation
Operation and Maintenance (O&M)	Post-closure care to ensure that site is maintained and monitored.	40 CFR 264.118 (RCRA Subpart G); 329 IAC 3-46.9
	Develop Contingency Plan and Emergency Procedures to minimize potential hazards from fires, explosions or any unplanned release during closure and post-closure status.	329 IAC 3-18
Security	<p>Sites should be secured in accordance with this rule which:</p> <ol style="list-style-type: none"> 1) Requires prevention of unknowing and unauthorized entry of persons or livestock if physical contact with the waste, etc. could cause injury or, if disturbance of the waste, etc. would cause a violation. 2) The facility must have either: A 24 hour surveillance system which continuously monitors and controls entry or an artificial or natural barrier which completely surrounds the active portion and a means to control entry (i.e., a lock) at all times, through the gates or other entrances to the active portion. 3) "Danger - Unauthorized Personnel Keep Out" signs are required at each entrance and other locations sufficient to be seen from any approach, legible from a distance of at least 25 feet. 	329 IAC 3-16-5
Slurry Wall	Excavation of soil for construction of slurry wall may trigger cleanup or land disposal restrictions.	See Consolidation, Excavation in this table.
Surface Water Control	Prevent run-on, and control and collect runoff from a 24-hour, 25-year storm during closure and post-closure status.	40 CFR 264.301(f),(g),(h); 329 IAC 3-53-2(f),(g),(h)
Treatment	Standards for miscellaneous units (long-term retrievable storage, thermal treatment other than incineration, open burning, open detonation, chemical, physical, and biological treatment units other than tanks, surface impoundments, or land treatment units) require new miscellaneous units to satisfy environmental performance standards by protection of groundwater, surface water, and air quality, and by limiting surface and subsurface migration.	40 CFR 264 (Subpart X); 329 IAC 3-54.9
	<p>Requires permit for construction of treatment facility and specifies standards for facility.</p> <p>Treatment of wastes subject to ban on land disposal must attain levels achievable by best demonstrated available treatment technologies (BDAT) for each hazardous constituent in each listed waste.</p>	<p>327 IAC 3</p> <p>40 CFR 268 (Subpart D)</p>

Table 6 (cont)

POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
 (Page 8 of 10)

Action	Requirement	Citation
Treatment - (continued)	<p>Prepare fugitive and odor emission control plan for this action.</p> <p>Establish procedures for review of construction and operation of any source that has the potential to emit criteria air pollutants. File an APEN with state to include estimation of emission rates for each pollutant expected.</p> <p>Verify through emission estimates and dispersion modeling that hydrogen sulfide emissions do not create an ambient concentration greater than or equal to 0.10 ppm.</p> <p>Verify that emissions of mercury, vinyl chloride, and benzene do not exceed levels expected from sources in compliance with hazardous air pollution regulations.</p>	<p>CAA Section 101^(b); 40 CFR 52^(b)</p> <p>40 CFR 52^(b); 326 IAC 2</p> <p>40 CFR 61^(b); 326 IAC 14</p> <p>40 CFR 61^(b); 326 IAC 14</p>
Underground Injection of Wastes and Treated Groundwater	<p>UIC program prohibits:</p> <ul style="list-style-type: none"> • Injection activities that allow movement of contaminants into underground sources of drinking water (USDW) and result in violations of MCLs or adversely affect human health, and • Construction of new Class IV wells, and operation and maintenance of existing wells. <p>Injection is prohibited prior to permit issuance.</p> <p>Wells used to inject contaminated groundwater that has been treated and is being reinjected into the same formation from which it was withdrawn are not prohibited if activity is part of CERCLA or RCRA actions.</p> <p>All hazardous waste injection wells must also comply with the RCRA requirements.</p> <p>If underground injection is proposed as part of a NPDES permit, additional terms and conditions will be added to the permit to protect ground water quality.</p>	<p>40 CFR 144.12</p> <p>40 CFR 144.13</p> <p>40 CFR 144.11</p> <p>40 CFR 144.14</p> <p>40 CFR 144.16; 329 IAC 3-40-1(d)</p> <p>327 IAC 5-4-2</p>
Excavation	<p>Area from which materials are excavated may require cleanup to levels established by closure requirements.</p> <p>Movement of excavated materials to previously uncontaminated, on site location and placement in or on land may trigger land disposal restrictions.</p>	<p>40 CFR 264 Disposal and Closure Requirements, 329 IAC 3-40 through 329 IAC 3-54.9</p> <p>40 CFR 268</p>

Table 6 (cont)

TABLE 2-3

**POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
(Page 9 of 10)**

Action	Requirement	Citation
Excavation - (continued)	Removal of non-hazardous excavated material from a CERCLA site may qualify the material as special waste and is subject to state regulations for special waste.	329 IAC 2-21
	All listed and characteristic hazardous wastes or soils and debris contaminated by a RCRA hazardous waste and removed from a CERCLA site may not be land disposed until treated as required by Land Ban. If alternative treatment technologies can achieve treatment similar to that required by Land Ban, and if this achievement can be documented, then a variance may not be required.	40 CFR 268
	Transport and disposal of hazardous waste excavated from a CERCLA site will require state administrative and financial assurance, and state manifest	329 IAC 3
	Develop fugitive and odor emission control plan for this action if existing site plan is inadequate.	CAA Section 101 ^(b) ; 40 CFR 52 ^(b)
	Particulate emissions from earth moving and material handling activities must be controlled, such that no visible emissions cross the property line and the increase in upward/downward total suspended particulate concentration is limited to 50 ug/m ³ .	326 IAC 6-4
	File an APEN with state to include estimation of emission rates for each pollutant expected.	40 CFR 52 ^(b) ; 326 IAC 2-1-2
	Verify through emission estimates and dispersion modeling that hydrogen sulfide emissions do not create an ambient concentration greater than or equal to 0.10 ppm.	40 CFR 61 ^(b) ; 326 IAC 14
	Verify that emissions of mercury, vinyl chloride, and benzene do not exceed levels expected from sources in compliance with hazardous air pollution regulations.	40 CFR 61 ^(b) ; 326 IAC 14

Table is correct

POTENTIAL FEDERAL AND STATE ACTION-SPECIFIC REQUIREMENTS
WASTE, INC. SITE
MICHIGAN CITY, INDIANA
 (Page 10 of 10)

Action	Requirement	Citation
Consolidation	Area from which materials are removed should be remediated.	See Clean Closure or Capping
	Consolidation in storage piles will trigger storage requirements.	40 CFR 262.34; 40 CFR 268 (subpart E)
	Place on or in land outside unit boundary or area of contamination will trigger land disposal requirements and restrictions.	40 CFR 285 (Subpart D)
	Develop fugitive and odor emission control plan for this action if existing site plan is inadequate.	CAA Section 101 ⁽¹⁾ ; 40 CFR 52 ⁽¹⁾
	File and APEI with state to include estimation of emission rates for each pollutant expected.	40 CFR 52 ⁽¹⁾ ; 326 IAC 2-1-2

Notes:

- (1) All of the Clean Air Act ARARs that have been established by the Federal government may be covered by matching State regulations. The State may have the authority to manage these programs through the approval of its implementation plans (40 CFR 52 Subpart Q)
- (2) These regulations apply regardless of whether the remedial action discharges into the sewer or trucks the waste to an inlet to the sewage conveyance system located "upstream" of the POTW

Table 6 (cont)

**COMPARATIVE COST SUMMARY
WASTE, INC. SITE
MICHIGAN CITY, INDIANA**

Alternative	Total Capital Cost (\$) ⁽¹⁾	Total O & M Cost (\$) ⁽²⁾	Total Present Worth (\$) ^(1,2)
1	0	0	0
2	5,200,000	290,000	9,700,000
3	11,300,000	290,000	15,700,000
4A	6,500,000	300,000	11,100,000
4B	7,300,000	300,000	11,900,000
5A	12,500,000	300,000	17,100,000
5B	13,300,000	300,000	17,900,000

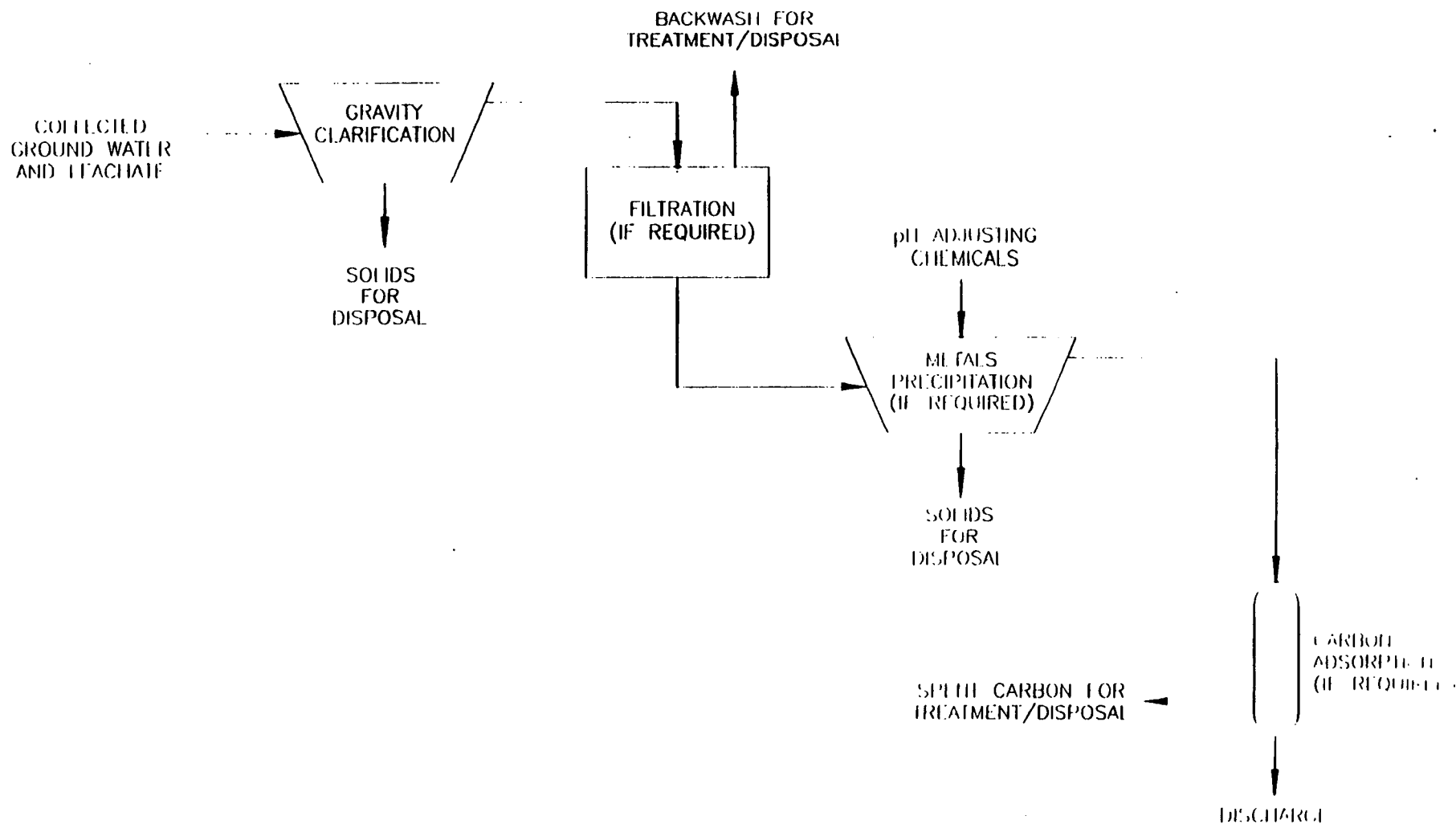
Key:

O&M = Operating and Maintenance.

Notes:

⁽¹⁾ Totals are rounded to the nearest \$100,000.

⁽²⁾ Present worth calculations assume a discount rate of 5 percent.



METALS TREATMENT SYSTEM
SIMPLIFIED PROCESS FLOW DIAGRAM
WASTE, INC. SITE
MICHIGAN CITY, INDIANA

development, and will prohibit the use of groundwater beneath the site for drinking water purposes.

Long term groundwater monitoring to insure that contaminated groundwater has not moved off-site and well maintenance will be required and will be further refined during remedial design. Two separate collection/extraction systems - a groundwater and leachate collection trench and groundwater extraction wells - shall be installed to capture and prevent any potential future off-site migration of the contamination plume. Groundwater and leachate will be collected by a trench along Trail Creek and in the area of steep slopes along the property lines near the creek.

Drainage pumps in the trench will lead to sumps, with submersible pumps. The trench would be keyed into the olive-grey clay along the toe of the landfill near the 590 foot elevation contour. A groundwater flow barrier, consisting of a high-density polyethylene (HDPE) liner of sheet piles along the creek side of the collection trench will be installed to prevent dehydrating the soils between the trench and the creek, to ensure that the collected groundwater and leachate do not migrate out of the collection trench and to prevent flood waters from entering the collection trench. The trench would be covered by the cap to provide further protection from floods and surface water runoff.

Extraction wells shall be installed at the site and utilized so that groundwater contaminated by the site is contained at the site boundary. This requirement shall ensure that the potential for future off-site migration of contaminated groundwater is eliminated. Details on extraction rates and extraction well placement shall be developed during remedial design to ensure that this requirement is met.

The collected groundwater and leachate shall be pumped to the Sanitary District of Michigan City Wastewater Treatment Facility (the District) for treatment. The District is located along Trail Creek directly across from the southwestern portion of the Waste, Inc. property. Discharge to the POTW will require a pumping station and necessary piping. Piping may be routed directly to the District or to the combined sewer along U.S. Highway 12 and will require winterization.

When the collected groundwater and leachate is discharged to the local POTW, this effluent will have to meet the District's discharge limits summarized in Table 5. In addition, the collected groundwater and leachate would have to fulfill the requirements on Table 5. If the collected groundwater and leachate does not meet these limits for discharge, treatment using a combination of gravity clarification, filtration, metals precipitation and activated carbon shall be used to treat the groundwater to these levels, so that discharge to the POTW will be allowable. A simplified process flow diagram for the treatment system is shown

in Figure 4.

Provisions shall be made so that if the District cannot accept direct discharge from the site (i.e. during rain events), then the collected groundwater and leachate will be stored on-site until the District can accept direct discharge.

The Subtitle D Cap shall meet the requirements of 329 IAC 2-14-19(3)(b) and 329 IAC 19(3)(a)-(c). The need for additional cover layers will be evaluated during RD/RA.

Capping the Waste, Inc. site is a three stage process. The heavily vegetated and wooded areas on the Lin-See Ltd. property must be cleared and grubbed. Then, the steep slope between the fill mound and Trail Creek will be moderated unless a waiver of slope requirements is granted. The slopes may require stabilization based on the results of the slope stability investigation during remedial design. The two options for moderating the slope are cut and fill (i.e. regrading within the current landfill area) and the addition of fill. Drums located at or near the toe of the landfill would have to either be moved or covered. The cap would then be placed over the new fill in the same manner as it would be over the rest of the site.

Gas collection shall be provided by installing vent pipes into the fill. The collected gas will be disposed of by flaring or venting. Final gas management requirements will be determined during remedial design.

As a portion of the selected remedy, information shall be gathered on the storm sewer that runs under the western portion of the landfill mound. This information shall assist in determining if the sewer can be rerouted from under the landfill mound or grouted and sealed so that the potential for leachate from the site to migrate along this route and ultimately discharge into Trail Creek is eliminated.

As a portion of the selected remedy, the underground tank that is located on the northern portion of the Waste, Inc. property shall be located and removed in accordance with the Underground Storage Tank regulations.

As a portion of the selected remedy, fish advisory signs shall be posted along Trail Creek, informing residents of the potential risks associated with consumption of fish that may have been impacted by the Waste, Inc. site, as was calculated in the site-wide risk assessment.

As a portion of the selected remedy, the on-site well (located on the north-central portion of the site directly behind the front gate) will be properly abandoned in accordance with the appropriate State of Indiana well abandonment regulations.

The point of compliance for this remedial action shall be the property boundary, as is illustrated in site documents such as the RI and the FS, and as defined on Figure 2. This action will ensure that groundwater will not migrate past the point of compliance.

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

At the public meeting and throughout the public comment period, site residents and proposed plan commentators recommended that a slurry wall component be added to the Subtitle D Cap remedial action primarily to address the potential for on-site contaminated groundwater to migrate away from the site. At the present time, groundwater has not been found to be moving away from the site; however, the potential exists for this to happen in the future.

EPA has modified the proposed remedy to address this concern in the following manner: EPA has added a requirement that extraction wells be installed that will ensure that site groundwater will always be contained at the site boundary, so that the potential for future off-site groundwater migration is eliminated. This requirement is preferred to the installation of a slurry wall because of the similarities in effectiveness between the two technologies and the detrimental impacts of installing a slurry wall, including dust and noise generation and disturbance of site wastes, that will produce much higher risks to the community in the short term.

Additionally, the RI did not identify any locations within a one mile radius of the site that were using groundwater. However, during the public comment period, 17 wells in the site vicinity were identified by a local group of citizens. Of these 17 wells, one was definitely located within a one mile radius of the site and two others were slightly farther from the site. At the request of the EPA, IDEM sampled these three wells to determine if they had been impacted by the site, even though RI data indicates that groundwater is not migrating away from the site. The results of this sampling exercise will be examined, when available, and if contamination attributable to the site is found in these wells, EPA will take appropriate measures, consistent with its authority under CERCLA, to remediate the problem.

EPA has also modified the proposed remedy to add requirements to remove the underground fuel tank that is located on the northern portion of the property. This action will remove a potential source of contamination. EPA has modified the proposed remedy to address the on-site storm sewer that is situated under the western portion of the landfill mound. This sewer will either be abandoned

or rerouted, depending on current usage. EPA has modified the proposed remedy to include proper abandonment of the on-site well, which has been the subject of concern throughout the RI/FS process. Finally, EPA has modified the proposed remedy to include the posting of fish advisory signs along Trail Creek, to warn anglers of potential hazards associated with fish consumption calculated in the risk assessment for the Waste, Inc. site.

Statutory Determinations

The selected remedy must satisfy the requirements of Section 121(a-e) of CERCLA to:

- a. Protect human health and the environment;
- b. Comply with ARARs;
- c. Be cost-effective;
- d. Utilize permanent solutions and alternate treatment technologies to the maximum extent practicable; and,
- e. Satisfy a preference for treatment as a principal element of the remedy.

The implementation of Alternative 3 at the Waste, Inc. site satisfies the requirements of CERCLA as detailed below:

a. Protection of Human Health and the Environment

Implementation of the selected alternative will reduce and control potential risks to human health posed by exposure to contaminated ground water. Institutional controls will provide short-term effectiveness for the prevention of drinking contaminated ground water under the site. The selected remedy also protects the environment by eliminating the potential risks posed by site contaminants and leachate discharging to surface water (Trail Creek) by creating a hydraulic barrier through pumping of groundwater.

Capping the landfill, in addition to reducing the potential future risk posed by exposure to landfill contaminants and contaminated soil, will reduce percolation and recharge through the cap by an estimated 90 percent, and maintain that rate of reduction over time. Ground-water contaminant loading will thus be reduced.

No unacceptable short-term risks will be caused by implementation of the remedy. The community and site workers may be exposed to noise and dust nuisances during construction of the cap. Vehicular accident occurrences may rise due to the projected increase in volume of truck traffic in hauling capping materials to the landfill. Standard safety programs will manage any short-term risks. Dust control measures and VOC-emission controls will mitigate those risks as well.

The permanent solutions to the principal threats to human health and the environment at the site outweigh the minimal short-term impacts of the construction of the remedial components. The risks due to ingestion of contaminated ground water would be reduced to acceptable levels once the principal threats have been addressed. Once the cap is installed there would be no need to replace or upgrade it, assuming proper maintenance.

b. Compliance With ARARs

CERCLA requires that remedial actions meet legally applicable or relevant and appropriate requirements of other environmental laws. A "legally applicable" requirement is one which would legally apply to the response action if that action were not taken pursuant to CERCLA. A "relevant and appropriate" requirement is one that, while not "applicable," is designed to apply to problems sufficiently similar to those at the site that its application is appropriate.

The selected remedy will comply with the Federal and/or State where more stringent, applicable or relevant and appropriate requirements (ARARs) listed below:

1. Chemical-specific ARARs

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the extent of cleanup at a site.

A. Soils/Sediments

No chemical-specific standards exist for soils and sediments. The cap will prevent any further risk posed by contact with or ingestion of contaminated soils on site.

B. Surface Water

i. Federal ARARs

Surface water quality standards for human health and aquatic life protection were developed under the Clean Water Act (CWA) Section 304. The Federal Ambient Water Quality Criteria (AWQC) are non-enforceable guidelines that set pollutant concentration limits to protect surface waters that are applicable to point source discharges, such as from industrial or municipal wastewater streams. At a Superfund site, the Federal AWQC would not be applicable except for pretreatment requirements for discharge of treated water to a Publicly Operated Treatment Works (POTW). CERCLA (Section 121(d)(1)) requires the U.S. EPA to consider whether AWQC would be relevant and appropriate under the circumstances of a release or threatened release, depending on the

designated or potential use of ground water or surface water, the environmental media affected by the releases or potential releases, and upon the latest information available. Since the aquifer may be a potential source of drinking water, and treated water will be discharged to the Michigan City POTW, AWQC adopted for drinking water and AWQC for protection of freshwater aquatic organisms are relevant and appropriate to the point source discharge of the treated water into the POTW.

ii. State ARARs

Section 303 of the CWA requires the State to promulgate state water quality standards for surface water bodies, based on the designated uses of the surface water bodies. CERCLA remedial actions involving surface water bodies must ensure that applicable or relevant and appropriate state water quality standards are met.

In addition, Indiana establishes an anti-degradation policy for all waters of the State and it establishes water quality standards for use classifications. These would be applicable to actions that involve discharges to POTW/Trail Creek in that discharges must meet water quality standards.

The Sanitary District of Michigan City, Indiana has sewer use regulations as part of its NPDES permit which require pretreatment prior to discharge to the sewer system. The remedy will provide mechanisms for any such pretreatment needed for the extracted groundwater which is to be disposed of in the POTW.

C. Groundwater

Because contaminated groundwater has not yet migrated away from the site and because the selected remedy will permanently contain the contaminated groundwater currently on-site, no treatment of groundwater is contemplated by this ROD.

2. Location-specific ARARs

Location-specific ARARs are those requirements that relate to the geographical position of a site. These include:

i. Federal ARARs

Both RCRA (40 CFR 264.18(b) - hazardous waste storage - flood plain) and Executive Order 11988 - Protection of Flood Plains, are applicable to the site due to its location within the mapped 100-year flood plain of Trail Creek. These regulations would require that the ground-water treatment system be located above this elevation and be protected from erosional damage. If it cannot be so located, an ARAR waiver for technical impracticability will be invoked.

Executive Order 11990 - Protection of Wetlands is an applicable requirement to protect against the loss or degradation of wetlands. Ground-water modeling has shown that the estimated extraction rate for Alternative 3 will not be expected to have an adverse effect on the wetlands.

Executive Order 11998 - Floodplain Management - is applicable at the site. Some construction will occur in the floodplain in order to cap the site to protect human health. All attempts will be made to minimize this impact, but an ARAR waiver will be invoked for that necessary construction in the flood plain.

The Federal Endangered and Threatened Species Act protects against the "taking" or harming of endangered or threatened wildlife resources in the area. These would be applicable to the remedial action, in that the poisoning of endangered or threatened species by site contaminants could be considered a "taking." However, the environmental evaluation conducted as a portion of the risk assessment indicated that there were no endangered, threatened or rare species to be found on or in areas immediately adjacent to the site.

3. Action-specific ARARs

Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

i. Federal ARARs

Even though Waste, Inc. Landfill was closed after November 1980 RCRA requirements for landfill closure, RCRA Subtitle C, are not applicable since the hazardous wastes of concern have not been determined to be either RCRA listed hazardous wastes or RCRA characteristic wastes. However, RCRA Subtitle C requirements would be relevant at the site, because the hazardous substances in the landfill are sufficiently similar to listed and/or characteristic RCRA wastes.

A Subtitle C cover is not appropriate for the site, however, because the maximum slope allowed is five percent. A cap with a five percent slope would extend several hundred feet over Trail Creek and well into the floodplain. Furthermore, the hazardous substances are present in the landfill at relatively low concentrations and dispersed over a wide area with no hot spots, making Subtitle C requirements inappropriate.

The RCRA Subtitle D landfill requirements are not applicable because they became effective after the site stopped receiving waste. Indiana landfill requirements listed at 329 IAC 2-14 are applicable because they apply to inactive landfills, are more stringent than federal standards, and are currently in effect.

In the event that a flood event occurs, which affects direct discharge to the District, or on-site pre-treatment is required, RCRA storage and disposal requirements must be met.

Additional Federal action-specific ARARs are found in Table 6.

ii. State ARARs

The cap proposed for the Waste, Inc. site satisfies the requirements of Indiana Subtitle D (329 IAC 2). The estimated reduction of water infiltration with the Alternative 3 cap is 90 percent; the cap design, therefore, also satisfies most of the requirements for Subtitle C caps found at 40 CFR 264.310(a)(1). Since the landfill waste is periodically in contact with the ground water at the site, and, since ground water is to be extracted from an area adjacent to the landfill and treated, the U.S. EPA has determined that it is not technically advantageous and, therefore, not appropriate to install a Flexible Membrane Liner (FML) at this site.

In addition to the cap design requirements of 329 IAC 2, the State is authorized to implement the National Pollutant Discharge Elimination System (NPDES) program. For discharge of treated water, the applicable or relevant and appropriate requirements are dependent on the point of discharge. The substantive requirements of an Indiana Pollutant Discharge Elimination System (IPDES) permit, under IAC, would be applied to the discharge of the collected water to the Michigan City POTW.

Additional ARARs are found in the FS.

c. Cost-effectiveness

Cost-effectiveness compares the effectiveness of an alternative in proportion to its cost of providing its environmental benefits. Table 7 lists the costs associated with the implementation of the remedies.

1. Landfill Alternatives

Alternative 1 is the least expensive alternative, but it does not provide adequate protection or effectiveness over the long-term and it also does not meet State landfill closure requirements. Alternatives 3 and 5 are initially more expensive than Alternatives 2 or 4, due to the cap design, but they provide better precipitation infiltration reduction rates than Alternatives 2 and 4, and they meet current landfill closure requirements. Alternatives 2 and 4 would provide some reduction of precipitation infiltration over the short-term, but it would be subjected to the same damage already experienced by the present cap and, thus,

costly repairs are more likely. Additionally, Alternatives 2 and 4 do not meet current landfill closure requirements.

2. Ground-Water Alternatives

Alternative 1 is the least expensive of the ground-water remedies, but it does not provide adequate protection of human health and the environment. Alternative 2 provides only containment of the landfill and contaminated soils but does not prevent potential off-site migration of groundwater and leachate. The other alternatives do prevent groundwater migration, with alternatives 3 and 4 being less expensive.

Thus, the selected remedy is the most cost-effective remedy, in that Alternative 3 is the only cost-effective option that complies with Federal and State landfill-closure ARARs. The slurry wall afforded by Alternatives 4 and 5 is not needed since the pump and treat system is just as effective in containing the groundwater.

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

The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable ("MEP"). This finding was made after evaluation of the protective and ARAR-compliant alternatives for the Waste, Inc. site remedial action and comparison of the "trade-offs" (advantages vs. disadvantages) among the remedial alternatives with respect to the five balancing criteria (see above).

Once the threshold criteria of protection of human health and the environment and ARARs compliance were satisfied, the key criteria used in remedy selection for the Waste, Inc. site were long-term effectiveness; reduction of toxicity, mobility, and volume ("TMV") through treatment; short-term effectiveness; and cost). The priority given to long-term effectiveness and to reduction of TMV at the site is consistent with U.S. EPA policy established in the NCP. This policy states that long-term effectiveness and reduction of TMV through treatment are generally the key decision factors to be considered at Superfund sites.

The selected remedy's long-term effectiveness and its ability to reduce the TMV of hazardous substances were weighed against its short-term effectiveness aspects in relation to the remaining alternatives. In general, the selected remedy does involve a small degree of risk to site workers and to the community in that there would be movement and treatment of hazardous substances during implementation in order to minimize the long-term effects those substances would have on human health and the environment.

There may be minimal risks associated with the hauling of materials for cap construction. Any risks posed by such action will be mitigated by attempting to secure local materials to construct the cap and to employ standard dust control measures during construction.

1. Landfill Alternatives

The FS report indicates that it is not practicable to utilize a permanent treatment technology on the low-level, long-term threat posed by the landfill contents. Although a cap is not a permanent solution to the low-level threat, it does provide adequate protection from exposure to the wastes. More importantly it provides adequate protection to the ground water by using a barrier to precipitation infiltration through the landfill, which reduces the rate of contaminant loading into the ground water.

The State has concurred with the selection of Alternative 3 as the preferred containment remedy for the landfill unit.

2. Ground-Water Alternatives

Alternative 3 provides a greater degree of long-term effectiveness and permanence than the other ground-water alternatives considered for the site.

None of the alternatives provide reduction of TMV through treatment. However, Alternative 3 does control groundwater migration so no further off-site contamination of surface water or ground water will occur.

3. Summary

The combination of engineering and institutional controls will minimize the residual threats remaining on-site. Negative short-term impacts during implementation of the remedy will be minimized by health and safety measures. The State has concurred with the selection of the preferred remedy. Community acceptance is addressed in the responsiveness summary.

e. Preference for Treatment as a Principal Element

The principal threats at the Waste, Inc. site are the on-site ground-water contamination, due to the potential use of the contaminated water as a drinking water source, and the contaminated soils found on site. No alternative satisfies the statutory preference for treatment as a principal element of the remedy through extraction (and treatment) of the ground-water contaminant plume to achieve Ground-Water Cleanup Standards. Since the landfill does not appear to contain "hot spots", and the wastes are

too heterogeneous for soil treatment to be fully effective, satisfaction of the preference for treatment as a principal element of the landfill portion of the remedy is not practical or cost effective.

EPA and IDEM believe the selected remedy satisfies the statutory requirements specified in Section 121 of SARA to protect human health and the environment; will comply with ARARs (or provide grounds for invoking a waiver); provides overall effectiveness proportionate to its costs; and will utilize permanent solutions and alternate treatment technologies to the maximum extent practicable.

APPENDIX A

Waste, Inc. Landfill Michigan City, Indiana

Responsiveness Summary

I. Responsiveness Summary Overview

In accordance with CERCLA Section 117, a public comment period was held from January 24, 1994 to April 22, 1994, to allow interested parties to comment on the United States Environmental Protection Agency's (U.S. EPA's) Feasibility Study (FS) and Proposed Plan for the Waste, Inc. Landfill Superfund site. At a February 9, 1994, public meeting, EPA and Indiana Department of Environmental Management (IDEM) officials presented the Proposed Plan for remediation at the Waste, Inc. site, answered questions and accepted comments from the public. Written comments were also received through the mail.

II. Background of Community Concern

The Waste, Inc. Landfill operated from 1965 to 1982 as an unpermitted landfill. In August, 1982, a consent order required that the site be covered with foundry sand and capped with clay. However, this order was not fully complied with. In January 1985, the site was scored for the National Priorities List (NPL). The site was placed on the NPL in 1987.

Community involvement has increased over the years as more people became aware of activities at the site. Residents and interested citizens have formed several environmental activist groups to deal with the growing problem of hazardous waste in LaPorte County. These include Save the Dunes Council, LaPorte County Environmental Association, Canada Community Improvement Society, People against Hazardous Waste Sites, and Mothers Opposed to Pollution.

Trail Creek dredging activities in 1987 raised community awareness of environmental activities at the site. Since that point, community interest and involvement has increased.

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

In a Proposed Plan that was issued on January 24, 1994, U.S. EPA (EPA) proposed Alternative 3, Subtitle D Cap, for on-site cleanup. This remedy was based on the information presented in the FS, prepared by the Site Steering Committee and reviewed and approved by EPA. During the public comment period, EPA received

numerous comments regarding the proposal of Alternative 3, most of which were not favorable. The majority of the comments recommended that EPA select Alternative 5B, Deep Slurry Wall and Subtitle D Cap, for the site cleanup.

As a result of the public comments, EPA has added several requirements to the selection of Alternative 3, Subtitle D Cap, as the remedy for site cleanup, as is outlined in the Record of Decision (ROD).

EPA will attempt to provide information relative to the additional requirements that this 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 other remedial 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.

1. Comments were raised concerning the proposed remedy not being able to prevent potential future off-site migration of contaminated groundwater.

U.S. EPA response 1: U.S. EPA understands the concerns regarding the potential for groundwater contaminated by the site to move away from the site in the future. Superfund cleanup remedies provide for remediation of actual and threatened releases of contamination from Superfund sites. At the Waste, Inc. site, there is no evidence that groundwater contamination is moving away from the site at present, however, the potential exists for this to occur in the future. Consequently, EPA has added a requirement to this ROD that will use groundwater extraction wells to assist in the collection of groundwater at the site, so that the potential for future off-site migration of contaminated groundwater is eliminated.

2. Comments were raised concerning the fact that groundwater monitoring results in the RI were not indicative of future results due to the presence of drums in the landfill.

U.S. EPA response 2: U.S. EPA agrees with this comment and with the installation of the aforementioned extraction wells and subsequent groundwater monitoring during the remedy implementation, will ensure that groundwater contaminated by the site is contained at the site boundary.

3. Comments were raised about the long term effectiveness of the proposed remedy, specifically excessive cap erosion and long term operation and maintenance and effectiveness of the leachate collection trench.

U.S. EPA response 3: Capping is accepted as an effective means of cleanup at landfill sites, due to the highly variable mixture of wastes present which precludes effective treatment of the contents of the landfill. Proper design and implementation of a landfill cap will ensure optimum performance. Periodic monitoring and routine maintenance after cap placement will identify potential operating problems early enough so that any adverse impacts can be addressed promptly.

The commentors are correct that the leachate collection trench will only collect leachate and groundwater from the shallow portion of the aquifer; however, the landfill cap, as designed, would significantly impact groundwater flow in the deeper portion of the aquifer by reducing the influences of groundwater mounding on local groundwater flow. This will allow the groundwater to revert to a more natural flow path, as if the landfill was not there. Landfills typically impact local groundwater flow significantly because the increased infiltration of rainwater causes the local groundwater to "mound up" or collect under the landfill. This interrupts local flow patterns and creates a "radial" flow pattern, or one that migrates away from the site in all directions. The landfill cap, coupled with the requirement that extraction wells be used to assist in total site groundwater isolation, will eliminate the off-site migration pathway.

It is true that the leachate collection trench will require long term maintenance to ensure optimal performance-the details for this are to be provided to the public in the operation and maintenance plan, which will be completed during the RD/RA process. The public will be frequently informed on site activities during the entire RD/RA process so that any questions or concerns can be promptly addressed.

4. Comments were raised that stated that the proposed remedy would not sufficiently protect human health and the environment and did not adequately meet the nine NCP criteria.

U.S. EPA response 4. U.S. EPA believes the remedy selected in this ROD does protect human health and the environment by the placement of a cap over the landfill contents and the collection of contaminated groundwater and leachate. These actions will prevent people from contacting site materials and by including deed restrictions at the site, will ensure that this contact will be prevented in the future. The selected remedy was evaluated against the nine NCP criteria and was determined to be the best alternative for site cleanup. The commentor is referred to the

comparative analysis section of the ROD to see how Alternative 3 was evaluated and rated superior to the other alternatives.

5. Comments were raised regarding the applicability of RCRA subtitle C regulations to the site cleanup and the inapplicability of Subtitle D regulations to site cleanup.

U.S. EPA response 5: RCRA Subtitle C requirements are not directly applicable because the site was never a permitted RCRA facility; however, they are relevant. A requirement is appropriate as well if its implementation is necessary to address the conditions at the site. According to 40 CFR 265.310 Subpart N, the cap requirement for closure of an interim status facility is that it must have equal to or less permeability than the soils at the bottom of the facility, in this case the olive gray clay layer. This permeability standard is the relevant and appropriate standard. The cap must be constructed in such a way as to meet that standard. In addition, Subtitle C requirements are not appropriate for the site because the maximum slope allowed is five percent, which would extend the cap several hundred feet into the Trail Creek floodplain. Finally, the hazardous substances are present in the landfill at relatively low concentrations and dispersed over a wide area with no hot spots, making RCRA Subtitle C requirements inappropriate.

RCRA Subtitle D requirements are not directly applicable because they became effective after the site stopped receiving waste. Indiana landfill requirements listed at 329 IAC 2-14 are applicable because they apply to inactive landfills, are more stringent than federal standards, and are currently in effect.

6. A commentor questioned EPA's selection of Alternative 3 over the slurry wall alternatives in relation to the short term effectiveness balancing criterion.

U.S. EPA response 6: The selection of Alternative 3 over the slurry wall alternatives because of increased short term effectiveness was not only based on the fact that Alternative 3 would take three fewer months to implement. The primary reason that it was rated superior to the slurry wall alternatives was because of the intrusive activities of slurry wall construction and the greatly increased short term impacts on site workers and nearby residents. Dust generation, trucks hauling excavated soils, the impact of slurry wall installation on under and above ground utilities in the site vicinity and increased noise were given far greater consideration than the implementation timeframe. EPA has determined that the remedy selected in this ROD will provide protection from site risks while subjecting the community to lower short term risks during implementation than the slurry wall alternatives.

B. Summary of comments regarding off-site impacts from the landfill contents and remediation activities.

7. Comments were raised regarding the RI findings that there were no private wells identified within a one mile radius of the site.

U.S. EPA response 7: The findings of the RI were that there were no private wells identified as using area groundwater within a one mile radius of the site. However, during the public comment period, several local groups conducted a door to door survey of site area residents and identified seventeen wells currently used for drinking water purposes. EPA requested that IDEM sample three of the wells identified by the local groups that were located approximately 1 mile from the site. The other fourteen wells were located approximately 2 miles from the site. The reasoning behind this sampling activity was to determine if any site related contamination had migrated to these locations. These monitoring results will be available soon and will be released to the public at that time.

This exercise is a perfect example of EPA working in conjunction with local residents to address a potential environmental problem. EPA appreciates the groups' efforts that resulted in the well sampling. EPA will continue to work with local residents so that potential concerns such as these are promptly identified and addressed.

8. A commentor stated that potential off-site migration of groundwater contamination has not been adequately modeled.

U.S. EPA response 8: Additional groundwater modeling will be done during remedial design, to assist in determining optimum performance and operating conditions for all remedy components.

9. Several commentors stated that the RI did not include an evaluation of biological indicators of exposure on individuals who live near the site.

U.S. EPA response 9: EPA requires a risk assessment be performed to evaluate potential risks to human health and the environment as a result of contamination at Superfund sites. This assessment does not include biological markers. However, the Agency for Toxic Substances and Disease Registry (ATSDR) can perform these studies if the results of the Health Assessment that ATSDR is required to perform for each Superfund site indicate that an epidemiological or other health study is warranted. At the Waste, Inc. site, this assessment is to be performed by ATSDR shortly. As a result of public comment, ATSDR also performed blood lead testing in the immediate site area that did not indicate any problems due to lead exposure. The results of this study will be released when they become available.

10. Several commentators were concerned about adverse impacts on nearby residents during actual site remediation.

U.S. EPA response 10: U.S. EPA shares this concern and will ensure that frequent monitoring will prevent this occurrence. A number of measures can be taken to prevent potential exposures. Dust suppression, such as spraying on-site areas with water or vapor suppressing foam, will be used to minimize dust generation. Air monitoring for personal safety, using organic vapor detectors will also be used, both to ensure the protection of on-site workers, as well as to ensure the protection of nearby residents and businesses.

C. Summary of comments regarding the selected remedy.

11. Commentors requested that specific variances from ARARs (cap slope angles, construction in the floodplain) be provided in the ROD so that actual cap design could proceed more efficiently

U.S. EPA response 11: It has not been demonstrated at this time that site specific variances are necessary. If cap design determines the need for variances or ARARs waivers, then they will be pursued at that time.

12. A commentor stated that the landfill did not pose any risks and EPA should select Alternative 1-No Action for site cleanup.

U.S. EPA response 12: EPA disagrees with this comment. The risks associated with potential exposure to site materials are unacceptable, as demonstrated in the site risk assessment. The risks calculated demonstrate an unacceptable increased health risk to human health and the environment due to exposure to hazardous substances disposed of at the site, if no action is taken to remediate the contamination problem. EPA has been tasked with an enormous responsibility of making hazardous sites safe so that everyday risks to people who live nearby are decreased. This is the case at the Waste, Inc. site.

13. A commentor called the costs for the alternatives ridiculous.

U.S. EPA response 13: The cost figures presented for the seven alternatives were derived from literature, vendor quotations, actual costs from similar projects, and standard cost information sources. These cost figures are provided primarily for the purposes of conducting a comparative assessment between remedial alternatives, in order to assess the economic feasibility of each alternative. What the cost figures demonstrate is that once hazardous wastes are improperly disposed of, it costs far more to clean them up than it does to dispose of them properly in the first place. With all of the new environmental laws and

regulations in place today, it is hoped that similar costs will not be passed along to future generations.

14. Several commentors suggested that EPA build a safe container from scratch and move the wastes to it.

U.S. EPA response 14: U.S. EPA disagrees with this approach because it entails the same risks as the total excavation and removal of the landfill approach. Plus, the building would have to be very large and very tall and nearby residents or local businesses may not be amenable to its presence. These types of containers are typically used for temporary storage of hazardous wastes, and are not typically used for permanent storage.

Compliance with the appropriate Federal and State standards for facility construction and hazardous materials storage, future maintenance of the building and the foundation, and provisions for security would still be required, as is the case for all of the alternatives considered for the site cleanup.

D. Summary of comments regarding other environmental issues related to site cleanup.

15. Several commentors stated that the storm sewer that runs under the western portion of the landfill should be addressed.

U.S. EPA response 15: The current and future usage of the storm sewer is being investigated by the site Steering Committee at the direction of EPA. This includes determining whether the sewer is vital for local drainage needs and a video survey to determine if it is leaking, as has been alleged in the past by numerous entities. This information will be available shortly. In any case, if the sewer is needed for local drainage, then it will be rerouted from under the landfill and the portion that is currently under the landfill will be permanently sealed. If it is determined that the sewer is not needed for local drainage, then it will be permanently sealed. Therefore, this potential migration pathway will be eliminated as a portion of the remedy.

EPA has requested in the past months information regarding the community allegations regarding perforations in the sewer line and has not received any information to date. If there is any information that residents would like to provide EPA, please do so as soon as possible.

16. Several commentors have stated that the site's southern portion is not fenced and trespassers have easy access to the site from this direction. These commentors also stated that the fences were not signed properly to warn people of hazards posed by the site.

U.S. EPA response 16: U.S. EPA agrees that a fence is needed along the southern site boundary. EPA directed the site Steering Committee to construct a fence in this area. The fence installation is now complete and proper warning signs have been placed on this new fence.

17. A commentor asked whether air emissions off of the Waste, Inc. Landfill were violations that would be subject to enforcement.

U.S. EPA response 17: Air emissions from the landfill could theoretically violate the Clean Air Act, if releases of sufficient quantities of specific hazardous air pollutants were detected. Also, the failure to report releases of greater than the "reportable quantity" of any hazardous substance or extremely hazardous substance could violate section 103 of CERCLA. Detection of any such violation would require monitoring equipment which is not in place at the site. However, even were violations detected, such violations would be chargeable to the owner or operator of the landfill. As discussed above, levying fines may prove futile because Waste, Inc. is bankrupt and the landfill has been inoperable for over a decade.

CERCLA gives U.S. EPA the authority to deal with air emissions if they pose an imminent and substantial endangerment to human health and the environment. The RI/FS conducted at the site has not found air emissions themselves to be cause for concern. Nevertheless, air releases will be monitored during construction and any appropriate action needed will be taken. Once the landfill is capped, any threat to human health or the environment from air emissions at the site will be eliminated.

18. Several commentors supported total removal of landfill materials as the appropriate remedy for the site.

U.S. EPA response 18: For a number of reasons, this is simply not feasible. First, it is too costly - EPA has placed a letter estimating what would be involved in total removal of the landfill in the site repositories. Superfund requires remedies to be cost effective. Second, it is dangerous to dig into a landfill, because of the unknown nature of landfill contents. Third, the volume of material to be removed is enormous and it would be nearly impossible to find a facility to accept the waste. Fourth, it would take an inordinate amount of time to excavate the landfill. Fifth, during the long period of excavation, residents would be exposed to the dust, smell, and air emissions of disturbed garbage. Sixth, this material would have to be trucked from the landfill, through the streets of Michigan City, to be disposed of at an off-site location. All of these factors make total removal a technically and administratively infeasible choice.

As is contained in the aforementioned letter, approximately 754,500 cubic yards of waste material would have to be removed. Following excavation, the landfill area would have to be backfilled, or filled in with clean soil. The total amount of time estimated to perform these activities is 22 years, during which trucks filled with Waste, Inc. waste would be travelling through the streets of Michigan City to their ultimate destination. The total estimated cost for all of these activities is \$241 million. The risks posed by the excavation and removal activities are far greater than those posed presently by the site.

19. A commentor felt that EPA and the City of Michigan City were trying to downplay the environmental problem.

U.S. EPA response 19: EPA cannot comment on the City's position relative to the cleanup. EPA, however, has committed necessary resources to expedite the site cleanup and the remedy selected in this ROD will expedite the site cleanup. EPA has communicated the risks posed if nothing is done at the site and has committed large amounts of resources to see that the remedy is designed and constructed as soon as possible. Finally, EPA has been very supportive of community concerns and, along with the IDEM, is the primary Agency responsible for moving the site through the Superfund process to where it is today.

E. Summary of comments regarding future citizen involvement in the site remediation process.

20. Several commentors stated that once the ROD is signed, citizen input will no longer be part of the remediation process at the site.

U.S. EPA response 20: Citizen input is always included as a part of the Superfund process. This is highlighted at the Waste, Inc. site by the frequent availability sessions and fact sheets in the past and EPA's willingness to have residential wells sampled at citizen request. EPA has also demonstrated a willingness to listen by including the storm sewer and on-site storage tank and fencing near Trail Creek as a portion of the selected remedy.

This will continue throughout the RD/RA process. Frequent fact sheets and availability sessions will explain the design and construction components of the selected remedy and will allow citizens to comment on RD/RA activities. The RD/RA process contains provisions for changes to the selected remedy, if changes become necessary. Major changes, such as changes in technologies or selected alternatives or the acquisition of new data that change a fundamental understanding of the site, are required to be resubmitted to the public for comment.

EPA has demonstrated a willingness to listen and take actions, when appropriate and within their authorities. This working relationship will only improve with time.

F. Summary of other questions regarding the site, not related to the proposed remedy.

Although EPA is not required to answer questions on issues unrelated to proposed remedies, in the interests of fostering good community relations and furthering the recent progress made in communicating with area residents, EPA is providing answers to these questions in this summary.

21. A commentor asked why there was no public notice for the consent order when it was released in 1987.

U.S. EPA response 21: EPA has responded to this question several times in the past. For the record, EPA Region 5 policy is not to public notice consent orders unless community interest indicates otherwise. At the time the consent order was released, EPA was not aware of the level of community interest at the site. However, when residents complained about the lack of opportunity for public comment on the consent order, EPA then asked for any comments. None were ever received. EPA is continually reassessing their community relations efforts and results at Superfund sites and at the beginning of remedial design, the community relations plan will be revised to accommodate all that has been learned about the community since 1987.

22. A commentor asked how EPA could void a State Order that required the site owner to construct a hydraulic cut-off wall as a component of site closure.

U.S. EPA response 22. EPA did not void the order. The State of Indiana issued this Order to the site owner, who then declared bankruptcy. Because it was issued by the State, they had jurisdiction to enforce it. Because the site owner declared bankruptcy, they could not enforce it. In 1985, Judge Kickbush issued an order declaring the site an imminent hazard, and also declared that the respondent did not possess the financial wherewithal to respond, therefore, a receiver was appointed. Subsequently, the Indiana Attorney General stated that all legal remedies had been exhausted and that the practical use of a receivership was limited for remedial response. The order was not carried out because there was no viable party to comply with it. The site was then referred to EPA to be addressed under CERCLA.

It should be noted that EPA's remedy will remediate the Waste, Inc. site. The RI/FS was funded by Potentially Responsible Parties (PRPs) and EPA will pursue those companies, as well as those others who have been notified of potential liability in the

past, to fund the cleanup. The site owner/operator has also been notified of his potential liability with regard to environmental contamination at the site and will be pursued in the same manner. In response to a question at the February meeting, the site is not being cleaned up for the former owner-it is being cleaned up to mitigate unacceptable environmental risks. Deed restrictions will be placed on the property limiting future use of the property as a portion of the remedy.

23. A commentor asked for a Natural Resources Damage Assessment (NRDA) to be performed for the site, as well as wetland mitigation for 160 acres for the 10 acres filled in by the dump.

U.S. EPA response 23: The authority for completion of NRDA's lies with IDEM, the Indiana Department of Natural Resources, and the U.S. Department of Fish and Wildlife. They are required by law to perform these at Superfund sites. Details of the assessments, such as the public comment that described an example for another site in Maine, are left to those Agencies. If citizens are not happy with the progress of assessment completion, EPA urges them to contact the appropriate Agencies.

24. A commentor referenced the Technical Assistance Grant (TAG) process at the site and the fact that the guidelines kept changing over time, making the application process more difficult.

U.S. EPA response 24: The TAG process was designed to assist communities with their understanding of the Superfund program. The guidelines for completion of the TAG application have, indeed, changed over the years that TAG has been in existence. The guidelines have been changed by our Region 5 TAG coordinator to make the completion of the TAG application easier. EPA Region 5 records show that, in the past, a group expressed interest in applying for a TAG grant but never completed the application. This year, several groups expressed interest in the TAG grant at the proposed plan meeting, but, to date, have not completed their application, despite repeated attempts by EPA to assist in the process.

25. A commentor stated that the adjacent site should be included in the site cleanup because of similar characteristics.

U.S. EPA response 25: The information in EPA's possession regarding the adjacent site, Lake Aluminum, does not indicate that it has similar characteristics to the Waste, Inc. site. According to written responses from the former owner, the adjacent business used the western portion of the Waste, Inc. property primarily for storage. However, EPA will continue to gather information regarding this property as a part of the remedial design activities and if additional information should

indicate a link, then EPA can pursue the link at that time. EPA continues to urge the community to indicate what information they are referencing so that EPA can investigate the matter promptly and efficiently.

26. A commentor stated that EPA include all information regarding the PRP status of Waste Management, the entity that bought the assets of Waste, Inc. in 1982.

U.S. EPA response 26: EPA has since sent a letter noticing potential liability to Waste Management, dated February 25, 1994, and the company will be noticed of their potential liability for remedy implementation negotiations in the same manner as the other PRPs.

27. A commentor stated that long term monitoring of the downstream Confined Disposal Facility (CDF) should be included as a portion of the selected remedy because it contains sediments that have been impacted by site contaminants.

U.S. EPA response 27: Superfund jurisdiction does not allow for long term monitoring of the CDF to be included as a portion of the site remedy unless it can be conclusively proven that it contains sediments that have been proven to be impacted by the site. There are many point and non-point source discharges to Trail Creek so that identifying sources of contaminants in Trail Creek is difficult, at best. However, EPA will look into this matter further and communicate any findings to local residents.

28. A commentor stated that the Superfund process at the Waste, Inc. Landfill has been closed and secretive.

U.S. EPA response 28: EPA disagrees with this statement. There have been at least six availability sessions, two public meetings, and numerous fact sheets that have been released to the public over the years, announcing site progress. EPA has also sampled residential wells at citizen requests, as well as installing fencing and signs at the site for security purposes. EPA extended the public comment period twice, at citizen requests, to allow for more time to prepare comments on the proposed plan. EPA also set up an information repository at the Bethany Bible Baptist Church at the request of local residents.

EPA will continue to keep the public informed on site progress and solicit and answer questions throughout the RD/RA process. This is the most important time as the site remedy will be designed and built, so that the environmental problems posed by the Waste, Inc. site can finally be addressed.

29. A commentor stated that the EPA was willing to allow a substandard remedy at the site, which demonstrated EPA's insensitivity to the issue of environmental justice.

U.S. EPA response 29: The selected remedy is the most effective remedy for remediating the Waste, Inc. site. The remedy will prevent direct contact with landfill contents, prevent the future off-site migration of groundwater contaminated by the landfill, address the on-site sewer and underground storage tank, provide for site access restrictions and deed restrictions for future land usage, provide for long term monitoring of the remedial action with provisions for actions to be taken if the remedy is not performing at maximum efficiency, and provide signs warning residents of potential hazards at the site as well as fish advisory signage along Trail Creek.

EPA has selected a standard municipal landfill remedy to be implemented at the site and is confident that the selected remedy will control or eliminate the risks posed by the site.

The issue was also raised that because the site is located in a poor minority community, it is not receiving equal opportunity for community involvement. The Waste, Inc. site community is afforded the same opportunities for public involvement as are offered at all Superfund sites. This is required by the Superfund law. At the Waste, Inc. site, community involvement has actually been far greater than what is required by the Superfund law. This is due to community interest, which EPA has responded to over the years.

30. A commentor stated that EPA should talk to the unnamed neighbor who lives immediately adjacent to the site as soon as possible.

U.S. EPA response 30: Dave Novak, site community relations coordinator and Dion Novak, site project manager, talked to the neighbor, Shelley Piotrowski on March 9, 1994 and answered questions relating to the site cleanup. She indicated at that time that she was satisfied with EPA responses. IDEM and IDOH have also contacted her.

31. Commentors were grateful that the site is to be finally cleaned up and want the best solution possible.

U.S. EPA response 31: EPA appreciates the positive comments received in writing and at the meeting that support efforts to remediate on-site contamination which will reduce risks to acceptable levels. EPA will continue to work with the community so that the remediation process is as quick and easy to understand as possible.

The comments are paraphrased in order to effectively summarize them in this document. The reader is referred to the public meeting transcript which is available in the public information repositories, which are located at the Michigan City Public Library, the LaPorte County Health Department, and the Bethany

Bible Baptist Church. 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 repositories.

U.S. EPA ADMINISTRATIVE RECORD
WASTE INC. SITE
MICHIGAN CITY, INDIANA
ORIGINAL
08/05/94

48

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
1	00/00/00	U.S. EPA		RI Statement of Work	22
2	04/13/87	Puchalski, C.. U.S. EPA	Keele, C.. Wildman, Harrold, Allen & Dixon	Cover Letter Forwarding Various Guidance Documents re: the Work Plan (UNSIGNED)	2
3	05/12/87	Niedergang, N.. U.S. EPA	Adams, J.. U.S. EPA	Transmittal Sheet Forwarding Mini QAPP for Review/Comment/Approval	1
4	05/28/87	Adams, J.. U.S. EPA	Niedergang, N.. U.S. EPA	Memorandum re: Approval of Short Form QAPP for the Surface Water and Sediment Sampling and Analysis	25
5	06/02/87	Novak, D.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: U.S. EPA's and IDEM's Comments of the Surface Water/Sediment Sampling of Trail Creek (UNSIGNED)	9
6	06/04/87	Baker R.. IDEM	Novak, D.. U.S. EPA	Letter re: IDEM's Comments Concerning the RI Work Plan	7
7	06/10/87	ERM-North Central, Inc.	U.S. EPA	Work Plan: Surface Water and Sediment Sampling Phase	77
8	06/17/87	Novak, D., U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: Approval w/Changes of the Work Plan for the Surface Water and Sediment Sampling Phase of the RI	2
9	06/25/87	ERM-North Central, Inc.	U.S. EPA	Work Plan: Surface Water and Sediment Sampling Phase	75
10	07/09/87	Keele, C., Wildman, Harrold, Allen & Dixon	Puchalski, C.. U.S. EPA	Letter re: Section XIV(A) of the Administrative Order by Consent and Request for a 30 Day Extension for Submittal of the Draft Work Plan	2
11	07/15/87	Puchalski, C.. U.S. EPA	Keele, C.. Wildman, Harrold, Allen & Dixon	Letter re: Resoonse to July 9, 1987 Letter Concerning Section XIV(A) of the Administrative Order by Consent and Request for a 30 Day Extension for the Submittal of the Draft Work Plan	2
12	08/25/87	Baker, R.. IDEM	Novak, D.. U.S. EPA	Letter re: IDEM's Comments on the July 20, 1987 Draft Work Plan	6
13	08/31/87	Lentzen, J.. Metcalf & Eddy, Inc.	Novak, D.. U.S. EPA	Letter re: Technical Evaluation of the Draft Work Plan	4

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
14	09/09/87	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA and IDEM's Comments Concerning the RI/FS Work Plan	16
15	09/10/87	Niedergang, N., U.S. EPA	Adams, J., U.S. EPA	Transmittal Sheet Forwarding the QAPP for Review/Comment/Approval	1
16	09/21/87	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Inclusion of Property on Eastern Boundary in RI/FS	2
17	09/27/87	ERM-North Central, Inc.	U.S. EPA	Technical Memorandum #2: Surface Water and Sediment Sampling Phase of RI	91
18	10/06/87	Adams, J., U.S. EPA	Niedergang, N., U.S. EPA	Memorandum re: Quality Assurance Section's Review of the Draft QAPP	3
19	10/16/87	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Comments on the Draft Technical Memorandum #1	2
20	11/00/87	U.S. EPA	Public	Fact Sheet: Long Term Investigation Planned	4
21	11/00/87	Jacobs Engineering Group Inc.	U.S. EPA	Final Community Relations Plan	26
22	11/06/87	U.S. EPA	Public	News Release: Announcement of November 18, 1987 Public Meeting	1
23	11/13/87	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Issues Raised at the October 2, 1987 Meeting Concerning the Natural Resource Trustee	1
24	12/04/87	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter Forwarding the RI/FS Work Plan w/Annotated Attachment	14
25	01/06/88	Keele, C., Wildman, Harrold, Allen & Dixon	Puchalski, C., U.S. EPA	Letter Confirming the January 5, 1988 Telephone Conversation re: Steering Committee's Agreement to Expand the Scope of the RI/FS	3
26	01/08/88	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the November 2, 1987 Work Plan w/Attachment	4
27	01/12/88	Hudak, D., U.S. DOI	Novak, D., U.S. EPA	Letter re: U.S. DOI's Comments Concerning the Proposed Work Plan	2
28	01/28/88	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on the Draft Workplan w/Handwritten Annotations	8
29	03/15/88	Keele, C., Wildman, Harrold, Allen & Dixon	Puchalski, C., U.S. EPA	Letter re: Concern over U.S. EPA Release of Information	3

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
30	07/16/88	Gasior, L., U.S. EPA	Michigan City Public Library and LaPorte Co. Health Dept.	Letters Forwarding Copies of the Surface Water and Sediment Sampling Report (UNSIGNED)	2
31	04/15/88	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter Forwarding CompuChem's Comments re: Statements Made in U.S. EPA Memo of December 18, 1987 Concerning Organic Data Results	5
32	04/20/88	Beauchamp, J., IDEM	Carrasquero, P., IDEM	Memorandum re: the Work Plan	3
33	05/03/88	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Corrected Data Package from CompuChem Laboratories w/Cover Letter	28
34	05/03/88	Hudak, D., U.S. DOI	Novak, D., U.S. EPA	Letter re: U.S. DOI's Comments on the March 22, 1988 Work Plan	3
35	05/13/88	Piccione, R., U.S. EPA	Novak, D., U.S. EPA	Memorandum: Reply to Laboratory Response Regarding Se Spike Recovery Dated April 5, 1988	1
36	05/16/88	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the March 22, 1988 Work Plan	4
37	05/17/88	Kratzmeyer, J., Metcalf & Eddy, Inc.	Novak, D., U.S. EPA	Letter re: Alternative Soil Sampling Program	5
38	05/24/88	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA and IDEM's Comments on the RI/FS Work Plan w/Handwritten Annotations	7
39	05/26/88	Gasior, A., U.S. EPA	Michigan City Public Library and LaPorte Co. Health Dept.	Letters Forwarding Additional Copies of the Surface Water and Sediment Sampling Work Plan (UNSIGNED)	2
40	06/01/88	Keele, C., Wildaan, Harrold, Allen & Dixon	Novak, D., U.S. EPA	Letter re: Notification of Receipt of U.S. EPA Comments on the Draft Work Plan	2
41	06/06/88	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter in Response to April 15, 1988 Letter re: the Quality Assurance Review of the Trail Creek Sampling Results	1
42	06/06/88	Churilla, P., U.S. EPA	Novak, D., U.S. EPA	Memorandum re: Organic Data Results	1
43	06/13/88	Winningham, B., IDEM	Carrasquero, P., IDEM	Memorandum re: Hydrogeologic Review of the March 22, 1988 Revision of the Work Plan	5

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
====	====	=====	=====	=====	=====
44	06/20/88	Keele, C., Wildman, Harold, Allen & Dixon	Novak, D., U.S. EPA	Letter re: Anticipated Areas of Discussion for the June 22, 1988 Meeting	2
45	06/27/88	ERM-North Central, Inc.	U.S. EPA	Technical Memorandum #1: Surface Water and Sediment Sampling Phase of RI	58
46	07/00/88	U.S. EPA	Public	Fact Sheet: Update	2
47	07/07/88	Hudak, D., U.S. DOI	Novak, D., U.S. EPA	Letter in Response to Request for Bioassay Information	2
48	07/11/88	Jordan, S.	Carrasquero, P., IDEM	Letter Forwarding Attached "Removal and Disposal of Used Underground Petroleum Storage Tanks" Report	13
49	07/12/88	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Biological Studies to be Performed During the RI and Screening/Soil Sampling	1
50	07/13/88	Gasior, A., U.S. EPA	Michigan City Public Library and LaPorte Co. Health Dept.	Letters Forwarding Copies of Technical Memorandum #1: Surface Water and Sediment Sampling (UNSIGNED)	2
51	08/00/88	ERM-North Central, Inc.	U.S. EPA	Data Management Plan for the RI/FS, Revision 1	28
52	08/01/88	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Disposition of the Remains from the June 1986 Trail Creek Sampling Event	1
53	08/02/88	Gasior, A., U.S. EPA	Michigan City Public Library and LaPorte Co. Health Dept.	Letters Forwarding Copies of Technical Memorandum #2: Surface Water and Sediment Sampling Studies (UNSIGNED)	2
54	08/22/88	Mayka, J., U.S. EPA	Adams, J., U.S. EPA	Transmittal Sheet Forwarding the QAPP for Review/Comment/Approval	1
55	09/06/88	Adams, J., U.S. EPA	Mayka, J., U.S. EPA	Memorandum re: Quality Assurance Section's Review of the QAPP, Revision 1	8
56	09/16/88	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Draft Work Plan, Revision 3	4
57	09/22/88	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Comments Concerning the Work Plan for the RI/FS (UNSIGNED)	5
58	10/25/88	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments to the August 1988 Draft Work Plan	2

NO# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
59	10/26/88	Novak, D., U.S. EPA	Keele, C., Wildman, Harrold, Allen & Dixon	Letter re: Background Samples, Geologic Descriptions of Soils, and Boring Depths	2
60	10/31/88	Planey, M., Jacobs Engineering Group Inc.	Canada Community Improvement Society	Letter Forwarding Information re: Waste, Inc. Superfund Site (UNSIGNED)	2
61	11/09/88	Keele, C., Wildman, Harrold, Allen & Dixon	Novak, D., U.S. EPA	Letter re: Steering Committee's Response to September 22, 1988 U.S. EPA Letter Concerning the Work Plan w/Attachment	4
62	11/16/88	Novak, D., U.S. EPA	Keele, C., Wildman, Harrold, Allen & Dixon	Letter re: U.S. EPA's Comments on the Revised Work Plan	2
63	11/29/88	Novak, D., U.S. EPA	Keele, C., Wildman, Harrold, Allen & Dixon	Letter Forwarding Attached IDEM Memorandum re: Leachate Sampling (UNSIGNED)	4
64	12/00/88	U.S. EPA	Public	Fact Sheet: Update	2
65	12/16/88	ERM-North Central, Inc.	U.S. EPA	Health and Safety Plan for the RI/FS, Revision 2	44
66	12/16/88	ERM-North Central, Inc.	U.S. EPA	Sampling and Analysis Plan for the RI/FS, Part I: Field Sampling Plan: Revision 2	59
67	12/16/88	ERM-North Central, Inc.	U.S. EPA	Sampling and Analysis Plan for the RI/FS, Part II: Quality Assurance Project Plan: Revision 2	455
68	12/16/88	ERM-North Central, Inc.	U.S. EPA	Work Plan for the RI/FS, Revision 4	160
69	12/19/88	Sould, M., U.S. EPA	Adams, J., U.S. EPA	Transmittal Sheet Forwarding the QAPP for Review/Comment/Approval	1
70	01/03/89	CompuChem Laborator- ies	U.S. EPA	CompuChem's Responses to Quality Assurance Section's Comments on the QAPP	3
71	01/03/89	Adams, J., U.S. EPA	Mayka, J., U.S. EPA	Memorandum re: Quality Assurance Section's Review of the QAPP, Revision 2 w/Attachments	18
72	01/12/89	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA Comments on the Work Plan and QAPP (UNSIGNED)	2
73	01/18/89	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Work Plan and QAPP	1

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
74	01/24/89	Baker, R.. IDEM	Novak, D.. U.S. EPA	Letter Forwarding Attached Leachate and Sediment Sampling Results	10
75	02/09/89	Sould, M.. U.S. EPA	Adams, J.. U.S. EPA	Transmittal Sheet Forwarding the QAPP for Review/Comment/Approval	1
76	02/17/89	Adams, J.. U.S. EPA	Mayka, J.. U.S. EPA	Memorandum re: Quality Assurance Section's Comments on the QAPP, Revision 3	15
77	02/23/89	Novak, D.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: Revisions to the Operations Plans and Comments on the QAPP	1
78	02/28/89	Chary, L.. Environmental Strategies & Consulting	Beck, J.. U.S. EPA	Letter re: Concerns of the Waste Inc. Clean Up Coalition (UNSIGNED)	3
79	04/26/89	Sould, M.. U.S. EPA	Adams, J.. U.S. EPA	Transmittal Sheet Forwarding the QAPP for Review/Comment/Approval	1
80	05/03/89	Jones, V.. U.S. EPA	Niedergang, N.. U.S. EPA	Memorandum re: Monitoring and Quality Assurance Branch's Conditional Approval of the QAPP w/Attachment	73
81	05/08/89	Novak, D.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter Forwarding U.S. EPA Memorandum Conveying Conditional Approval of the QAPP (UNSIGNED)	1
82	06/00/89	U.S. EPA	Public	Fact Sheet: Update	6
83	06/09/89	Gasior, A.. U.S. EPA	Michigan City Public Library, et al.	Letters Forwarding Copies of the RI/FS (UNSIGNED)	3
84	06/29/89	Anderson, T.	Novak, D.. U.S. EPA	Questionnaire re: Work Plan and Partial Work Plan w/Attachments	14
85	06/29/89	Chary, L.. Environmental Strategies & Consulting	U.S. EPA	Questions for U.S. EPA's Public "Open House"	2
86	07/05/89	Novak, D.. U.S. EPA	Chary, L.. Environmental Strategies & Consultants: et al.	Letters Requesting Background Information (UNSIGNED)	3
97	07/06/89	Novak, D.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: Startup of Fieldwork (UNSIGNED)	1

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
88	07/06/89	Novak, D., U.S. EPA	Kintzele, J.; Baldwin, J.; and Wiseman, J.	Letters Requesting Background Information (UNSIGNED)	3
89	07/12/89	Charv. L., Environmental Strategies & Consulting	Novak, D., U.S. EPA	Letter re: Community Concerns w/July 16, 1989 Addendum Concerning the Consent Order	6
90	07/14/89	Novak, D., U.S. EPA	Charv, L., Environmental Strategies and Consulting	Letter Requesting Comments re: the Consent Order	1
91	07/17/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Schedule for Initial RI Activities	2
92	07/20/89	Anderson, T.	Novak, D., U.S. EPA	Letter Responding to U.S. EPA Letter of July 5, 1989 re: the Work Plan	1
93	07/25/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Collection of Soil Samples and Use of Steel, 55 Gallon Drums, without Plastic Liners w/Attachment	2
94	07/31/89	Beck, J., U.S. EPA	Charv, L., Waste Inc. Community Group	Conversation Record re: Community Group's Request to Receive, Comment, and Discuss Technical Memorandums w/Attached Correspondence	7
95	08/10/89	Anzia, M., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Soil Screening Program	1
96	08/11/89	Novak, D., U.S. EPA	Anderson, T.	Letter re: Answers to Questions Given to the U.S. EPA at the June 29, 1989 Availability Session (UNSIGNED)	4
97	08/11/89	Novak, D., U.S. EPA	Charv, L., Environmental Strategies & Consulting	Letter re: Responses to Questions Provided at the June 29, 1989 Availability Session (UNSIGNED)	2
98	08/15/89	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Technical Memorandum #3 (UNSIGNED)	4
99	08/18/89	Beck, J., U.S. EPA	Charv, L., Environmental Strategies & Consulting	Letter re: Community Relations (UNSIGNED)	1

NO# ----	DATE ----	AUTHOR -----	RECIPIENT -----	TITLE/DESCRIPTION -----	PAGES -----
100	08/22/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Memorandum re: Soil Screening	1
101	08/28/89	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on Technical Memorandum #3	2
102	09/07/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter Forwarding Attached Map Showing the Proposed Locations of Piezometers	2
103	09/08/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter Enclosing Soil Screening Results, Soil Screening Boring Locations, and Proposed Soil Sampling Locations	22
104	09/12/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Disposition of U.S. EPA Comments of August 15, 1989 re: Technical Memorandum #3 and Copies of Water Well Records w/Cover Letter	29
105	09/22/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Procedures for the Drilling and Sampling Programs	1
106	09/27/89	Fisher, D., IDEM	Novak, D., U.S. EPA	Handwritten Memorandum re: IDEM's Review of Soil Screening Results w/Attachment	4
107	09/27/89	Edwards, D., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Analytical Results for Michigan City Municipal Water Supply	11
108	09/29/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Proposed Location of Background Soil Sample	2
109	10/04/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Memorandum re: Soil Sample Locations	2
110	10/10/89	Fisher, D., IDEM	Novak, D., U.S. EPA	Handwritten Memorandum re: IDEM's Review of Technical Memorandum #3	1
111	10/11/89	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Review of Soil Screening Results	2
112	10/13/89	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Technical Memorandum #3 (UNSIGNED)	2
113	10/25/89	Baker, R., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Review of Technical Memorandum #3, Revision 1	1
114	11/03/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter Forwarding Attached October 13, 1989 Disposition on U.S. EPA Comments re: Technical Memorandum #3, Revision 1	5

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
115	11/03/89	ERM-North Central, Inc.	U.S. EPA	Technical Memorandum #3. Revision 2	62
116	11/22/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Delay of Submittal for Technical Memorandum #4	1
117	11/22/89	Novak, D., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: RI/FS Schedule and Technical Memorandum #2 (UNSIGNED)	1
118	11/27/89	Schafer, G., U.S. EPA	File	Handwritten Review Comments re: Proposed Monitoring Well Locations	5
119	11/27/89	Ball, R., and Edwards, D., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Proposed Monitoring Well Locations w/Attachments (Annotated)	70
120	12/00/89	U.S. EPA	Public	Fact Sheet: RI Update	2
121	12/04/89	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Request for Extension of Submittal Date for Technical Memorandum #4	1
122	12/11/89	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Approval of Request for Extension of Technical Memorandum #4	2
123	12/21/89	Baker, R., IDEM	Frey, R., U.S. EPA	Letter re: IDEM's Comments on the Proposed Monitoring Well Locations	2
124	01/03/90	Gasior, A., U.S. EPA	Addressees	Letters Forwarding Copies of Technical Memorandum #3 (UNSIGNED)	3
125	01/08/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Proposed Monitoring Well Locations Report	6
126	02/01/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Resubmittal of Technical Memorandum #4	2
127	02/07/90	Ball, R., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Request for Extension of Submission for the Proposed Monitoring Well Report	1
128	02/08/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Approval of Extension for Submission of the Proposed Monitoring Well Report	1
129	02/15/90	Ball, R. and Edwards, D., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter in Response to U.S. EPA's Comments on the Proposed Monitoring Well Locations Report	14

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
130	02/16/90	PRC Environmental Management, Inc.	U.S. EPA	Technical Review of Technical Memorandum #4 w/February 29, 1990 Cover Letter	10
131	02/20/90	U.S. EPA	Public	News Release: Announcement of February 28, 1990 Availability Session	1
132	02/28/90	Read, C., Save the Dunes Council	U.S. EPA	Letter re: Community Relations	1
133	03/01/90	Pastor, S., U.S. EPA	File	Memorandum re: February 28, 1990 Availability Session	1
134	03/01/90	Martin, K., U.S. EPA	Lesser, T., U.S. EPA	Memorandum re: February 28, 1990 Availability Session Trip Report	2
135	03/02/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Delay in Providing Review Comments on Technical Memorandum #4 and Locations for the Proposed Monitoring Well Network	1
136	03/05/90	Martin, K., U.S. EPA	Read, C., Save the Dunes Council	Letter re: Community Relations	1
137	03/07/90	Read, C., Save the Dunes Council	Martin, K., U.S. EPA	Letter re: Community Relations	1
138	03/14/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Technical Memorandum #4	13
139	03/19/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Cover Letter Forwarding U.S. EPA's Comments re: the Data Validation Results for the Soil Sampling Activities in Technical Memorandum #4	1
140	03/26/90	Baker, R., IDEM	Frey, R., U.S. EPA	Letter re: IDEM's Review of Technical Memorandum #4	3
141	03/30/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Comments on Proposed Monitoring Well Locations	4
142	04/02/90	Baker, R., IDEM	Frey, R., U.S. EPA	Letter re: IDEM's Comments on the Proposed Monitoring Well Locations for Task II. Revision 1	2
143	04/04/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Additional Comments on the Proposed Geotechnical Sampling	2
144	04/17/90	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Monitoring Well Installation	1

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
145	04/19/90	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Extension of Submission for Technical Memorandum #4	1
146	04/30/90	Ball, R. and Edwards, D., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Disposition of U.S. EPA and IDEN's Comments on Proposed Monitoring Well Locations w/Appendices	41
147	04/30/90	ERM-North Central, Inc.	U.S. EPA	Report: Proposed Monitoring Well Locations for Task II	94
148	05/07/90	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter w/Attached Revised RI/FS Schedule	4
149	06/26/90	Baker, R., IDEN	Frey, R., U.S. EPA	Letter re: IDEN's Comments on Technical Memorandum #4, Revision 1	2
150	07/10/90	PRC Environmental Management, Inc.	U.S. EPA	Technical Review of Technical Memorandum #4, RI, Phase 1, Task 2 w/July 27, 1990 Cover Letter	8
151	08/00/90	ERM-North Central, Inc.	U.S. EPA	Disposition of U.S. EPA Comments on Technical Memorandum #4, Revision 2	34
152	08/01/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Technical Memorandum #4, Revision 1	12
153	08/15/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Technical Memorandum #4 and RI/FS Schedule	2
154	08/22/90	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: ERM-North Central's Comments on Technical Memorandum #4, Revision 1	11
155	09/00/90	ERM-North Central, Inc.	U.S. EPA	Report: Proposed Scope of Work Private Well and Round Two Monitoring Well Sampling	78
156	09/04/90	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Deletions and Modifications to Technical Memorandum #4, Revision 1	10
157	09/13/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Technical Memorandum #4, Revision 2	2
158	09/14/90	Edwards, D., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter Forwarding Copies of the Proposed Scope of Work for Private Well and Round Two Monitoring Well Sampling	1
159	09/21/90	Thomas, C., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: Technical Support Unit's Comments on the Proposed Scope of Work for Private Well and Round Two Monitoring Well Sampling	2

DOC# ====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
160	10/01/90	Wright, L., IDEM	Frey, R., U.S. EPA	FAX Transmittal Forwarding Attached Handwritten Draft of September 1990 Work Plan	10
161	10/12/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA and IDEM's Comments on Proposed Scope of Work, Round 2	4
162	11/08/90	Ball, R. and Edwards, D., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Proposed Scope of Work for Private Well and Round 2 Monitoring Well Sampling w/Attachments	4
163	11/08/90	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: U.S. EPA's Review and Approval of Technical Memorandum #4, Revision 3	2
164	12/00/90	U.S. EPA	Public	Fact Sheet: Technical Memorandum #4 Update	6
165	12/10/90	U.S. EPA	Public	News Release: Announcement of December 13, 1990 Availability Session	1
166	12/00/91	U.S. EPA		Guidance: "Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites" (EPA/540/P-91/001; OSWER Directive 9355.3-11)	311
167	02/07/91	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Delays in Completing the RI/FS	3
168	02/19/91	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Proposed Schedule for Completion of RI/FS Activities	3
169	03/18/91	Anzia, M., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter w/Attached Proposed Modification to the RI Report Format	15
170	03/25/91	Baker, R., IDEM	Frey, R., U.S. EPA	Letter re: Proposed Modification of the RI Report Format	2
171	03/31/91	Watters, E., U.S. EPA	Niedergang, N., U.S. EPA	Memorandum re: Water Division's Review of the FS Report	3
172	04/22/91	Frey, R., U.S. EPA	Ball, R., ERM-North Central, Inc.	Letter re: Proposed Modification to the RI Report Format	3
173	05/06/91	Baker, R., IDEM	Frey, R., U.S. EPA	Letter re: IDEM's Comments on Technical Memorandum #5	7
174	05/13/91	Frey, R., U.S. EPA	Payne, D., U.S. EPA	FAX Memorandum Forwarding Attached July 27, 1988 "Determination of Total Organic Carbon in Sediment" Report	13

NO.	DATE	AUTHOR	RECIPIENT	TITLE-DESCRIPTION	PAGES
=====	=====	=====	=====	=====	=====
175	07/01/91	Frey, R.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Technical Memorandum #5	16
176	07/03/91	U.S. EPA		Schedule for Remaining Tasks	1
177	07/31/91	Ball, R.. ERM-North Central, Inc.	Frey, R.. U.S. EPA	Letter re: Revision 1 to Technical Memorandum #5	11
178	08/08/91	Frey, R.. U.S. EPA	Griener, M.. Eichhorn, Eichhorn & Link	Letter re: Submission of Draft RI Report	1
179	08/08/91	Ball, R.. ERM-North Central, Inc.	Frey, R.. U.S. EPA	Memorandum re: Revised Due Date for RI Report	1
180	08/12/91	Verhagen, T.. Marley Corporation	Frey, R.. U.S. EPA	Letter re: Request for Extension for Submittal of Draft RI Report	3
181	08/26/91	Frey, R.. U.S. EPA	Addressees	Memorandum Forwarding for Review the Draft RI	1
182	08/27/91	Versar Inc.	U.S. EPA	Letter of Transmittal Forwarding Attached Review of Technical Memorandum #5	6
183	08/27/91	Baker, R.. IDEM	Frey, R.. U.S. EPA	Letter re: IDEM's Review of Technical Memorandum #5, Revision 1	2
184	09/09/91	Ball, R.. ERM-North Central, Inc.	Frey, R.. U.S. EPA	Letter Forwarding Attached Appendices F and G of the Baseline Risk Assessment	7
185	09/11/91	Frey, R.. U.S. EPA	Addressees	Memorandum Forwarding Six Pages to be Inserted into the Draft RI Report	1
186	09/16/91	Steele, G.. Indiana State Board of Health	Baker, R.. IDEM	Memorandum re: ISBH's Review of the Risk Assessment, Appendices F and G	1
187	09/17/91	Kleiman, J.. U.S. EPA	Frey, R.. U.S. EPA	Memorandum re: RCRA's Review of the Draft RI Report for ARARs	1
188	09/18/91	Frey, R.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on Technical Memorandum #5, Revision 1	3
189	09/20/91	Adamkus, V.. U.S. EPA	Prosser, K.. IDEM	Letter re: Request for IDEM's Review of the Alternatives Array Document and State ARARs	2
190	09/23/91	Baker, R.. IDEM	Frey, R.. U.S. EPA	Letter re: IDEM's Comments on the RI Report w/Attachments	15

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
191	09/23/91	Watters, E., U.S. EPA	Niedergang, N., U.S. EPA	Memorandum re: Water Division's Review of the Draft RI	2
192	09/25/91	Gowland, T., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: CERCLA Compliance Branch's Comments on the Draft RI w/Attachments	41
193	09/26/91	Moran, E., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: TSU's Comments on the Risk Assessment	2
194	09/30/91	Harrero, J., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: Air Toxics and Radiation Branch's Review of the RI Report	1
195	10/02/91	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter Forwarding Revised Pages for Technical Memorandum #5, Revision 1	5
196	10/02/91	Frey, R., U.S. EPA	Grimmer, M., Eichhorn, Eichhorn & Link	Letter re: Specifications for Site Perimeter Fence	3
197	10/02/91	ERM-North Central, Inc.	U.S. EPA	Technical Memorandum #5, Revision 1A	459
198	10/08/91	Ball, R., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter re: Incorporation of CRL Data Validation Comments into Technical Memorandum #5, Revision 1	2
199	10/11/91	Baker, R., IDEM	Frey, R., U.S. EPA	Letter re: IDEM's Review of the Alternatives Array Document	3
200	10/21/91	Frey, R., U.S. EPA	Baker, F., Weil-McLain	Letter re: Specifications for Site Perimeter Fence	3
201	10/21/91	Helmer, E., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: BTAG's Review of the Ecological Assessment	3
202	10/22/91	Grzechoskie, C., U.S. EPA	Pawlowski, U.S. EPA	Memorandum re: Wetlands Regulatory Unit's Comments on the Draft RI	2
203	10/25/91	Hudak, D., U.S. DOI	Frey, R., U.S. EPA	Letter re: U.S. DOI's Comments on the RI Report and the Baseline Risk Assessment	5
204	10/28/91	Watters, E., U.S. EPA	Niedergang, N., U.S. EPA	Memorandum re: Addendum to Water Division's Review of the Draft RI	2
205	11/07/91	Frey, R., U.S. EPA	Grimmer, M., Waste Inc. Steering Committee: et al.	Letter re: U.S. EPA's Comments on the Draft RI Report and Baseline Risk Assessment w/Attachments	81

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
206	11/09/91	Frosser, K.. IDEM	Adams, V.. U.S. EPA	Letter re: IDEM's Review of the Alternatives Array Document and Evaluation and Comments on the ARARs	9
207	11/11/91	Ball, R.. ERM-North Central, Inc.	Frey, R.. U.S. EPA	Letter re: Due Date for the Final RI Report	1
208	11/25/91	Grimmer, M.. Eichhorn, Eichhorn & Link	Frey, R.. U.S. EPA	Letter in Response to U.S. EPA November 7, 1991 Letter re: Comments on the Draft RI Report and Baseline Risk Assessment	2
209	12/18/91	Baker, R.. IDEM	Edwards, D.. ERM-North Central, Inc.	Letter re: National Wetland Inventory	2
210	12/20/91	Aylward, L.. Sundstrand Corporation	Frey, R. and Brannigan, T.. U.S. EPA	Letter Forwarding Attached Journal Article re: Risk Assessment	2
211	01/07/92	Frey, R.. U.S. EPA	Grimmer, M.. Eichhorn, Eichhorn & Link	Letter re: Baseline Risk Assessment	3
212	01/10/92	Ball, R.. ERM-North Central, Inc.	Frey, R.. U.S. EPA	Letter Forwarding Copies of RI Report, Revision 1	1
213	02/05/92	Baker, F.. Weil-McLain	Frey, R.. U.S. EPA	Letter re: Placement of Fence Adjacent to Trail Creek w/Attached Correspondence	4
214	02/07/92	Frey, R.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: Comments on Alternatives Array Document and Due Date for Draft FS Report	2
215	02/12/92	Frey, R.. U.S. EPA	Ball, R.. ERM-North Central, Inc.	Letter re: U.S. EPA Approval of Technical Memorandum #5, Revision 1A	2
216	02/13/92	Martin, K.. U.S. EPA	Addressees	Letters Forwarding Copies of Technical Memorandum #5	3
217	02/14/92	Baker, R.. IDEM	Frey, R.. U.S. EPA	Letter re: IDEM's Comments on the RI Report, Revision 1	2
218	02/20/92	Taylor, E.. ERM-North Central, Inc.	Frey, R.. U.S. EPA	Letter Forwarding an Addendum to Attachment B of Technical Memorandum #5, Revision 1A	2
219	02/20/92	Baker, R.. IDEM	Frey, R.. U.S. EPA	Letter re: IDEM's Comments on the Baseline Risk Assessment	3

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
220	02/26/92	Martin, K., U.S. EPA	Addressees	Letters Forwarding Copies of Attachments A, B, and C for Technical Memorandum #5	7
221	02/00/92	U.S. EPA	Public	Fact Sheet: Technical Memorandum #5 Update	6
222	02/04/92	Frey, R., U.S. EPA	Bell, P., ERM-North Central, Inc.	Letter re: U.S. EPA's Comments on the Draft RI Report, Revision 1 w/Attachments	7
223	02/10/92	Frey, R., U.S. EPA	Addressees	Memorandum Forwarding the Draft FS Report for Review	2
224	02/24/92	Taylor, E., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter Forwarding Copies of the RI Report, Revision 2	1
225	03/25/92	ERM-North Central, Inc.	U.S. EPA	Remedial Investigation Report, Revision 2	355
226	03/30/92	Versar, Inc.	U.S. EPA	Technical Review of FS Report (Draft)	14
227	03/31/92	Taylor, E., ERM-North Central, Inc.	Frey, R., U.S. EPA	Letter Forwarding Copies of Page 4-32 of the RI, Revision 2	1
228	03/31/92	Hudak, D., U.S. DOI	Frey, R., U.S. EPA	Letter re: U.S. DOI's Comments on the Draft FS Report	1
229	03/31/92	Kleiman, J., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: RCRA's Review of the Draft FS Report for ARARs	1
230	04/02/92	Martin, K., U.S. EPA	Lesser, T., U.S. EPA	Memorandum re: April 1, 1992 Availability Session Trip Report	1
231	04/03/92	Belkman, D., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: Review of March 6, 1992 FS Report	2
232	04/06/92	Carrasquero, P., IDEM	Frey, R., U.S. EPA	Letter re: IDEM's Comments on the FS Report	4
233	04/10/92	Frey, R., U.S. EPA	Grimmer, M., Waste Inc. Steering Committee: et al.	Letter re: U.S. EPA's Comments on the Revised Baseline Risk Assessment	9
234	04/10/92	Marrero, J., U.S. EPA	Frey, R., U.S. EPA	Memorandum re: Air Toxics and Radiation Branch's Review of the FS Report	1
235	04/10/92	Harrity, D., PRC Environmental Management, Inc.	Frey, R., U.S. EPA	Technical Review of FS Report (Draft) w/Cover Letter	17

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
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236	05/01/92	ENVIRON Corporation	U.S. EPA	Baseline Risk Assessment	204
237	05/01/92	Kasuscinski, R., ENVIRON Corporation	Prev. R., U.S. EPA	Letter Forwarding Copies of the Revised Baseline Risk Assessment Report w/Attached Response to U.S. EPA's Comments of April 10, 1992	10
238	06/09/92	Larrasquero, P., IDEM	Prev. R., U.S. EPA	Letter re: IDEM's Comments on the Baseline Risk Assessment, Revision 2	2
239	07/09/92	Grimmer, M., Waste Inc. Steering Committee	Prev. R., U.S. EPA	Letter re: Request to Include Enclosed Baseline Risk Assessment Comments into the Administrative Record	7
240	11/05/92	Prev. R., U.S. EPA	Fabinski, L., ATSDR; U.S. Public Health Service	Letter re: U.S. EPA's Comments on the Draft Public Health Assessment	73
241	11/24/92	Prev. R., U.S. EPA	Grimmer, M., Waste Inc. Steering Committee	Letter re: U.S. EPA's Approval of the RI Report, Revision 2 and the Baseline Risk Assessment	2
242	12/31/92	Novak, D., U.S. EPA	Grimmer, M., Eichhorn, Eichhorn & Link	Letter re: U.S. EPA's Comments on the FS Report (UNSIGNED)	25
243	01/00/93	Indiana State Department of Health	U.S. EPA	Public Health Assessment	74
244	01/04/93	Prev. R., U.S. EPA	Addressees	Memorandum Forwarding the Final RI Report and Baseline Risk Assessment	1
245	01/29/93	Verhagen, T., Marley Corporation	Novak, D., U.S. EPA	Letter re: Request for Extension for Submittal of FS Report	2
246	02/02/93	Place, M.; Versar, Inc.	Bunsen, S.; Versar, Inc.	Memorandum re: Modflow Groundwater Flow Model	1
247	02/03/93	Taylor, E., ERM-North Central, Inc.	Novak, D. and Tyndall, K., U.S. EPA	Memorandum re: Additional Field Work to Support the FS Report	1
248	02/08/93	Taylor, E., ERM-North Central, Inc.	Tyndall, K., U.S. EPA	Memorandum re: Access to Josam Property	1
249	02/12/93	Novak, D., U.S. EPA	Verhagen, T., Marley Corporation	Letter re: Revised FS Schedule	2

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
250	02/15/93	Wright, L., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Response to Questions Raised During the January 12, 1993 Meeting to Discuss Agency Comments	3
251	03/05/93	Edwards, D., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Supplemental Field Work for the FS w/Attachments	28
252	03/17/93	Grimmer, M., Waste Inc. Steering Committee	Novak, D., U.S. EPA	Letter re: Completion of FS Report	4
253	03/17/93	Taylor, E., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter w/Attached Outline of Ground Water Modeling Project	37
254	03/25/93	Novak, D., U.S. EPA	Grimmer, M., Waste Inc. Steering Committee	Letter re: Denial of Request for Extension for Submittal of the FS Report	2
255	04/02/93	Grimmer, M., Waste Inc. Steering Committee	Novak, D., U.S. EPA	Letter re: Extension for Submittal of the FS Report	3
256	04/08/93	Bunsen, S. and Place, M.: Versar, Inc.	Novak, D., U.S. EPA	Memorandum re: Versar's Comments on the Outline of Groundwater Modeling Project	2
257	04/16/93	Branigan, T., U.S. EPA	Grimmer, M., Waste Inc. Steering Committee	Letter re: Dispute Resolution Concerning Submittal of the Revised FS	5
258	04/26/93	Verhagen, T., Marley Corporation	Novak, D. and Branigan, T., U.S. EPA	Letter re: Dispute Resolution Concerning the Submittal of the Revised FS w/Attachment	10
259	05/12/93	Verhagen, T., Marley Company	Novak, D. and Branigan, T., U.S. EPA	Letter Submitted on Behalf of the Waste Inc. Steering Committee re: Delay in Submission of the Revised FS	2
260	05/12/93	Taylor, E., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Delay in Submission of FS Report	2
261	06/03/93	ERM-North Central, Inc.	U.S. EPA	Feasibility Study Report. Appendices: Revision 1	535
262	06/03/93	Taylor, E., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter Forwarding the FS Report, Revision 1 w/Attached Table Denoting U.S. EPA's Comments Addressed in the Red Line/Strike Out Version	8

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
263	06/16/93	Traub, J., U.S. EPA	Grimmer, M., Waste Inc. Steering Committee	Letter re: Dispute Concerning the Deadline for Submission of the Revised FS Report	10
264	06/21/93	Gorski, W., U.S. EPA	Figiulo, I., U.S. EPA	Memorandum re: Wetlands Regulatory Unit's Comments on the Draft FS	2
265	06/23/93	Harrity, D., PRC Environmental Management, Inc.	Novak, D., U.S. EPA	Technical Review of the FS Report (Draft) w/Cover Letter	32
266	06/24/93	Watters, E., U.S. EPA	Traub, J., U.S. EPA	Memorandum re: Water Division's Review of the Revised FS	2
267	06/29/93	Bandemehr, A., U.S. EPA	Novak, D., U.S. EPA	Memorandum re: Air Toxics and Radiation Branch's Review of the Revised FS (Annotated)	5
268	07/02/93	Kleiman, J., U.S. EPA	Novak, D., U.S. EPA	Memorandum re: RCRA's Review of the Draft FS for ARARs	1
269	07/09/93	IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the FS Report, Revision 1 (Draft)	10
270	07/12/93	Smith, J., IDEM	Wright, L., IDEM	Memorandum re: Superfund Section's Review of the FS, Revision 1 for ARARs	3
271	07/16/93	U.S. EPA	Public	Letter re: Activities Update	4
272	07/21/93	Novak, D., U.S. EPA	Grimmer, M., Waste Inc. Steering Committee	Letter re: U.S. EPA's Comments to the Revised FS w/Attachments (UNSIGNED)	21
273	07/26/93	Grimmer, M., Eichhorn, Eichhorn & Link	Novak, D., U.S. EPA	Letter re: Delay in Making Revisions to the Revised FS	1
274	08/02/93	Taylor, E., ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: Request for Extension of FS Report, Revision 2	2
275	08/17/93	Novak, D., U.S. EPA	Taylor, E., ERM-North Central, Inc.	Letter re: U.S. EPA's Denial of Request for Extension for Submission of the FS Report, Revision 2 (UNSIGNED)	2
276	08/19/93	ERM-North Central, Inc.	Novak, D., U.S. EPA	Letter re: ERM's Comments on the FS, Revision 1 w/Attachments	79
277	08/23/93	Wright, L., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Revised FS (UNSIGNED)	3

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
278	09/24/93	Wright, L., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the August 19, 1993 Revised FS	3
279	09/30/93	ERM-North Central, Inc.	U.S. EPA	Feasibility Study Report, Revision 3	312
280	09/30/93	Novak, D., U.S. EPA	Griener, M., Waste Inc. Steering Committee	Letter re: Approval w/Corrections of the Revised FS (UNSIGNED)	2
281	10/01/93	Bunsen, S., Versar, Inc.	Novak, D., U.S. EPA	Letter re: Versar's Review of Comments and Changes to the FS	2
282	10/20/93	Hudak, D., U.S. DOI	Novak, D., U.S. EPA	Letter re: U.S. DOI's Comments on the FS, Revision 3	1
283	12/20/93	Novak, D., U.S. EPA	Addressees	Memorandum Forwarding the Draft Proposed Plan for Review	1
284	12/28/93	Heller, D., U.S. EPA	Novak, D., U.S. EPA	Memorandum re: RCRA's Review of the Proposed Plan for ARARs	1
285	01/00/94	U.S. EPA	Public	Fact Sheet: Proposed Plan for Remedial Action	8
286	01/04/94	Hawvermale, G., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Comments on the Proposed Plan Fact Sheet	2
287	01/10/94	Meyer, D., U.S. EPA	Novak, D., U.S. EPA	Memorandum re: Air Toxic and Radiation Branch's Comments on the Proposed Plan	1
288	01/10/94	Watters, E., U.S. EPA	Traub, J., U.S. EPA	Memorandum re: Water Division's Review of the Draft Proposed Plan	3
289	02/09/94	Marilyn M. Jones & Associates, Ltd.	U.S. EPA	Condensed Transcript: U.S. EPA Public Hearing	75
290	02/09/94	Anderson, T., Save the Dunes Council	Novak, D., U.S. EPA	Letter re: Comments Concerning the Proposed Alternatives w/Attachments	10
291	02/09/94	Various	U.S. EPA	Public Comment Sheets	8
292	02/18/94	Boklund, R., LaPorte County Health Department	Novak, D., U.S. EPA	Letter re: LCHD's Request for a 30 Day Extension of the Comment Period for the Proposed Plan	1
293	03/01/94	Novak, D., U.S. EPA	Anderson, T., Save the Dunes Council	Letter in Response to Questions Raised re: Proposed Remediation Plan (UNSIGNED)	2

DOC# =====	DATE =====	AUTHOR =====	RECIPIENT =====	TITLE/DESCRIPTION =====	PAGES =====
294	03/09/94	Bergerson, S., City of Michigan City	Novak, D., U.S. EPA	Letter re: Michigan City's Request for a 30 Day Extension to the Public Comment Period	1
295	03/11/94	Steele, G., Indiana State Department of Health	Novak, D., U.S. EPA	Letter re: ISDH's Request for Extension of the Public Comment Period for the Proposed Plan and FS	1
296	03/14/94	Jordan, A., and Parish, M., Minority Health Coalition	Novak, D., U.S. EPA	Letter re: Request for Extension of the Public Comment Period	1
297	03/15/94	Boklund, R., LaPorte County Health Department	Novak, D., U.S. EPA	Letter re: LCHD's Request for a Temporary Postponement of the Comment Period for the Proposed Plan	1
298	03/23/94	Adams, J. and Hamper, M., Warzyn Inc.	Novak, D., U.S. EPA	Letter re: Cost Estimate for a Complete Removal Remedy	3
299	03/31/94	Adamskus, V., U.S. EPA	Recipients	Administrative Order by Consent	49
300	04/15/94	City of Michigan City	U.S. EPA	Resolution #3688: Resolution to the Indiana State Department of Health Regarding the Public Health Assessment for Waste Inc. w/Attachments	5
301	04/15/94	City of Michigan City	U.S. EPA	Resolution #3689: Resolution to the U.S. EPA Regarding the Waste Inc. Superfund Site w/Attachment	3
302	04/19/94	Mothers Opposing Pollution	Novak, D., U.S. EPA	Comments on the Proposed Plan and FS w/Cover Letter	13
303	04/21/94	Anderson, T., Save the Dunes Council	Novak, D., U.S. EPA	Letter re: Comments Concerning Support of Alternative 5B w/Attachments	13
304	04/21/94	Boklund, R., LaPorte County Health Department	Novak, D., U.S. EPA	Letter re: LCHD's Comments on the Proposed Plan	3
305	04/22/94	Carrasquero, P., IDEM	Novak, D., U.S. EPA	Letter re: IDEM's Recommendations for the ROD	2
306	04/22/94	Adams, J., Warzyn Inc.	Novak, D., U.S. EPA	Letter re: Technical Comments on the Proposed Plan for Remedial Action	6
307	07/13/94	Pastor, S., U.S. EPA	Anderson, T., Waste Inc. Cleanup Coalition	Letter re: Technical Assistance Grant	2

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
====	====	=====	=====	=====	=====
308	07/22/94	Carrasquero, P. IDEM	Novak, D., U.S. EPA	Letter re: IDEN's Comments on the ROD	2

PAGE NO. 1
05/16/89

- INDEX -
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc NO	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSMER/EPA Number
0000	1	INDEX TO COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS	05/01/89	- OMPE - PRC-ENVIRONMENTAL MANAGEMENT, INC	Final	8		1) DATA ELEMENT DEFINITIONS 2) ORGANIZATIONAL ABBREVIATIONS AND ACRONYMS IDENTIFIED IN INDEX	
** Pre-Remedial									
0001	1	EXPANDED SITE INSPECTION TRANSITIONAL GUIDANCE FOR FY-88	10/01/87	- OERR	Final	74	2		OSMER #9345 1 02
0002	1	PRELIMINARY ASSESSMENT GUIDANCE FISCAL YEAR 1988	01/01/88	- OERR/ASCD	Final	83	2		OSMER #9345 0 01
** Removal Action									
1000	1	CERCLA REMOVAL ACTIONS AT METHANE RELEASE SITES	01/23/86	- LONGEST, H.L./OERR	Final	2	2		OSMER #9360 0 06
1001	1	COSTS OF REMEDIAL RESPONSE ACTIONS AT UNCONTROLLED HAZARDOUS WASTE SITES	01/01/81	- RISHIEL, H.L., ET AL /SCS ENGINEERS - ALBRECHT, D.W./MERL	Final	164	1		
1002	1	EMERGENCY RESPONSE PROCEDURES FOR CONTROL OF HAZARDOUS SUBSTANCE RELEASES	01/01/83	- MELVOLD, R.W./ROCKWELL INTERNATIONAL - MCCARTHY, L.T./MERL	Final	23	1		EPA 600/1-84-021
1003	1	ENVIRONMENTAL REVIEW REQUIREMENTS FOR REMOVAL ACTIONS	04/13/87	- OERR/ERD	Final	6	2		OSMER #9318 0 05
1004	1	GUIDANCE ON IMPLEMENTATION OF THE "CONTRIBUTE TO REMEDIAL PERFORMANCE" PROVISION	04/06/87	- OSMER	Final	6	2		OSMER #9360 0 13
1008	2	GUIDANCE ON NON-NPL REMOVAL ACTIONS INVOLVING NATIONALLY SIGNIFICANT OR PRECEDENT SETTING ISSUES	04/03/89	- LONGEST, H.L./OERR	Final	9	2	1) REQUEST FOR CIRCULARITY	OSMER #9360 0 19
1005	1	INFORMATION ON DRINKING WATER ACTION LEVELS	04/19/88	- FIELDS, JR., T./OSMER/ERD	Final	17	2	1) MUM RELEASES FROM FAMILIARLY APPLIED PESTICIDES 2) MUM/ERD CONTAMINATION 3) GUIDANCE FOR ETHYLENE DIBROMIDE IN DRINKING FID0	
1006	1	SUPERFUND REMOVAL PROCEDURES, REVISION #3	02/01/88	- OSMER/OERR	Final	365	1		OSMER #9360 0 031
1007	1	THE ROLE OF EXPEDITED RESPONSE ACTIONS UNDER SARA	04/21/87	- LONGEST, H.L./OERR	Final	3	2		OSMER #9360 0 15
4007	26	INTERIM FINAL GUIDANCE ON REMOVAL ACTION LEVELS AT CONTAMINATED DRINKING WATER SITES (Secondary Reference)	10/06/87	- OSMER/OERR	Final	9	2		OSMER #9360 1 01
6001	32	REMOVAL COST MANAGEMENT MANUAL (Secondary Reference)	04/01/88	- OSMER/OERR	Final	170	1		OSMER #9360 0 071

PAGE NO. 2
05/16/89

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Fier	Attachments	OSMER/EPA Number
** RI/FS - General									
2000	2	CASE STUDIES 1-23 REMEDIAL RESPONSE AT HAZARDOUS WASTE SITES	03/01/84	ORD/OEET/MERL - OSMER/OERR	Final	830	1		EPA 540/2-84/002B
2001	3	EPA GUIDE FOR MINIMIZING THE ADVERSE ENVIRONMENTAL EFFECTS OF CLEANUP OF UNCONTROLLED HAZARDOUS-WASTE SITES	06/01/85	ENVIRONMENTAL RESEARCH LABORATORY	Final	250	2		EPA/600/8-85/018
2002	3	GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA	10/01/88	OSMER/OERR	Final	390	1		OSMER #9355 1-01
2003	3	JOINT CORPS/EPA GUIDANCE	06/24/83	OERR/PAS	Final	42	2		OSMER #9295 2-02
2004	4	MODELING REMEDIAL ACTIONS AT UNCONTROLLED HAZARDOUS WASTE SITES (VOL. I-IV)	04/01/85	HOUTWELL, S.H., ET AL./ANDERSON-NICHOLS AND (1) - OSMER/OERR - AMMON, D.C. AND BORNWELL, JR., T.O./MERL	Final	350	1		OSMER #9355 0-08
2005	4	POLICY EFFECTED PLAINS AND WETLAND ASSESSMENTS FOR CERCLA ACTIONS	08/01/85	HEDDEMAN, JR., W.N./OERR - LUCERO, G./OMPE	Final	9	2		OSMER #9280 0-02
2006	4	REMEDIAL RESPONSE AT HAZARDOUS WASTE SITES: SUMMARY REPORT	03/01/84	ORD/MERL	Final	95	1		EPA 540/2-84/002A
2007	4	REVISED PROCEDURES FOR IMPLEMENTING OFF-SITE RESPONSE ACTIONS	11/13/87	PORTER, J.W./OSMER	Final	20	2		OSMER #9834 11
2008	4	RI/FS IMPROVEMENTS	07/23/87	LONGEST, H.L./OERR	Final	11	2	1) RI/FS IMPROVEMENTS	OSMER #9355 0-20
2009	4	RI/FS IMPROVEMENTS FOLLOW-UP	04/25/88	LONGEST, H.L./OERR	Final	16	2	1) RI/FS IMPROVEMENTS FOLLOW-UP 2) REMEDIAL INFORMATION TRANSFER ACTIVITIES	OSMER #9355 1-05
2010	4	SUPERFUND FEDERAL-LEAD REMEDIAL PROJECT MANAGEMENT HANDBOOK	12/01/86	OERR	Draft	179	1		OSMER #9355 1-1
2011	5	SUPERFUND REMEDIAL DESIGN AND REMEDIAL ACTION GUIDANCE	06/01/86	OERR	Final	100	1		OSMER #9355 0-4A
2012	5	SUPERFUND STATE-LEAD REMEDIAL PROJECT MANAGEMENT HANDBOOK	12/01/86	OERR	Final	120	1		OSMER #9355 2-1
** RI/FS - RI Data Quality/Site & Waste Assessment									
2100	5	A COMPENDIUM OF SUPERFUND FIELD OPERATIONS METHODS	12/01/87	OERR - OMPE	Final	550	1		OSMER #9355 0-14
2101	6	DATA QUALITY OBJECTIVES FOR REMEDIAL RESPONSE ACTIVITIES: DEVELOPMENT PROCESS	03/01/87	COM FEDERAL PROGRAMS CORP., - OERR/OMPE	Final	150	1		OSMER #9355 0-7B

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

DOC No	Vol	Title	Date	Authors	Status	Pages	Fier	Attachments	OSWER/EPA Number
2102	6	DATA QUALITY OBJECTIVES FOR REMEDIAL RESPONSE ACTIVITIES: EXAMPLE SCENARIO: RI/IS ACTIVITIES AT A SITE W/ CONTAMINATED SOILS AND GROUNDWATER	03/01/87	- CDM FEDERAL PROGRAMS CORP - CERR/OMPE	Final	120	1		OSWER #9355 0 70
2103	6	DESIGN AND IMPLEMENTATION OF HAZARDOUS WASTE REACTIVITY TESTING PROTOCOL	02/01/84	- HOLBACH, C.D., ET AL /ACUREX CORP - BARKLEY, N /MERL	Final	150	1		EPA-600/2-84-057
2104	6	FIELD SCREENING FOR ORGANIC CONTAMINANTS IN SAMPLES FROM HAZARDOUS WASTE SITES	04/02/86	- ROFFMAN, H.K., ET AL /ANUS CORP. - CARTER, A. /MICHIGAN DEPT OF NATURAL RESOURCES - THOMAS, T. /EPA	Final	11	2	1) MEMO FIELD SCREENING FOR ORGANIC CONTAMINANTS	
2105	6	FIELD SCREENING METHODS CATALOG: USER'S GUIDE	09/01/88	- CERR/MSD	Final	90	1		EPA/540/2-88/005
2106	6	FIELD STANDARD OPERATING PROCEDURES MANUAL #4-SITE ENTRY	01/01/85	- CERR/MSD	Final	29	2		OSWER #9285 2-01
2107	7	FIELD STANDARD OPERATING PROCEDURES MANUAL #6-WORK ZONES	04/01/85	- CERR/MSD	Final	19	2		OSWER #9285 2-04
2108	7	FIELD STANDARD OPERATING PROCEDURES MANUAL #8 AIR SURVEILLANCE	01/01/85	- CERR/MSD	Final	24	2		OSWER #9285 2-03
2109	7	FIELD STANDARD OPERATING PROCEDURES MANUAL #9-SITE SAFETY PLAN	04/01/85	- CERR/MSD	Final	26	2	1) SAMPLE SITE SAFETY PLAN AND CRNA SAFETY PLAN 2) EMERGENCY OPERATION CRNA REAL TIME MONITOR 3) RESPONSE SAFETY CHECK-OFF SHEET	OSWER #9285 2-05
2110	7	GEOPHYSICAL METHODS FOR LOCATING ABANDONED WELLS	07/01/84	- FRISCHNICK, L.M., ET AL. /U.S GEOLOGICAL SURVEY - VANCE, J.J. /EMSL	Final	211	1		EPA-600/4-84-065
2111	7	GEOPHYSICAL TECHNIQUES FOR SENSING BURIED WASTES AND WASTE MIGRATION	06/01/84	- BENSON, R.C., ET AL. /TECHNOS, INC - VANCE, J.J. /EMSL	Final	236	1		EPA-600/7-84/064
2112	8	GUIDELINES AND SPECIFICATIONS FOR PREPARING QUALITY ASSURANCE PROGRAM DOCUMENTATION	06/01/87	- ORD/QUALITY ASSURANCE MANAGEMENT STAFF	Final	31	2	1) MEMO GUIDANCE ON PREPARING QAP'S DATED 6/10/87	
2113	8	LABORATORY DATA VALIDATION FUNCTIONAL GUIDELINES FOR EVALUATING INORGANICS ANALYSES	07/01/88	- EPA DATA REVIEW WORK GROUP - BLEYLER, R. /VIAR AND CO. /SAMPLE MONI OFFICE - MSD	Draft	20	2		
2114	8	LABORATORY DATA VALIDATION FUNCTIONAL GUIDELINES FOR EVALUATING ORGANICS ANALYSES	02/01/88	- BLEYLER, R. /VIAR AND CO. /SAMPLE MONI OFFICE - EPA DATA REVIEW WORKGROUP - MSD	Draft	45	2		

PAGE NO. 4
05/16/89

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol Title	Date	Authors	Status	Pages	Tier	Attachments	OSMR/EPA Number
2115	8 PRACTICAL GUIDE FOR GROUND-WATER SAMPLING	09/01/85	- BARCELONA, M. J., ET AL./ILLINOIS ST. WATER SURVEY - SCALF, M.R./ORD/ERL	Final	175	1		EPA/600/2-85/104
2116	8 SEDIMENT SAMPLING QUALITY ASSURANCE USER'S GUIDE	07/01/85	- BARTH, D.S. & STARKS, T.S./UNIV. OF NEV. LAS VEGAS - BROWN, K.W./EARD	Final	120	1		EPA/600/4-85/048
2117	8 SOIL SAMPLING QUALITY ASSURANCE USER'S GUIDE	05/01/84	- BARTH, D.S. & MASON, B. J./U. OF NEVADA, LAS VEGAS - BROWN, K./ORD/EARD	Final	104	1		EPA 600/4-84/043
2118	9+ TEST METHODS FOR EVALUATING SOLID WASTE, LABORATORY MANUAL PHYSICAL/CHEMICAL METHODS, THIRD EDITION (VOLUMES 1A, 1B, 1C, AND 11)	11/01/86	- OSMR	Final	3000	1		
2119	11 USER'S GUIDE TO THE CONTRACT LABORATORY PROGRAM	12/01/88	- OERR/CLP SAMPLE MANAGEMENT OFFICE	Final	220	2		OSMR #9240 0-1
** RI/FS - Land Disposal Facility Technology								
2200	12 COVERS FOR UNCONTROLLED HAZARDOUS WASTE SITES	09/01/85	- MCANENY, C.C., ET. AL./U.S. COE/MES - HOUTHOOFF, J.M./MERL	Final	475	2		EPA/540/2-85/002
2201	13 DESIGN, CONSTRUCTION, AND EVALUATION OF CLAY LINERS FOR WASTE MANAGEMENT FACILITIES	11/01/88	- COLDMAN, J.L., ET. AL./NUS - ROULTER, M.H./RREL	Final	500	2		EPA/530/SW-88/0071
2202	13 EVALUATING COVER SYSTEMS FOR SOLID AND HAZARDOUS WASTE	09/01/82	- LUTTON, R.J./U.S.A. COE/MES - LANDRETH, R.E./MERL	Final	58	2		OSMR #9476 00-1
2203	13 GUIDANCE MANUAL FOR MINIMIZING POLLUTION FROM WASTE DISPOSAL SITES	08/01/78	- TOLMAN, A.L., ET. AL./A.W. MARTIN ASSOCIATES, INC. - SANNING, D.E./MERL	Final	83	1		EPA-600/2-78-142
2204	13 LAND DISPOSAL RESTRICTIONS	08/11/87	- LONCEST, H.L./OERR - LUCERO, C./OMPE	Final	23	2	1) SUMMARY OF MAJOR LDR PROVISIONS AND CALIFORNIA LIST PROHIBITIONS 2) OTHER ATTACHES CITED ARE AVAILABLE IN	

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Fig	Attachments	OSWER/EPA Number
2205	14	LINING OF WASTE CONTAINMENT AND OTHER IMPOUNDMENT FACILITIES	09/01/88	- MATRECON, INC. - LANDRETH, R./ORD/RISK REDUCTION ENGINEERING LAB	Final	950	2	FED REG	
2206	15	LINING OF WASTE IMPOUNDMENT AND DISPOSAL FACILITIES	03/01/83	- LANDRETH, R./MERL	Final	480	2		OSWER #9480 00 4
2207	15	PROCEDURES FOR MODELING FLOW THROUGH CLAY LINERS TO DETERMINE REQUIRED LINER THICKNESS	01/01/84	- OSM	Draft	145	2		OSWER #9480 00 91
2208	15	RCA GUIDANCE DOCUMENT: LANDFILL DESIGN LINER SYSTEMS AND FINAL COVER	07/01/82	- EPA	Draft	30	2		
2209	15	SETTLEMENT AND COVER SUBSIDENCE OF HAZARDOUS WASTE LANDFILLS: PROJECT SUMMARY	05/01/85	- MURPHY, W.L. - GILBERT, P.A.	Final	4	2		EPA 600/S2-85-015
2210	15	SUPPLEMENTARY GUIDANCE ON DETERMINING LINER/LEACHATE COLLECTION SYSTEM COMPATIBILITY	08/07/86	- NEEDLE, B.R./PERMITS AND STATE PROGRAMS DIV	Final	60	2	1) ANALYSIS AND FINGERPRINTING OF UNEXPOSED & EXPOSED POLYMERIC MEMBRANE LINERS MATRECON, INC. 2) SEC 3019 EXPOSURE INFO AND HEALTH ASSESSMENTS	OSWER #9480 00 13
2211	15	TECHNICAL GUIDANCE DOCUMENT: CONSTRUCTION QUALITY ASSURANCE FOR HAZARDOUS WASTE LAND DISPOSAL FACILITIES	10/01/86	- FERRMANN, J.C./AMERL/LAND POLLUTION CONTROL DIV. - OSWER	Final	88	2		OSWER #9472 003
2212	15	TREATMENT OF REACTIVE WASTES AT HAZARDOUS WASTE LANDFILLS: PROJECT SUMMARY	01/01/84	- SIEGHER, D. ET AL /ARTHUR D LITTLE, INC. - LANDRETH, R./MERL	Final	4	2		EPA/600/S2-83/118
3000	25	APPLICABILITY OF THE RCRA MINIMUM TECHNICAL REQUIREMENTS RESPECTING LINERS AND LEACHATE COLLECTION SYSTEMS (Secondary Reference)	04/01/85	- SKINNER, J./OSW	Final	3	2		OSWER #9480 01(85)
**		RT/IS - Other Technologies							
2300	16	A COMPENDIUM OF TECHNOLOGIES LISTED IN THE TREATMENT OF HAZARDOUS WASTES	09/01/87	- ORD/CERI	Final	49	2		EPA/625/8-87/014

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

DOC NO	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
2301	16	CARBON ADSORPTION ISOTHERMS FOR TOXIC ORGANICS	04/01/80	- DOBBS, R.A./MERL - COHEN, J.M./MERL	Final	321	2		EPA/600/8-80/023
2302	17	ENGINEERING HANDBOOK FOR HAZARDOUS WASTE INCINERATION	09/01/81	- BONNER, T.A., ET. AL./MONSANTO RESEARCH CORP. - OBERACKER, D.A./OEET	Final	445	2		OSWER #9488 00 5
2303	17	EPA GUIDE FOR IDENTIFYING CLEANUP ALTERNATIVES AT HAZARDOUS WASTE SITES AND SPILLS: BIOLOGICAL TREATMENT	-	- PACIFIC NORTHWEST LABORATORY - RANIERE, L.C./CORVALLIS ENVIRONMENTAL RESEARCH LAB	Final	120	2		EPA-600/3-83-063
2304	17	EPA GUIDE FOR INFECTIOUS WASTE MANAGEMENT	05/01/86	- OSWER/OSW	Final	75	2		OSWER #9410 00-2
2305	17	GUIDANCE DOCUMENT FOR CLEANUP OF SURFACE IMPOLLUTION SITES	06/01/86	- EDWARDWOODWARD-CLYDE/ROY F. WESTON - BARTH, E./OERR	Final	39	1		OSWER #9380 0 06
2306	17	GUIDANCE DOCUMENT FOR CLEANUP OF SURFACE TANK AND DRUM SITES	05/28/85	- EDWARDWOODWARD-CLYDE/ROY F. WESTON/C.C. JOHNSON - BARTH, E. AND BIXLER, B./OERR	Final	135	1		OSWER #9380 0-03
2307	18	HANDBOOK FOR EVALUATING REMEDIAL ACTION TECHNOLOGY PLANS	08/01/83	- BRENFELD, J. AND BASS, J./ARTHUR D. LITTLE INC. - PAREN, H.R./MERL	Final	439	1		EPA-600/2-83-076
2308	18	HANDBOOK FOR STABILIZATION/SOLIDIFICATION OF HAZARDOUS WASTE	06/01/86	- OLLINNE JR., M J ET AL./U.S. OE/MES - FOLTHOFF, J.M./ORDA/MERL	Final	125	1		EPA/540/2-86-001
2309	19	HANDBOOK REMEDIAL ACTION AT WASTE DISPOSAL SITES (REVISED)	10/01/85	- ORD/MERL - OSWER/OERR	Final	560	1		EPA/625/6-85/006
2310	20	LEACHATE PLUME MANAGEMENT	11/01/85	- REPO, E. AND KUFF, C./JRB ASSOCIATES - BARKLEY, N./EPA	Final	590	1		EPA/540/2-85/004
2311	20	MOBILE TREATMENT TECHNOLOGIES FOR SUPERFUND WASTES	09/01/86	- CAMP, DRESSER, AND MCKEE INC. - GALER, L.D./HRSD	Final	130	1		EPA/540/2-86-0011
2312	21	PRACTICAL GUIDE-TRIAL BURNS FOR HAZARDOUS WASTE INCINERATORS	04/01/86	- CORMAN, P., ET. AL./MIDWEST RESEARCH INSTITUTE - OBERACKER, D.A./MERL	Final	63	2		EPA/600/2-86/050
2313	21	PRACTICAL GUIDE-TRIAL BURNS FOR HAZARDOUS WASTE INCINERATORS, PROJECT SUMMARY	07/01/86	- CORMAN, P., ET. AL./MIDWEST RESEARCH INSTITUTE - OBERACKER, D.A./MERL	Final	2	1		EPA/600/52-86/0501

PAGE NO. 7
05/16/89

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol Title	Date	Authors	Status	Pages	Fig	Attachments	OSMR/EPA Number
2314	21 PROHIBITION ON THE PLACEMENT OF BULK LIQUID HAZARDOUS WASTE IN LANDFILLS-STATUTORY INTERPRETIVE GUIDANCE	06/11/86	- OSMR/OSM	Final	35	1	1) MEMO RE SAME SUBJECT FROM WILLIAMS, M.E./OSM	OSMR #9487 00-2A
2315	21 REVIEW OF IN-PLACE TREATMENT TECHNIQUES FOR CONTAMINATED SURFACE SOILS-VOL. 2: BACKGROUND INFORMATION FOR IN-SITU TREATMENT	11/01/84	- SIMS, R.C., ET AL./JRB ASSOCIATES - BARKLEY, N./MERL	Final	350	1		EPA/540/2-84-003b
2316	21 REVIEW OF IN-PLACE TREATMENT TECHNIQUES FOR CONTAMINATED SURFACE SOILS-VOL. 1: TECHNICAL EVALUATION	09/19/84	- OSMR/OERR - OED/MERL	Final	165	1		EPA/540/2-84-003a
2317	22 SLURRY TRENCH CONSTRUCTION FOR POLLUTION MIGRATION CONTROL	02/01/84	- OERR - OED/MERL	Final	220	1		EPA/540/2-84-001
2318	22 SYSTEMS TO ACCELERATE IN SITU STABILIZATION OF WASTE DEPOSITS	09/01/86	- AMURER, M., ET AL./ENVIROSPHERE CO. - CRUBE, W./MERL	Final	285	1		EPA 540/2-86/001
2319	22 TECHNOLOGY SCREENING GUIDE FOR TREATMENT OF CERCLA SOILS AND SLUDGES	09/01/88	- OSMR/OERR	Final	130	1		EPA 540/2 88/004
2320	22 TREATMENT TECHNOLOGY BRIEFS: ALTERNATIVES TO HAZARDOUS WASTE LANDFILLS	07/01/86	- EMERL	Final	35	2		EPA/600/8-86/017
** RI/FS - Ground-Water Monitoring & Protection								
2400	23 CRITERIA FOR IDENTIFYING AREAS OF VULNERABLE HYDROGEOLOGY UNDER RCRA: STATUTORY INTERPRETIVE GUIDANCE	07/01/86	- OSMR/OSM	Final	950	2		OSMR #9472 00-2A
2401	24 FINAL RCRA COMPREHENSIVE GROUND-WATER MONITORING EVALUATION (CME) GUIDANCE DOCUMENT	12/19/86	- LUCERO, G.A./OMPE	Final	55	2	1) RELATIONSHIP OF TECHNICAL INADEQUACIES TO GROUND-WATER PERFORMANCE STANDARDS	OSMR #9950-2
2402	24 GROUND-WATER MONITORING AT CLEAN-CLOSING SURFACE IMPOUNDMENT AND WASTE PILE UNITS	03/31/88	- PORTER, J.W./OSMR	Final	3	2		OSMR #9476 00-14
2403	24 GROUND-WATER PROTECTION STRATEGY	08/01/84	- OFFICE OF GROUND-WATER PROTECTION	Final	65	2		EPA/440/6-84-002
2404	24 GUIDELINES FOR GROUND-WATER CLASSIFICATION UNDER THE EPA GROUND-WATER PROTECTION STRATEGY	12/01/86	- OFFICE OF GROUND-WATER PROTECTION	Draft	600	2		
2405	24 OPERATION AND MAINTENANCE INSPECTION GUIDE (RCRA GROUND-WATER MONITORING SYSTEMS)	03/30/88	- OSMR/OMPE/RCRA ENFORCEMENT DIVISION	Final	50	2	1) TRANSMITTAL MEMO RE SAME SUBJECT	OSMR #9950-3

- INDEX -
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc NO	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
2406	24	PROTOCOL FOR GROUND-WATER EVALUATIONS	09/01/86	HAZARDOUS WASTE GROUND WATER TASK FORCE	Final	200	2		OSWER #9080 0-1
2407	25	RORA GROUND-WATER MONITORING TECHNICAL ENFORCEMENT GUIDANCE DOCUMENT (TECD)	09/01/86	EPA	Final	270	2		OSWER #9950 1
2408	25	RORA GROUND-WATER MONITORING TECHNICAL ENFORCEMENT GUIDANCE DOCUMENT, TECD: EXECUTIVE SUMMARY	07/01/87	LUCERO, G.A./OMPE	Final	8	1		OSWER #9950 1-a
** ARARs									
3000	25	APPLICABILITY OF THE FISHA MINIMUM TECHNICAL REQUIREMENTS RESPECTING LINERS AND LEACHATE COLLECTION SYSTEMS	04/01/85	SKINNER, J./OSW	Final	3	2		OSWER #9480 01(85)
3001	25	CERCLA COMPLIANCE WITH OTHER ENVIRONMENTAL STATUTES	10/02/85	PORTER, J.W./OSWER	Final	19	1	1) POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS	OSWER #9234 0-2
3002	25	CERCLA COMPLIANCE WITH OTHER LAWS MANUAL	08/08/88	OSWR	Draft	245	2		OSWER #9234 1-01
3003	25	EPA'S IMPLEMENTATION OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986	05/21/87	THOMAS, L. M./EPA	Final	4	2		
3004	25	GUIDANCE MANUAL ON THE RORA REGULATION OF RECYCLED HAZARDOUS WASTES	03/01/86	INDUSTRIAL ECONOMICS, INC. - OSW	Final	350	2		OSWER #9441 00-2
3005	25	INTERIM RORA/CERCLA GUIDANCE ON NON-CONTIGUOUS SITES AND ON-SITE MANAGEMENT OF WASTE AND TREATMENT RESIDUE	03/27/86	PORTER, J.W./OSWER	Final	8	2	1) COMBINING HAZARDOUS WASTE SITES FOR REM. ACTION	OSWER #9347 0-1
2400	23	CRITERIA FOR IDENTIFYING AREAS OF VULNERABLE HYDROGEOLOGY UNDER RORA: STATUTORY INTERPRETIVE GUIDANCE [Secondary Reference]	07/01/86	OSWER/OSW	Final	950	2		OSWER #9472 00-2A
2401	24	FINAL RORA COMPREHENSIVE GROUND-WATER MONITORING EVALUATION (OME) GUIDANCE DOCUMENT [Secondary Reference]	12/19/86	LUCERO, G.A./OMPE	Final	55	2	1) RELATIONSHIP OF TECHNICAL INADEQUACIES TO GROUND-WATER PERFORMANCE STANDARDS 1) TRANSMITTAL MEMORE SAME SUBJECT	OSWER #9950 2
2405	24	OPERATION AND MAINTENANCE INSPECTION GUIDE (RORA GROUND-WATER MONITORING SYSTEMS) [Secondary Reference]	03/30/88	OSWER/OMPE/RORA ENFORCEMENT DIVISION	Final	50	2		OSWER #9950 3
2407	25	RORA GROUND-WATER MONITORING TECHNICAL ENFORCEMENT GUIDANCE DOCUMENT (TECD) [Secondary Reference]	09/01/86	EPA	Final	270	2		OSWER #9950 1
2408	25	RORA GROUND-WATER MONITORING TECHNICAL ENFORCEMENT GUIDANCE DOCUMENT, TECD: EXECUTIVE SUMMARY [Secondary Reference]	07/01/87	LUCERO, G.A./OMPE	Final	8	1		OSWER #9950 1-a

PAGE NO. 9
05/16/89

- INDEX -
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSMR/EPA Number
2708	15	RCA GUIDANCE DOCUMENT: LANDFILL DESIGN LINER SYSTEMS AND FINAL COVER [Secondary Reference]	07/01/82	- EPA	Draft	30	2		
9001	37	RCA/CERCLA DECISIONS MADE ON REMEDY SELECTION [Secondary Reference]	06/24/85	- KILPATRICK, M. /COMPLIANCE BRANCH, OMB	Final	3	2		
** Water Quality									
4000	26	ALTERNATE CONCENTRATION LIMIT GUIDANCE PART 1, ACL POLICY AND INFORMATION REQUIREMENTS	07/01/87	- OSM/MD	Final	124	2		OSMR #9481 (X) 01
4001	26	GUIDANCE DOCUMENT FOR PROVIDING ALTERNATE WATER SUPPLIES	02/01/88	- OERR	Final	64	2		OSMR #9355 3-01
4002	26	INTERIM FINAL GUIDANCE ON REMOVAL ACTION LEVELS AT CONTAMINATED DRINKING WATER SITES	10/06/87	- OSMR/OERR	Final	9	2		OSMR #9360 1 01
4003	26	QUALITY CRITERIA FOR WATER 1986	05/01/87	- OFFICE OF WATER REGULATIONS AND STANDARDS	Final	325	2		EPA/440/5-86 (X)
2301	16	CARBON ADSORPTION ISOTHERMS FOR TOXIC ORGANICS [Secondary Reference]	04/01/80	- COHBS, R. A. /MERL - COHEN, J. M. /MERL	Final	321	2		EPA/600/8-80-021
1005	1	INFORMATION ON DRINKING WATER ACTION LEVELS [Secondary Reference]	04/19/88	- FIELDS, JR., T. /OSMR/ERO	Final	17	2	1) MMD RELEASES FROM FAMILIARLY APPLIED PESTICIDES 2) MMD ERO? CONTAMINATION 3) GUIDANCE FOR FURTHER DETERMINATION IN DRINKING WTR	
** Risk Assessment									
5000	27	ATSDR HEALTH ASSESSMENTS ON NPL SITES	06/16/86	- DEPT. OF HEALTH AND HUMAN SERVICES/ATSDR	Draft	14	2		
5001	27	CHEMICAL, PHYSICAL & BIOLOGICAL PROPERTIES OF COMPOUNDS PRESENT AT HAZARDOUS WASTE SITES	09/27/85	- CLEMENT ASSOCIATES, INC.	Final	320	2		OSMR #9850 1
5002	27	FINAL GUIDANCE FOR THE COORDINATION OF ATSDR HEALTH ASSESSMENT ACTIVITIES WITH THE SUPERFUND REMEDIAL PROCESS	05/14/87	- PORTER, J. W. /OSMR/OERR - ATSDR	Final	22	2	1) SAME TITLE, DATED 4/22/87	OSMR #9285 4 01
5003	27	GUIDELINES FOR CARCINOGEN RISK ASSESSMENT (FEDERAL REGISTER, SEPTEMBER 24, 1986, p. 33992)	09/24/86	- EPA	Final	13	2		

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc NO	Vol Title	Date	Authors	Status	Pages	Tier	Attachments	CERCLA/EPA Number
5004	27 GUIDELINES FOR EXPOSURE ASSESSMENT (FEDERAL REGISTER, SEPTEMBER 24, 1986, p. 34042)	09/24/86	- EPA	Final	14	2		
5005	27 GUIDELINES FOR HEALTH ASSESSMENT OF SUSPECT DEVELOPMENTAL TOXICANTS (FEDERAL REGISTER, SEPTEMBER 24, 1986, p. 34028)	09/24/86	- EPA	Final	14	2		
5006	27 GUIDELINES FOR MUTAGENICITY RISK ASSESSMENT (FEDERAL REGISTER, SEPTEMBER, 24, p. 34006)	09/24/86	- EPA	Final	8	2		
5007	27 GUIDELINES FOR THE HEALTH RISK ASSESSMENT OF CHEMICAL MIXTURES (FEDERAL REGISTER, SEPTEMBER 24, 1986, p. 34014)	09/24/86	- EPA	Final	13	2		
5008	28 HEALTH EFFECTS ASSESSMENT DOCUMENTS (58 CHEMICAL PROFILES) VOL 28: ACETONE, ARSENIC, ASBESTOS, BARIUM, BENZO(A)PYRENE, CADMIUM, CARBON TETRACHLORIDE, CHLOROBENZENE, CHLORDANE, CHLOROFORM, COAL TARS, COPPER, CRESOLS, CYANIDE, DDT, 1,1-DICHLOROETHANE, 1,2-DICHLOROETHANE; VOL 29: 1,1-DICHLOROETHYLENE, 1,2-DICHLOROETHYLENE, CIS-1,2-DICHLOROETHYLENE, ETHYLBENZENE, GLYCOL ETHERS, HEXAChLOROBENZENE, HEXACHLOROBUTADIENE, HEXAChLOROCYCLOPENTADIENE, HEXAVALENT CHROMIUM, IRON (AND COMPOUNDS), LEAD, LINDANE, MANGANESE (AND COMPOUNDS), MERCURY, METHYL ETHYL KETONE, METHYLENE CHLORIDE, NAPHTHALENE, NICKEL, PENTACHLOROPHENOL, PHENOL, PHENANTHRENE; VOL 30: POLYCHLORINATED BIPHENYLS (PCBS), POLYCYCLIC AROMATIC HYDROCARBONS (PAHS), PYRENE, SELENIUM (AND COMPOUNDS), SODIUM CYANIDE, SULFURIC ACID, 2,3,7,8-TETRAChLORODIBENZO-P-DIOXIN, 1,1,2,2-TETRAChLOROETHANE, TETRAChLOROETHYLENE, TOLUENE, 1,1,2-TRICHLOROETHANE, 1,1,1-TRICHLOROETHANE, TRICHLOROETHYLENE, 2,4,5-TRICHLOROPHENOL, 2,4,6-TRICHLOROPHENOL, TRIVALENT CHROMIUM, VINYL CHLORIDE, XYLENE, ZINC (AND COMPOUNDS)	09/01/84	- CERCLA/EPA/CDO - CERCLA/CERR	Final	1750	2		EPA/540/1-86/001-058
5009	31 INTEGRATED RISK INFORMATION SYSTEM (IRIS) (A COMPUTER-BASED HEALTH RISK INFORMATION SYSTEM AVAILABLE THROUGH E-MAIL--BROCHURE ON ACCESS IS INCLUDED)	-	- CERCLA	Final	-	2		

PAGE NO. 11
05/16/89

- INDEX -
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc No	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSWER/EPA Number
.....
5010	31	INTERIM POLICY FOR ASSESSING RISKS OF "DIOXINS" OTHER THAN 2,3,7,8-TCDD	01/07/87	- THOMAS, L.M./EPA	Final	50	2	1) INTERIM PROCEDURES FOR ESTIMATING RISKS ASSOCIATED WITH EXPOSURES TO MIXTURES: 10/86	
5011	31	PUBLIC HEALTH RISK EVALUATION DATABASE (PIRED) (USER'S MANUAL AND TWO DISKETTES CONTAINING THE DBASEIII PLUS SYSTEM ARE INCLUDED)	09/16/88	- OERR/TOXICS INTEGRATION BRANCH	Final	-	2		
5012	31	ROLE OF ACUTE TOXICITY BIOASSAYS IN THE REMEDIAL ACTION PROCESS AT HAZARDOUS WASTE SITES	08/01/87	- ATHEY, L.A., ET AL /PACIFIC NORTHWEST LABORATORY - MILLER, W.E./CORVALLIS ENVIRONMENTAL RESEARCH LAB	Final	106	2		EPA/600/8-87/044
5013	31	SUPERFUND EXPOSURE ASSESSMENT MANUAL	04/01/88	- OERR	Final	160	1		OSWER #9285 5-1
5014	31	SUPERFUND PUBLIC HEALTH EVALUATION MANUAL	10/01/86	- OERR - OSWER	Final	500	1		OSWER #9285 4-1
5015	31	TOXICOLOGY HANDBOOK	08/01/85	- LIFE SYSTEMS, INC. - TYBURSKI, T.E./OMPE	Final	126	2		OSWER #9850 2
8000	32	INDICAMENT ASSESSMENT GUIDANCE [Secondary Reference]	11/22/85	- PORTER, J.W./OSWER	Final	11	2		OSWER #9850 0 1
** Cost Analysis									
6000	32	REMEDIAL ACTION COSTING PROCEDURES MANUAL	10/01/87	- JRB ASSOCIATES/CIDM HILL - ORD/MERL - OSWER/OERR	Final	56	1		
6001	32	REMOVAL COST MANAGEMENT MANUAL	04/01/88	- OSWER/OERR	Final	170	1		OSWER #9360 0-025
1003	1	ENVIRONMENTAL REVIEW REQUIREMENTS FOR REMOVAL ACTIONS [Secondary Reference]	04/13/87	- OERR/ERD	Final	6	2		OSWER #9318 0 05
** Community Relations									
7000	32	COMMUNITY RELATIONS IN SUPERFUND: A HANDBOOK (INTERIM VERSION)	06/01/88	- OERR	Final	188	2	1) CWP 6 OF THE CCM REL HANDBOOK 11/03/88	OSWER #9230 0 011

PAGE NO. 12
05/16/89

-INDEX-
COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

Doc NO	Vol	Title	Date	Authors	Status	Pages	Tier	Attachments	OSMER/EPA Number
** Enforcement									
8000	32	ENDANGERMENT ASSESSMENT GUIDANCE	11/22/85	PORTER, J.W./OSMER	Final	11	2		
8001	32	INTERIM GUIDANCE ON POTENTIALLY RESPONSIBLE PARTY PARTICIPATION IN REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES	05/16/88	PORTER, J.W./OSMER	Final	37	2		OSMER #9850 0-1 OSMER #9835 1a
** Selection of Remedy/Decision Documents									
9000	32	INTERIM GUIDANCE ON SUPERFUND SELECTION OF REMEDY	12/24/86	PORTER, J.W./OSMER	Final	10	2		
9001	32	RRA/CERCLA DECISIONS MADE ON REMEDY SELECTION	06/24/85	KILPATRICK, M./COMPLIANCE BRANCH, OPE	Final	3	2		OSMER #9355 0-19