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EPA Superfund
Record of Decision:

TIPPECANOE SANITARY LANDFILL, INC.
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Declaration for the Record of Decision

Site Name and Location

Tippecanoe Sanitary Landfill, Inc. Site
Tippecanoe County, Indiana

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Tippecanoe Sanitary Landfill, Inc. Site in Tippecanoe County, Indiana, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record file for this site.

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 Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

This remedy addresses all of the conditions prompting remedial response actions that have been identified at the Site. It addresses the wastes that are contained at this former municipal landfill through a barrier cover and leachate and gas collection. It provides contingent groundwater remediation; this remediation will be implemented if the source control measures being taken along with natural attenuation do not appear to be controlling the groundwater contamination within the stated time frames or if future downgradient water supplies are threatened.

The major components of the selected remedy include:

- a sanitary landfill cover for the waste disposal area;
- a fence that surrounds, at a minimum, the waste disposal area and the barrier cover;
- leachate extraction and treatment, either by transfer to the local publicly owned treatment works (POTW) for treatment (if the POTW can accept the leachate) or on-site treatment and discharge to Wildcat Creek or the Wabash River, with this discharge meeting National Pollutant Discharqe Elimination System (NPDES) permit requirements and with proper disposal of the treatment residues;
- gas extraction system;
- a contingent groundwater remediation component that will be implemented if either source control and natural attenuation are determined to not be reducing the downgradient ground-water contamination to acceptable levels within the specified time frame or if human health is being threatened by water being extracted from downgradient water supply wells;
- on-site groundwater treatment, if groundwater remediation is implemented, to produce an effluent meeting the NPDES permit requirements that will be discharged to surface water with the treatment residues being properly disposed of off-site;
- deed restrictions, including provisions for the protection of the remedial actions taken and the prohibition of wells on the Site to be used for a water supply; and
- site monitoring and maintenance of all remedial action components.

Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The remedy utilizes permanent solutions and alternative treatment or resource recovery tecnologies, to the maximum extent practicable, for this Site. The large size of the landfill and the apparent lack of on-site hot spots representing major sources of contamination renders treatment of the waste disposal area impracticable and non-cost effective. Thus the statutory preference for a remedy requiring permanent treatment as a principal element cannot be followed. A principal threat, which the U.S. Environmental Protection Agency (USEPA) would expect to treat, has not been indicated. Instead, as provided

for at 40 CFR 300.430(a)(1)(iii)(B), USEPA expects to use engineering controls, such as containment, for source control at a municipal landfill because the wastes pose a relatively low-level, long-term threat and because permanent treatment of the entire landfill is impracticable. The selected response action is consistent with the USEPA's guidance for remedial response actions at municipal landfills, as described in "Presumptive Remedy for CERCLA Municipal Landfill Sites", OSWER Directive No. 9355.0-49FS.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

State Concurrence

The State of Indiana has stated that it concurs in the selected remedy.

<IMG SRC 97078A>

Record of Decision Summary
Tippecanoe Sanitary Landfill, Inc. Site

I. Site Description

The Tippecanoe Sanitary Landfill, Inc. (TSL) site (Site)is located at 2801 North Ninth Street Road, just outside Lafayette, Indiana. The approximately 79-acre site lies within the common floodplain of the Wabash River, which lies some distance north and west of the landfill, and Wildcat Creek, which flows toward the north approximately 600 feet northeast of the landfill. Figure 1 shows the Site and some of the adjacent property.

Except for the valley wall along the western boundary of the landfill, the ground surface beneath the landfill was formerly relatively flat farmland. The original ground surface was approximately at elevation 524 feet (North American Vertical Datum (NAVD) of 1927) and rose to an approximate elevation of 550 feet (NAVD) along the valley wall. The Site is bordered by railroad tracks to the west, with North Ninth Street Road further west and some residences and businesses on the west side of this road, several residences to the north and northwest, farmland to the north and northeast and east, a wooded area to the east and southeast, and a borrow area to the south where quarrying operations are on-going. A private residence lies on the northwest corner of the property used for the landfill, but the area near this residence was not to be used for waste disposal operations. The buildings used in the landfill operation in the latter years of its operation lie on part of the waste disposal area.

II. Site History and Enforcement Activities

In 1971, Tippecanoe County, Indiana, Purdue University, the City of West Lafayette, Indiana, and the City of Lafayette, Indiana decided that there should be one landfill in the county that local residents, commercial entities, and industry could use for the disposal of non-hazardous wastes. As a result, the first three parties moved ahead to establish such a landfill; the City of Lafayette, Indiana, joined them later. TSL was privately formed to operate a landfill and reached an agreement with the Tippecanoe County Board of Commissioners in June 1971 for the operation of a landfill. TSL first leased the property at the Site for the landfill in June 1971; about 10 acres in the northwest corner, which were not clearly defined, were excluded from the lease. An operating permit was issued on April 12, 1971 and landfilling operations began in June 1971. Gerald Schlossberg purchased TSL in about 1975, and on February 17, 1976 the State Board of Health issued another operating permit for the landfill.

The municipal landfill was operated at the Site until it was closed in October 1989 pursuant to a Consent Decree from an Indiana state court. During the years that the landfill was operated, there were several periods when the landfill did not have an operating permit from the state. During these periods, the landfill generally continued to operate while the landfill operator appealed the state's permit decisions in Indiana state courts. Some of the claims against the landfill operator were that there was only sporadic daily cover, unsatisfactory daily cover, possible acceptance of hazardous waste, poor geologic conditions, and failures to operate in accordance with the requirements of the permit.

Primarily, the wastes disposed of at the Site were the solid wastes generated by local residents, businesses, and industries. An industrial sludge went to the Site for a number of years in the 1970s, and this practice was discontinued when a sludge sample was found to contain elevated levels of polychlorinated biphenyls (PCBs). During the last year or more of operation, some out-of-state wastes were disposed of at the Site. The

landfill closed before the anticipated final elevations were reached. An acceptable final cover was never installed over all of the landfill after the landfill stopped accepting wastes.

On March 8, 1990, the U.S. Environmental Protection Agency (USEPA), the Indiana Department of Environmental Management (IDEM), and ten of the parties who had been named potentially responsible parties (PRPs) for the Site agreed to an Administrative Order on Consent that requires these PRPs to conduct a remedial investigation (RI) and feasibility study (FS) for the Site. More parties were named PRPs in 1992, and nine additional PRPs joined the original group. The Site was finalized on the National Priorities List (NPL) on August 30, 1990.

III. Highlights of Conmunity Participation

The Proposed Plan and the documents designated as being the remedial investigation report and the feasibility report were released to the public in July 1997. These documents were made available to the public in both the administrative record and an information repository maintained at the Tippecanoe County Public Library, Lafayette, Indiana; a copy of the administrative record is also maintained in the Records Center in the offices of Region 5 in Chicago. The notice of availability of these documents was published in the Lafayette-West Lafayette Journal and Courier on July 24, 1997. A public comment period was held from July 28, 1997 through August 28, 1997. A public meeting was held on August 6, 1997. At this meeting, representatives from USEPA and IDEM answered questions about the Site's conditions and the remedial alternatives under consideration. A response to the comments received during the comment period is included in the Responsive Summary, which is a part of this Record of Decision. This decision document presents the selected remedial action for the Tippecanoe Sanitary Landfill, Inc. site in Tippecanoe County, Indiana, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and, to the extent practicable, the National. Contingency Plan (NCP). The decision for the Site is based on the administrative record.

IV. Scope of the Response Action

The selected remedial action presented in this decision document for this landfill will address all the releases and threatened releases of hazardous substances that have been ascertained so far for the site and which warrant remedial response action. The landfill wastes are considered low level threat wastes, that is wastes that generally can be reliably contained and that would present only a low risk in the event of releases or continued releases.

V. Site Characteristics

A presumptive remedy approach has been taken for the remedial investigation and feasibility study for this Site, using the Superfund program's past experience to streamline the site investigation and reduce the technology evaluation phase (Presumptive Remedy for CERCLA Municipal Landfill Sites, USEPA, Directive No. 9355.0-49FS, September 1993). Presumptive remedies are preferred technologies for common categories of sites, based on historical patterns of remedy selection and USEPA's evaluation of performance data on technology implementation. Using the presumptive remedy approach does not mean that the remedy has been selected. It is still necessary to obtain some basic data about the site, propose a remedy (or propose no action) for public comment, consider any comments received, and issue a Record of Decision (ROD) stating what has been decided concerning remediation. The components of the source containment presumptive remedy for municipal landfill sites are: landfill cap; source area groundwater control to contain the plume; leachate collection and treatment; landfill gas collection and treatment; and/or institutional controls to supplement engineering controls.

If the presumed remedy (containment), or parts of it, will not be implemented at this Site, further investigations may be required, as discussed in more detail below. The media sampled were: sediments in ditches and surface soils around the landfill, but not generally on the waste disposal area; groundwater; surface water, leachate; and landfill gas. See Figure 2 for the locations of the groundwater and leachate wells. Groundwater wells were screened at three different elevations: A wells were at the water table; B wells were at the approximate elevation of the top of the middle confining layer; and C wells were at the approximate elevation of the high-capacity pumps at the factory southwest of the Site and some of the nearby residential wells.

The waste disposal area at the site covers approximatelv 59 acres. The estimated volume of material (wastes and soil) in the waste disposal area, assuming that the bottom of the wastes is approximately at the elevation of the surrounding farmland, is 3.4 million cubic yards.

Surficial alluvium deposits existed in the area of the land-fill before landfill operations began that, if still present under the wastes, would resist the movement of leachate from the wastes to the upper aquifer. The water table at the Site is sometimes less than 5 feet below the estimated bottom of the landfill. There are two sand-and-gravel aquifers under at least part of the landfill, separated by a till layer that restricts possible groundwater flow between the two aquifers. This till layer may disappear, however, toward the west, resulting in one aquifer. Generally, the groundwater flow in the area of the landfill in the upper aquifer is towards the west, with some radial flow in the western part of the landfill. In the lower aquifer, the flow is toward the southwest where there are some high-capacity extraction pumps. In the western part of the Site and further west, the vertical flow direction is downwards.

Landfill gas has been escaping from the waste area through the surrounding soils and moving toward some of the nearby residences. This could result in safety and health problems. Methane monitoring alarms have been installed in two nearby homes and an office and are currently being monitored quarterly by IDEM.

As discussed in the report for the remedial investigation, the leachate from the TSL site sampled from the wells in late 1992 and early 1993 was generally similar in content to the leachate from municipal landfills that had been summarized in an USEPA report. In January 1993, the leachate level was 12 to 23 feet above the base of the landfill. These levels indicate that there is some resistance to the flow of leachate into the groundwater below. However, there have been some reports that at least some of the surficial alluvium deposits were removed prior to the placement of wastes. It is also possible that some surficial alluvium deposits might have been removed by an abandoned meander bend of Wildcat Creek that has been reported to have existed in the area. Any removal, whether partial or total, of the surficial alluvium deposits, without replacement by a material with a similar resistance to water flow, would lead to the possibility of easier movement of leachate into the groundwater

Chloride, sodium, and specific conductivity results for the three rounds of groundwater sampling in 1992 (a preliminary round of four wells and Rounds 1 and 2 that included all of the groundwater wells except one (MW-15A) with an abnormal water level) clearly demonstrated that the groundwaters at wells MW-14A, MW- 10A, MW-11B, and MW-16A in the northwest corner, at well MW-20B toward the southwest, and at wells MW-4AR and MW-21B, all in the upper aquifer, and at well MW-21C in the lower aquifer had been contaminated (at some wells there was an order of magnitude increase in the chloride concentrations over the background value). The groundwaters at some other wells (for example, wells MW-3AR and MW-17A) had also been contaminated.

There were also other contaminants found in the downgradient groundwaters, including many inorganics in the field-filtered samples (designated as being dissolved concentrations), especially arsenic and manganese, whose concentrations were significantly above the background levels, and organic tentatively identified compounds (TICs). There were only a few detections of target compound list (TCL) volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) in the groundwater. However, the numbers of SVOC TICs in a few downgradient wells reached 20 (the maximum number the laboratory had to report), and the estimated concentrations of a few of the substances exceeded 1000 Ig/l, based on unvalidated data. In the four northwest corner wells, one groundwater sample had 8 SVOC TICs but the rest had 13 to 20 SVOC TICs, with the average number of SVOC TICs being about 15 per well.

No VOC TICs were reported in the wells in the lower aquifer (the C wells). But there were 6 and 9 detects of SVOC TICs reported in well MW-19C, which was considered an upgradient well, and in the four downgradient wells the SVOC TICs reported ranged from 7 to 20, averaging nearly 15 per well sample.

No PCBs were found in the groundwater of either aquifer and no pesticides were detected in the lower aquifer groundwater.

Arsenic concentrations exceeded the maximum contaminant level (MCL) 1) of 50 Ig/l during the preliminary round of sampling in a northwest corner well (MW-14A). Arsenic was detected in about a third of the downgradient samples overall. Antimony concentrations exceeded the MCL of 6 Ig/l during Round 2 in groundwater at two wells and during the preliminary round in the duplicate sample from one well, despite the fact that the detection limits (about 53 Ig/1 in the preliminary sampling round and around 17 Ig/l in the other two rounds) were significantly above the MCL.

Secondary maximum contaminant levels (SMCLs) 2) for aluminum, iron, manganese, and total dissolved solids (TDS) were exceeded in one or more wells in one or more rounds of sampling; in some cases, an exceedance was found in a background well. Some detects of manganese and iron in downgradient wells were at concentrations that were more than ten times the 95% upper confidence limit background concentrations.

Ten polycyclic aromatic hydrocarbons (PAHs) were detected at low concentrations (1 to 4 Ig/l) in the

groundwater in one deep well (MW-3C) in the southeast corner during Round 1 sampling, but not during Round 2; the MCL for benzo(a)pyrene (the only one of the ten PAHs with an established MCL) was exceeded. There was one detect of 4,6-dinitro-2-methylphenol (DNOC) in one deep well during one sampling round. In well MW-21C, background values were exceeded for one or more sampling rounds for calcium, magnesium, manganese, sodium, alkalinity, chloride, and total dissolved solids (TDS).

Selected results for the groundwater samplings of 1992 are presented in Table 1.

Surface water samples were taken from water that was present in two ditches around the landfill and from the two ponds in the southeast corner of the Site. Some metals were detected at elevated (compared to background groundwater) levels in the two ponds, and mercury was detected in the water from one pond and both ditches. Dieldrin, the only pesticide detected, was found only in the duplicate sample from one of the ponds.

In May 1997 the groundwater monitoring wells and three of the four leachate wells were sampled to determine if there were any significant changes in the groundwater contamination (the leachate wells were sampled to get samples of both leachate and groundwater at the same time). One of the leachate wells had been damaged beyond repair; the results from the other three were sufficient for the purposes for which the sampling was done. In well MW-14A, dissolved arsenic was above the MCL of 50 Ig/l at 52.9 Ig/l and 52.6 Ig/l in the duplicate; the dissolved arsenic concentration was above the MCL in the preliminary round in this well, but it had been in the 40 to 50 Ig/l range during the subsequent two rounds of samplings. In well MW-16A, the dissolved arsenic concentration was 19.1 Ig/l; before, the average concentration was 23.7 Ig/l. In well MW-3AR, the dissolved manganese concentration was 5450 Ig/l whereas before its average was 1720 Ig/l. In well MW-10A (like wells MW-14A and MW-16A, in the northwest corner) the dissolved manganese concentrations were 1240 Ig/l and 1280 Ig/l (duplicate), and before, the average concentration here was 1375 Ig/l. The dissolved nickel concentration in well MW-3AR, a shallow well next to the landfill, was 119 Ig/l; in 1992 the average concentration here was 9.9 Ig/l. The MCL for nickel had been 100 Ig/l, but this has been remanded (FR, 60, 3926 (June 29, 1995)). Altogether there were 8 detects of nickel in the 19 downgradient wells. In well MW-21B, the dissolved sodium concentration was 130,000 Ig/l, whereas the averaqe concentration in this well in 1992 was 83,700 Ig/l. The dissolved sodium concentration in well MW-21C has also increased (to 90,200 Ig/l from an average of 64,100 Ig/l); the concentrations of several other metals have also increased in this well. The average dissolved sodium concentration for the 5 background wells is 10,800 Ig/l. In well MW-11B, two PAHs were detected in the 0.1 to 0.2 Ig/l concentration range. In the four northwest corner wells, the number of detects of SVOC TICs ranged from 4 to 24 (the latter in well MW-16A), based on unvalidated data. In well MW-21C, there were 19 detects of SVOC TICs. The results of this recent sampling have not indicated any significant improvement in the quality of the groundwater. Therefore, groundwater contamination continues to be a Site condition that must be considered in the selection of remedial actions.

In the May 1997 sampling, the leachate elevations were approximately 20 to 25 feet above the water table elevation. The landfill continues to retain a significant amount of leachate.

VI. Summary of Site Risks

For the risk assessment and ecological evaluation, since the presumptive remedy approach was used, scenarios involving exposures to soil on the landfill and to leachate were not included; exposures to landfill gas on the landfill and inside the nearby residences were also not included. If for some reason the presumed remedies are not eventually a part of the final remedy that is implemented, USEPA will review the risk assessment to make sure that no unacceptable risks are left unaddressed by dropping part or parts of the presumed remedy. (Exposures to nearby possibly contaminated soils were also not evaluated in the risk assessment and ecological evaluation. These soils must be addressed further in the design phase when the cover is designed by determining whether there are contaminated soils and sediments in the adjacent areas that present a threat and, therefore, must be excavated or covered.) The risk assessment focused on the groundwater and the surface water exposures and the ecological evaluation focused on the surface water exposures. The risk assessment and the ecological evaluation are based on the 1992 sampling results.

In the baseline risk assessment, groundwater as a water supply, with the exposure routes of ingestion, dermal contact while showering, and inhalation of contaminants released from the water, was evaluated, an adult was evaluated for potential carcinogenic effects and a child was evaluated for potential noncarcinogenic effects. Also, a trespassing teenager was evaluated for exposure to contaminants in the on-site ponds through incidental ingestion of and dermal contact with surface water while swimming or wading. Both the reasonable maximum exposure (RME) 3) and the central tendency case (CTC) 4) were evaluated.

1. The MCL is the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. MCLs are established on the basis of unfiltered samples.

2. SMCLs are unenforceable federal guidelines regarding taste odor, color, and certain other non-aesthetic effects of drinking water. They are discussed here partly to provide a fuller depiction of the effect of the landfill on the groundwater. However, 329 IAC 10 for solid waste land disposal facilities in Indiana does establish SMCLs as one component of the groundwater protection standards.

3. The reasonable maximum exposure is the highest exposure that is reasonably expected to occur.

4. In the central tendency case, the exposure is not as high as with the RME. The two differ in such things as the water ingestion rate and exposure duration, for the adult or teenager, but both use the same water concentrations for the same well exposure situations in this study.

5. Excess lifetime cancer risks are determined by muliplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., 10 -4 or 1.0 (10 -4)). An excess lifetime cancer risk of 10 -6 indicates a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year ifetime under the specific exposure conditions at the site.

Cancer potency factors (CPFs have been developed by USEPA for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. The resulting excess lifetime cancer risk is an upper-bound estimate 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. CPFs 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.

6. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ), the ratio of a single substance's estimated exposure level (intake) to a reference dose for that substance. Adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed gives the hazard index (HI). The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures. However, the additivity of doses assumed when doing this most properly only applies for substances that induce the same effects by the same mechanism of action.
Reference doses (RfDs) have been developed by USEPA for indicating the potential for adverse healthy effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs are estimates of lifetime daily exposure levels for humans, including sensitive individuals, that are likely to be without appreciable risk of deleterious effects. The estimated intakes are compared at the time that the landfill was operating and for some time thereafter, the residences to the northwest of the landfill were using their wells for their water. Since that time, eleven residences have reportedly been provided with city water. However, there has been no report of what has become of their wells, and there is apparently the possibility that new wells could be installed.

Estimated incremental or excess individual lifetime cancer risks 5) as a result of exposures to potential carcinogens and estimated hazard indexes (HIs), which are the sums of the hazard quotients (HQs), and estimated HQs, which are measures of the potential for noncarcinogenic effects 6) due to exposure to contaminants, are presented in Table 2 for both the RME and CTC scenarios for using groundwater as a water supply. The results for the northwest wells (wells MW-14A, MW-16A, MW-10A, and MW-11B) have been determined since this area of the aquifer appears to contain the higher concentrations of contaminants. The results for the total aquifer are also presented for comparison purposes. These results for the total aquifer would not ordinarily be determined since it was clear that the contamination in the downgradient aquifer differed in the various directions; instead, the risks in the various parts of the aquifer should have been determined as has been done here for the wells in the northwest corner. The results for the trespasser scenarios do not increase the risks significantly.

USEPA has established the carcinogenic risk range of 10 -4 ro 10 -6 as the acceptable level for exposures to potentially carcinogenic substances. Remedial action for a site is generally warranted when the baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions for either current or future land use exceeds a 10 -4 lifetime excess cancer risk. There are several instances in Table 2 where this level has been exceeded. There may be a concern about arsenic in the aquifer in the northwest corner and in the aquifer as a whole. There may also be a concern about the PAHs in the aquifer.

A hazard index, when additivity of doses is acceptable, or a hazard quotient of 1.0 or more indicates that there may be a level of concern for potential noncarcinogenic health effects. Here, some HQs exceed unity,

which indicates that there is a level of concern about possible noncarcinogenic effects. There may be concerns about arsenic, manganese, and iron. There may also be concerns about antimony and DNOC.

There is some uncertainty about the numerical results in all environmental risk assessments. Generally, conservative assumptions are used for the estimations so that one is reasonably confident that the "true risk" will not exceed the risk estimate obtained. However, the uses of conservative values do not necessarily mean that the risks and hazards estimated are definitely overestimates, for there are some factors that can cause an underestimation of the risks and hazards.

The TICs were not included in the quantitative risk assessment. Health information was reported for only one of the identified TICs, and this one was detected at a low concentration (5 Ig/l) in only one groundwater sample. Many TICs were detected at Significant concentrations and in some wells there were a significant number of TICs. There is a possibility that some of the TICs could contribute significantly to the risks and hazards at the Site, so not including them in the quantitative risk assessment might mean that the risks and hazards have been underestimated.

Sodium and potassium were not included in the quantitative risk assessment. The maximum downgradient concentration of sodium (130,000 Ig/l) was more than 10 times the upper 95% background concentration and the maximum downgradient concentration of potassium (49,500 Ig/l) was more than 19 times the upper 95% background concentration. The downgradient concentrations might contribute significantly to the hazards from the Site. Reference doses for sodium and potassium are not available. However, USEPA has used a guidance level for sodium of 20,000 Ig/l for drinking water.

There is more uncertainty associated with the carcinogenic unit risk (from which the cancer slope is calculated) that is being used for arsenic than with the unit risks and cancer slopes for most other carcinogens. Therefore, it has been stated that carcinogenic risk estimates for arsenic could be modified downward by as much as an order of magnitude when making risk management decisions in specific situations (Memorandum to USEPA Offices from USEPA Administrator Lee M. Thomas, June 21, 1988). Even if the full modification could be used here, which has not been justified, the risk for arsenic in the northwest corner wells would still be a concern.

A preliminary ecological screening analysis was carried out that addressed only the on-site ponds in the remedial investigation because of the use of the presumptive remedy approach. A toxicity quotient method was used for the aquatic analysis, in which the estimated environmental concentration was divided by a chemical specific benchmark concentration to get the quotient; unfortunately, no benchmark concentrations were obtained for some substances and these were not evaluated. No criteria were found for evaluating the potential impacts to terrestrial receptors. For the acute case, the toxicity quotients for three substances were in the possible concern range. For the chronic case, the toxicity quotients for four substances were in the possible concern range, and that for mercury (10.8) was in the probable concern range.

Based on these results, USEPA has determined that active or threatened releases of hazardous substances from the Site, if not addressed by an active measures, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. Description of Alternatives

The alternatives that have been evaluated are:

Alternative 1: No Action;

Alternative 2: Deed Restrictions and Fencing; Barrier Cover; Landfill Gas System; Groundwater Monitorinq;

Alternative 3: Deed Restrictions and Fencing; Barrier Cover; Leachate Collection; Landfill Gas System; Groundwater Monitoring; A. Leachate Discharge to POTW; B. Leachate Treatment and Discharge to Surface Water;

Alternative 4: Deed Restrictions and Fencing; Barrier Cover; Leachate Collection; Landfill Gas System; Groundwater Remediation; A. Leachate Discharge to POTW; B. Leachate Treatment and Discharge to Surface Water;

Alternative 5: Deed Restrictions and Fencing; Barrier Cover; Leachate Collection; Landfill Gas System; Partial Refuse Relocation; Groundwater Monitoring, A. Leachate Discharge to POTW; B. Leachate Treatment and Discharge to Surface Water.

Alternative 6: Deed Restrictions and Fencing; Barrier Cover; Leachate Collection; Landfill Gas System;

Partial Refuse Relocation; Groundwater Remediation; A. Leachate Discharge to POTW; B. Leachate Treatment and Discharge to Surface Water.

A. Elements of the Alternatives

The various components of the alternatives are generally found in more than one alternative, except for the "No Action" alternative. These components are described below, and each of the alternatives consists of those components listed for it above. The no-action alternative (Alternative 1) does not contain any of these components. The USEPA Superfund program requires that the no-action alternative be evaluated to establish a baseline for comparison. Under this alternative, USEPA would take no further action at the Site. However, if this were to be the selected alternative, because the investigation and study were done using the presumptive remedy approach, it would be necessary to reevaluate the investigation and the risk assessment to determine if there were additional significant risks at the Site that had not been fully addressed.

1. Deed Restrictions and Fencing

Restrictions would be placed on the deed(s) for the property used for the landfill and its associated operations (not including propertiy where only cover material was obtained) to limit future site use and development and to notify any potential purchasers of the prior use of the property. The restrictions would exempt to ensure the integrity of the waste containment system by greatly restricting future building on the waste disposal area so that the cover would remain intact and by requiring that there be no interference with the maintenance of the components constructed for the remediation and with the monitoring of the Site. Other restrictions on uses of the Site that might damage the inteqrity of the cover would also be imposed. Restrictions on the installation of wells on the landfill property, other than those required for the remedial action, would be imposed and restrictions on the use of wells on the surrounding properties where the groundwater remains contaminated would be sought for the period of time that the groundwater would remain contaminated at unacceptable levels.

Fencing would be installed around at least the area capped to physically limit access to the site; fencing around the entire Site, except for the property that had not been used for waste disposal in the northwest corner, would be preferred. Signs would be posted at intervals on the fence and elsewhere as needed to make clear that there may be a health threat associated with going on the Site.

2. Barrier Cover

A barrier cover that meets the Indiana requirements for sanitary landfills or municipal solid waste landfills would be provided. IDEM has stated that the cover must comply with the requirements of 329 IAC 10 (Solid Waste Land Disposal Facilities). The minimum cover that would be required by 329 IAC 10 would consist of 24 inches of compacted soil of the proper Unified Soil Classification (a greater thickness may be required on slopes greater than 15%, with no slope over 33%) (the barrier), with a slope of at least 4%, plus 6 inches of topsoil; the compacted soil layer must be compacted to achieve a hydraulic conductivity equal to 10 -7 cm/s or less. Grain size, Atterberg limits, and hydraulic conductivity tests as approved by the commissioner or as required by 329 IAC 10 must be performed to confirm the quality of the final cover. Prior to the installation of the cover, the Site would be graded to obtain acceptable slopes. The grading of the Site would also provide for acceptable control of runoff from the waste disposal area and the rest of the Site. Proper management of runoff would be provided. Acceptable vegetation would be established on all areas where work had been done. All of this would be constructed and tested according to all applicable construction quality control and construction quality assurance requirements. The constructed cover would have to be maintained so that it would continue to provide the protection that the cover provided when installed. Any leachate seeps that appeared on the cover before or during the maintenance period would have to be eliminated and the cover would have to be repaired.

Consideration must be taken of the fact that much of the waste disposal area was originally in a flood plain. Where the barrier cover might be damaged by floodwaters, protection of the cover must be provided. It is preferred that this protection not result in the removal of additional significant area from the flood plain.

If it is found to be cost-effective and feasible, the cover on some parts of the landfill might be provided by merely repairing and upgrading the present cover. The resultant cover would have to meet all of the requirements established for a cover constructed as above; especially, the barrier layer would have to consist of compacted soil of one of the specified classifications, the slopes would all have to meet the requirements, and the junctures between areas having a new barrier and areas having a repaired barrier would have to allow no more infiltration than that for a new barrier layer. All areas with a repaired and upgraded barrier layer as well as any areas where no repairing and upgrading of the barrier layer had been done would

have to have 6 inches of new topsoil at the top to complete the cover; thus the entire waste disposal area would he covered by 6 inches of new topsoil to ensure that any contaminated soil present would have been covered. Vegetation would have to be established over all of the waste disposal area and the cover would have to be maintained, as described above.

During the design phase, soils and sediments in areas outside the waste disposal area, including the southeast corner pond area and areas off the landfill property, that might have become contaminated through inadequate waste-handling practices, surface water runoff, leachate flow, migration of wastes or contaminants through the air, or other means would be further tested for soil contamination. Any areas found to contain unacceptable contamination would be addressed, most likely through excavation of the contaminated material, placement of this material on the waste disposal area where it would be capped, and placement of acceptable clean replacement material in the excavated area. The water and sediments in the ponds in the southeast corner would also be tested during the design phase, and if unacceptable contamination were found, the water and sediments would be addressed in a manner that would be acceptable to USEPA; this might range from complete elimination of the ponds to removal of small areas of contaminated sediment. If any hot spots would be discovered in the landfill prior to the completion of the installation of the cover or the repair and upgrading of the cover, these would be addressed in a manner acceptable to USEPA.

3. Landfill Gas System

A gas collection and control system that would meet federal and Indiana requirements would be provided. The components of the system would include either an active or passive collection system and any required control system, such as a flare or flares. Some of the wells would be installed on the sideslopes, especially toward the northwest corner where the gas migration problem, has been the most troublesome. Gas monitoring probes installed in the ground around the entire landfill outside the waste disposal area would be used to determine that the gas venting system was meeting the requirements regarding migration of gas away from a landfill. When drilling into the landfill, monitoring for hydrogen cyanide and hydrogen sulfide will be needed.

4. Groundwater Monitoring

Groundwater monitoring, and monitoring of the waters in the ponds in the southeast corner, would be conducted to follow the changes in water quality with time. Monitoring of background groundwater would also be done so that any changes in the water quality of the ponds and downgradient groundwater due to changes in the upgradient groundwater could be determined. The initial monitoring system would be defined during the design phase in consultation with the agencies. It would be used to monitor all levels of the aquifers that might be impacted by leakage of leachate from the landfill and would monitor the waters for the substances specified by the agencies. The sampling and analysis plan for this monitoring would be subject to the prior approval of the agencies. One purpose of the groundwater monitoring being conducted without any groundwater remediation components having been implemented would be to determine whether any remediation of the groundwater would be required. As a minimum, the groundwater monitoring system would have to meet the Indiana requirements for solid waste land disposal facilities (329 IAC 10).

5. Leachate Collection and Discharge to POTW

Leachate would be collected from vertical wells installed in the landfill to within one or two feet of the bottom of the landfill. These wells would be either wells installed solely for the extraction of leachate or the wells installed for the landfill gas collection system, or a combination of these. Reduction of the leachate head in the waste disposal area to one to two feet above the bottom of the landfill would be the objective of the leachate extraction system. The leachate would eventually be transferred to the sewer or to on-site storage, if such was needed or deemed to be the preferred method of operation, for later transfer to the sewer, with the sewer carrying the leachate to the local publicly owned treatment works (POTW). Treatment of leachate from a municipal landfill at the local POTW is not uncommon. The amount of leachate to be treated is not great, and the rate of (discharge could be adjusted, if necessary, to fit the available capacity of the POTW. All required testing of the leachate and any required on-site pretreatment would be provided.

6. Leachate Collection, Treatment, and Discharge to Surface Water

Leachate collection would be done using the vertical extraction wells described above. Leachate would be transferred to the treatment system constructed on the Site or just off the Site, in an appropriate place. The treatment system would consist of the processes needed to meet the requirements of an NPDES (National Pollutant Discharge Elimination System) permit. The actual steps of the process would be determined during the design phase, which might require laboratory testing. Treatment residues would be disposed of in a manner acceptable to the agencies. The treated water would be discharged via a pipeline to either Wildcat

Creek or the Wabash River.

7. Groundwater Remediation

Metal constituents, primarily arsenic and manganese, are the main substances of concern in the groundwater, based on the results of the remedial investigation. Concentrations of sodium, chloride, barium, iron, ammonia and total dissolved solids are some other parameters that may require attention in a water treatment system. Sampling and analyses done during the time the landfill was operating indicated that there were also organic contaminants of concern in the groundwater at those times, and this will have to be considered in the future.

During the design phase and later, groundwater data would be obtained, using a groundwater monitoring system as described in the section on groundwater monitoring, to establish the full extent of the groundwater plume and follow the changes expected in the concentrations of the contaminants following the installation of the source control measures (primarily the cover and the leachate extraction system). If the information and data collected during this monitoring period did not indicate that the groundwater leaving the Site would reach acceptable levels of contamination within 10 years after the barrier cover and leachate extraction system had been installed, the movement of the unacceptably contaminated groundwater off the Site would have to be stopped. For unacceptably contaminated groundwater found downgradient of the Site, if information and data collected during the monitoring indicated that this contamination would not be reduced to acceptable levels within 30 years, restoration of the aquifer in these areas would be undertaken. If the potential risks to users of existing or new wells installed downgradient of the Site, east of the Wabash River, were unacceptable at any time, groundwater interception or remediation would have to be undertaken immediately. Unacceptable groundwater contamination would be defined by concentrations exceeding the maximum contaminant levels (MCLs), secondary maximum contaminant levels (SMCLs), and health-based levels. The health-based levels would be concentrations that are protective of public health and the environment and take into consideration the USEPA guidelines for assessing risks. The determination of the necessity for groundwater interception or remediation would include consideration of the requirements the Indiana article for solid waste land disposal facilities (329 IAC 10). The possibility of taking advantage of natural attenuation would be included in the evaluation of the need for groundwater interception or remediation. If groundwater action was determined to be needed, following the installation of the source control measures, such action would be designed, constructed and operated for as long as it was determined to be necessary in order to be protective of human health and the environment.

Interception of groundwater, if needed, would be expected to consist of wells in the affected area that would provide a barrier to further movement of the contaminated groundwater through extraction of the groundwater. Remediation of groundwater, if needed, would be expected to consist of a pump-and-treat system. The extracted groundwater in either case would be transferred by pipeline to a treatment system installed on the Site or just off the Site, in an appropriate place. The treatment system would consist of the processes needed to produce a water for discharge that would meet the requirements of an NPDES permit. The treated groundwater would be discharged via pipeline to Wildcat Creek or the Wabash River under an NPDES permit. The pump-and-treat system would be operated until it would no longer be needed. All necessary sampling would be performed. Sampling and analyses of the groundwater (groundwater monitoring) would be done periodically to make sure that the extraction system was performing correctly and to determine whether or not it, or only parts of it, were still needed. Sampling and analyses would also be done periodically in contaminated areas downgradient that were not being remediated to determine whether or not remediation in these areas might be needed.

8. Partial Refuse Relocation

Relocation of the wastes that lie against the soil that underlies the buildings (the soil on the side of the hill) in the northwest corner might eliminate or greatly reduce the migration of landfill gas toward these buildings. The wastes would be removed down to the native soil to create an area about 30 feet wide for a distance of about 1200 feet. These wastes would be placed on other parts of the waste disposal area where they would be properly compacted. In the areas where the wastes were removed, the proper slopes would be provided on the surfaces of the remaining wastes. The soil underlying the wastes that had been removed would be sampled for contamination. If unacceptable levels of contamination were found and it would not be possible to excavate all of this contaminated soil, the soil would be capped. Proper environmental controls would be used to minimize the release of odors, landfill gas, and contaminated dust during the relocation of the wastes. If any hazardous wastes were encountered, they would be properly handled and disposed of.

B. Summary of the Alternatives

Alternative 1 is the no action alternative that must be considered. The other alternatives contain differing

amounts of action. Alternative 2 consists of: deed restrictions and fencing; a barrier cover; a landfill gas system; and groundwater monitoring. Alternative 3 is Alternative 2 plus leachate collection. Alternative 4 is Alternative 3 with contingent groundwater remediation added and includes modified groundwater monitoring. Alternative 5 is Alternative 3 with partial refuse relocation added. Alternative 6 is Alternative 4 with partial refuse relocation added.

C. Costs and Time Required for Implementation

The estimated capital costs, costs for annual operation and maintenance (O&M), and total present net worth costs for the alternatives are given in Table 3.

Except for the no-action alternative and those alternatives including groundwater remediation, the periods of time required to implement the remedies are similar. The installation of leachate extraction wells and a leachate treatment system would not increase greatly the time for the completion of the construction of the barrier cover and the landfill gas control system. It is expected that the barrier cover and gas and leachate systems could be installed in one construction season; establishment of a fully acceptable vegetation layer might make an additional year. Leachate extraction and disposal or treatment would be operated as long as would be required, which could be 30 years or longer; the length of time and the rate of leachate extraction would depend upon the quality of the barrier cover. Groundwater remediation would not be implemented until it was established that it would be needed, but the rest of the components of these alternatives would be installed as soon as possible. Once the need was determined for groundwater remediation, it could be designed and installed in less than a year. Operation of the qroundwater extraction and treatment system would be done until it was no longer needed, which might be 10 to 30 years, or longer.

As required by CERCLA, a review of the remedial action selected will be conducted at least every five years after the beginning of the remedial action since wastes are being left at the Site. With the no-action alternative, this review would probably require some sampling and analyses of the groundwater and evaluation of the condition of the Site; these costs have not been included in the cost estimate.

VIII. Summary of Comparative Analysis of Alternatives

In this section the nine evaluation criteria that USEPA uses to evaluate each alternative are discussed. These nine criteria are:

1) Overall protection of human health and the environment. The alternatives are assessed to determine whether they can adequately protect human health and the environment from unacceptable risks.

2) Compliance with ARARs. The alternatives are assessed to determine whether they attain applicable or relevant and appropriate requirements (ARARs) under federal environmental laws and state environmental or facility siting laws or provide grounds for invoking one of the waivers permitted.

3) Long-term effectiveness and permanence. The alternatives are assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful.

4) Reduction of toxicity, mobility, or volume through treatment. The degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume is assessed, including how treatment is used to address the principal threats posed by the site.

5) Short-term effectiveness. The short-term impacts of alternatives are assessed considering short-term risks to the community, potential impacts on site workers, potential environmental impacts, and the time until protection is achieved.

6) Implementability. The ease or difficulty of implementing the alternative is assessed by considering technical feasibility, administrative feasibility, and availability of services and materials.

7) Costs. Capital costs, annual operation and maintenance costs, and net present value of capital and O & M costs are assessed.

8) State acceptance. The concerns of the state are assessed.

9) Community acceptance. This assessment includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose.

The first two criteria are the threshold criteria. Each alternative must meet these requirements, unless a specific ARAR is waived, in order to be eligible for selection. The next five criteria are the primary balancing criteria. The last two criteria are the modifying criteria that are to be considered in remedy selection.

A. Overall Protection of Human Health and the Environment

Alternative 1 (No Action) and Alternative 2 (Landfill Cover) do not provide adequate protection of human health and the environment since the source of the contamination in the groundwater is not adequately controlled. The cover will not prevent all infiltration, and so leachate will continually be generated and leak out the bottom of the landfill into the groundwater.

Alternative 3 (Source Control) may provide adequate protection of human health and the environment if the groundwater contamination does indeed decline with no more intervention than the installation of source control (landfill cover and gas and leachate removal) measures.

Alternative 4 (Source Control and Groundwater Remediation) includes the possibility of additional intervention in the spread of groundwater contamination, which would be necessary when there is no indication of an adequate decline in the spread of the contamination without any intervention. However, the decision to actively intervene will not be made until there is an opportunity to evaluate the capability of the source control measures to provide protection of human health and the environment for the groundwater. To protect human health, groundwater containing contamination levels in excess of the maximum contaminant levels (MCLs), proposed MCLs, and non-zero maximum contaminant level goals (MCLGs) needs to be prevented from leaving the Site; when necessary, a carcinogenic risk of no more than 10 -4 (possibly something slightly higher for arsenic if a modification, as discussed above, can be justified) and a cumulative hazard index, for those substances that induce the same effect by the same mechanism, or a hazard quotient of one would be used for the criteria.

Alternatives 5 (Source Control and Partial Refuse Relocation) and 6 (Source control, Groundwater Remediation, and Partial Refuse Relocation) provide the same protections of human health and the environment as Alternatives 3 and 4, respectively, just in a different manner. All of the alternatives except Alternative 1 provide adequate protection from contact with the wastes and adequate protection from the release of landfill gas.

B. Compliance with Applicable or Relevant and Appropriate Requirements

Only Alternatives 4 and 6 will meet the identified applicable or relevant and appropriate requirements (ARARs). Alternatives 1, 2, 3, and 5 do not meet the ARARs because there are exceedances of MCLs in the downgradient groundwater and there are no active means provided to correct this. Alternatives 4 and 6 provide for the groundwater remediation that may be required under the applicable parts of the solid waste regulations. In the case of the other alternatives, if remediation of the groundwater were determined to be necessary under the solid waste regulations and there was resistance to its implementation because it was not part of the alternative chosen, that alternative would have to be amended to require such remediation.

All alternatives except Alternative 1 require the installation of a barrier cover that meets the identified ARAR for the cover for this Site, 329 IAC 10.

C. Long-term Effectiveness and Permanence

The final landfill cover system included with all alternatives except Alternative 1 provides long-term effectiveness with proper maintenance. The cover reduces the mobility of the contaminants by covering the wastes and reducing water infiltration. A proper landfill cover, along with other source control measures, is the accepted means for minimizing the release of wastes from landfills. The gas extraction that is a part of all alternatives except Alternative 1 reduces the mobility of landfill gas that contains constituents that may be harmful to human health and the environment and may be a safety hazard. The leachate collection system of all alternatives except Alternatives 1 and 2 completes the source control that is necessary to properly reduce the mobility of the contaminants and provides long-term effectiveness. Groundwater remediation that is a part of Alternatives 4 and 6 provides a barrier to the further movement of unacceptably contaminated groundwater and increases the long-term effectiveness. Since wastes will remain at the Site in all alternatives, five-year reviews of the protectiveness of the remedy will be required. In the case of Alternatives 3 and 5, where groundwater remediation is not a part of the remedy, if it were determined during one of these reviews that groundwater remediation were necessary, the selected remedy could be amended and such remediation could be included.

D. Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives 4 and 6 provide for the potential extraction and treatment of the groundwater. This will reduce the mobility and volume of the contaminants. Alternatives 3, 4, 5, and 6 provide for the extraction and treatment of leachate. This will reduce the mobility and volume of the contaminants. Alternatives 2, 3, 4, 5, and 6 provide for the extraction of landfill gas and possibly its treatment through flaring, which will decrease its toxicity. This will reduce the mobility of this gas through the soils toward nearby residences.

E. Short-term Effectiveness

The groundwater remediation of Alternatives 4 and 6 prevents the further migration of contaminated groundwater and provides for the greatest short-term effectiveness. Handling of the wastes generated in on-site treatment of leachate (Alternatives 3B, 4B, 5B, and 6B) and groundwater (Alternatives 4 and 6) may present some slight risks to the workers and to others when wastes from the treatment processes are hauled off the Site for proper disposal. Installation of the groundwater and leachate and gas extraction wells may present some risks to the workers. Partial refuse relocation (Alternatives 5 and 6) might present some risks to the workers and some nearby residents through the release of landfill gas; there also might be a unacceptable odor problem associated with this refuse relocation. The installation of the cover, especially if the grading involves uncovering some of the wastes, might present some risks to the workers and some nearby residents. There are some possibilities of risks to residents and workers if the pipeline and sewer carrying the leachate to the POTW were to leak (Alternatives 3A, 4A, 5A, and 6A). The extraction of gas and leachate from the landfill provides added protection against the spreading of the contamination. The cover for the wastes that is a part of all alternatives except Alternative 1 provides protection against contact with wastes and contaminated soils.

F. Implementability

Among the alternatives requiring active remedies, Alternative 2 would be the simplest to implement, followed by Alternatives 3 and 4. Alternatives 5 and 6 would be more complicated to implement than Alternatives 3 and 4, respectively. All of the alternatives should be fairly easy to implement since none contains elements that have proved difficult or impossible to implement in the agency's experience with similar sites. A possible exception would be removal of arsenic from leachate or groundwater in an on-site treatment system (full treatment or pretreatment) to meet NPDES discharge or POTW pretreatment requirements since the reduction of arsenic concentrations to low levels is reportedly difficult. Another possible exception could arise if a contaminant that has not been fully evaluated at this time were found to be difficult or costly to remove in the treatment system. A possible implementation problem might arise in the alternatives in which leachate is sent to the POTW for treatment if changes in the content of the leachate occur or regulations regarding waste streams being sent to POTWs change. Also, in these alternatives, there might be an implementability problem, if the POTW is too close to its capacity under all conditions. Alternatives 3B, 4, 5B, and 6 require that an NPDES permit be obtained for discharge of the treated water to either Wildcat Creek of the Wabash River; the permit should be obtainable. If landfill gas cannot be vented directly to the atmosphere, there should be no problem in developing a flare system to handle the gas.

G. Cost

The costs of the various alternatives are presented in Table 3. Alternative 1 has essentially no costs associated with it. Groundwater remediation, of course, adds to the costs of source control alone, but it may be necessary for the protection of human health and the environment.

H. State Acceptance

The Indiana Department of Environmental Management has been involved throughout the remedial investigation and feasibility study. The State has indicated that they believe that the requirements of Alterative 4 are necessary for this Site.

1. Community Acceptance

There was only one strong objection raised to the preferred remedy that has been presented to the community in the Proposed Plan. This was an objection raised to the possible inclusion of partial refuse relocation in the remediation because of the expected strong odors that would accompany such work. The comments that have been received are answered in the Responsive Summary that is a part of this ROD.

IX. Selected Remedy

The alternative that has been selected by USEPA in consultation with IDEM is Alternative 4A. This alternative includes: Site access controls, including a fence around at least the waste disposal area, and restrictions on site use, including prohibition of installation of water supply wells on the Site and of site uses that would damage the remedial actions; a barrier cover that meets the Indiana requirements for sanitary landfills or municipal solid waste landfills specified in 329 IAC 10; a leachate collection system from vertical wells installed in the landfill and discharge of the leachate to the local POTW following any required pretreatment, a landfill gas collection and control system that meets federal and Indiana requirements for landfills; a groundwater remediation program, if one would be needed because the source control measures (cover and gas and leachate extraction) were insufficient to prevent unacceptable contamination of the groundwater off the Site. Further details concerning each of the components to this selected remedy are presented above in section VII.A.

If it were found that the local POTW would not be able to accept the leachate, then Alternative 4B is the preferred alternative. The only change that would result is that the leachate would be treated on the Site and discharged to a local surface water body under a NPDES permit.

Because of the possible release of objectional odors, partial refuse relocation has not been included as an acceptable element of the selected remedy.

X. Statutory Determinations

USEPA's primary responsibility at Superfund sites is to select remedial actions that protect human health and the environment. Section 121(d)(2) of CERCLA also requires that the selected remedial action for the site comply with applicable or relevant and appropriate environmental standards under state and federal environmental laws with respect to contaminants remaining on site at completion of the remedy unless a waiver is granted. With respect to ongoing work at the site, it is USEPA's policy to comply with state and federal environmental laws. The selected remedy must also be cost-effective and utilize treatment technologies to the maximum extent practicable. CERCLA also establishes a preference for remedies that include treatment as a principal element. This section discusses the extent to which the selected remedy satisfies these statutory elements.

The Proposed Plan for the Tippecanoe Sanitary Landfill, Inc. site was released for public comment in July 1997, and a 30-day long public comment period was provided. The Proposed Plan identified Alternative 4A as the preferred alternative unless the local POTW could not accept leachate from the Site, in which case Alternative 4B would be the preferred alternative. Also, the Proposed Plan stated that the partial refuse relocation of Alternatives 6A or 6B could be included in the remedy if it was determined that this was desirable. USEPA reviewed all the comments received during the comment period. Upon review of these comments, it was determined that Alternative 4A or 4B was the alternative of choice. However, it was determined that the partial refuse relocation should be dropped as a potential element of the remedy. These determinations have been made upon consultation with, and with the concurrence of, the State of Indiana.

A. Protection of Human Health and the Environment

The selected response action will be effective in containing the source materials in the landfill that are contributing to contamination at the Site.

The partial baseline risk assessment performed for the Site identified exposure scenarios that resulted in noncarcinogenic health effects that may be of concern and cancer risks that exceed the USEPA's suggested risk range of 10 -4 to 10 -6. The scenarios contemplated the use of the contaminated groundwater downgradient of the Site as a water supply, analyzing exposures due to 1) ingestion of the water, 2) dermal contact with the water, and 3) inhalation of vapors that might arise from the water. These risks are addressed by the selected remedy by controlling the source of the contamination and by the possible future implementation of groundwater remediation. If groundwater remediation is determined to be needed after the source control measures are installed or because a downgradient water supply is found to be threatened, the remediation measures implemented will be operated and maintained until the groundwater no longer presents a human health risk, that is, when the groundwater contamination would no longer be unacceptable. Unacceptable groundwater contamination is defined by concentrations exceeding the maximum contaminant levels (MCLs), secondary maximum contaminant levels (SMCLs), and health-based levels. The health-based levels would be concentrations that are protective of public health and the environment and take into consideration the USEPA's guidelines for assessing risks.

Since it was known that it was necessary to install a landfill cover system over the wastes, no sampling of the surface soils was done and no risk assessment for exposure to these soils was performed. The landfill cover system and gas and leachate extraction systems will provide the required protection from the hazards due to the wastes that are being left in place.

Discharges of treated water to surface water (either Wildcat Creek or the Wabash River), if Alternative 4B has to be used because the local POTW cannot accept leachate from the Site, will be regulated by the NPDES requirements, which will ensure that the remedial action does not adversely affect the stream.

Based on the present levels of contaminants detected in the aquatic ecosystem, ecological effects appear to be minimal. Based on the fact that the groundwater is the main means by which contamination is being transported (except for the leachate seeps present on the waste disposal area now which will be eliminated by the barrier cover), terrestrial ecosystem effects are not expected. However, during the implementation of the remedy, the surface ponds and the surrounding soils and sediments will be further investigated to determine if any action regarding these media might be required.

B. Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 4 will meet all of the identified federal and more stringent state applicable or relevant and appropriate requirements (ARARs). The major ARARs that have been identified are listed in Table 4.

C. Cost-Effectiveness

USEPA determines that Alternative 4 is cost-effective. Section 300.430(f)(1)(ii)(D) of the NCP requires USEPA to evaluate cost-effectiveness by comparing all the alternatives that meet threshold criteria (protection of human health and the environment and compliance with ARARs) against three balancing criteria (long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and short-term effectiveness). Alternative 4 presents the best balance among these factors.

The lowest cost alternative involving some remedial action is Alternative 2, landfill cover and gas system. However, this alternative does not provide a means for stopping the movement of the contaminated groundwater from leaving the site, if such a measure is deemed to be necessary. Nor does it provide as much source control as is deemed to be necessary and which is reasonably possible. Since the minimum barrier cover that has been included in the alternatives considered that require some action will not completely prevent infiltration, some leachate removal is required to further reduce the amount of contamination reaching the groundwater.

Alternative 3A, which does include leachate control, is the next least costly alternative, but this again does not provide for containment of the contaminated groundwater. Thus it does not satisfactorily address the effectiveness criteria.

Alternative 4A does provide the possible necessary containment of contaminated groundwater and the possible remediation of downgradient contaminated groundwater, if this is fuund to be necessary. While this alternative is more costly than Alternative 3A, it is to be noted that if no groundwater remediation is found to be necessary after the effects of source containment and natural attenuation have been evaluated, the costs will be approximately those of Alternative 3A. Alternative 4A is the least costly alternative that provides a possible barrier to the migration of the contaminated groundwater, something which the remedial action must provide. Thus this alternative is cost-effective for providing the protection that is required at the Site.

Alternative 4B would be used only if the POTW could not accept the leachate from the Site. While more costly, these would be unavoidable additional costs under the circumstances. Treatment of leachate at a POTW is something that is not uncommon.

D. Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable (MEP)

USEPA believes that the alternative selected represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner. The selected alternative provides the best balance of long-term effectiveness and permanence, reduction of toxicity, mobility, and volume through treatment, short term effectveness, implementability, and cost, taking into account the statutory preference for treatment as a principal element as well as state and community acceptance.

E. Preference for Treatment as a Principal Element

This site is a sanitary landfill, and it is generally recognized that containment will be the main method of addressing the wastes, which pose only relatively low, long-term threats to human health and the environment.

Collection of leachate and transport to the POTW for treatment, gas venting or extraction and possible flaring, and installation of a barrier cover are being used to address the releases and threatened releases at the Site. Treatment on-site is being used to address the contaminated groundwater, which represents the greatest identified health risk, if remediation of the groundwater is determined to be necessary after the results of the source control measures are evaluated and natural attenuation is taken into account.

This remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size of the landfill and the fact that no on-site hot spots representing major sources of contamination have been found preclude a remedy in which contaminants could be excavated and treated effectively. No principal threat to which the treatment preference could be directed has been identified at the Site.

XI. Explanation of Change

One change regarding the remedy selected that has been made to what was stated in the Proposed Plan has been the elimination of the partial refuse relocation for possible inclusion in tne remedy. The Proposed Plan did not select the alternative (Alternative 6A) that included the elements of Alternative 4A along with partial refuse relocation as the preferred alternative it merely stated that this partial refuse relocation could be implemented as part of the remedy if it would be found to be desirable. Because of a concern about the possible release of objectionable odors during such a relocation of wastes, this option is not included with the selected remedy.

IDEM has further investigated its requirements for solid waste landfills and has determined that the requirements of 329 IAC 10 (Solid Waste Land Disposal Facilities) apply to this Site. Previously, it had been expected that this article would apply to most aspects of the remediation of the Site. The primary exception had been the barrier cover. Now 329 IAC 10 also applies to the barrier cover. This may not result in much change in the requirements for the barrier cover, if it is found that the barrier cover to be installed will be that required by 329 IAC 10-22-7(b). However, if IDEM determines that one of the other barrier covers included in 329 IAC 10 is required, there will be some change in the requirements and these will result in a geomembrane being included as part of the cover.

Table 1. Selected Groundwater Results

Substance	MCL SMCL µg/l	Downgradient Wells				NW Corner Wells				Background Wells			
		Detect Freq.	Range µg/1	No. Exceed M or S	UCL 95 µg/1	Detect Freq.	Range µg/l	No. Exceed M or S	UCL 95 µg/l	Detect Freq.	Range µg/l	No. Exceed M or S	UCL95 µg/l
B(A)P-TE (PAHs)	(a)	1/41	(b)	M-1	1.41	0/9	--	M-0	ND	0/11	--	M-0	ND
dieldrin	--	1/40	0.02	--	0.02	0/9	--	--	ND	0/11	--	--	MD
aldrin	--	2/41	0.037-0.044	--	0.026	1/9	0.044	--	0.030	0/11	--	--	ND
DNOC	--	1/41	25.	--	13.4	0/9	--	--	ND	0/11	--	--	ND
carbon disulfide	--	1/41	4.	--	4.0	0/9	--	--	MD	0/11	--	--	ND
aluminum	S-50-200	1/41	575	S-1	55.1	0/9	--	S-0	ND	2/11	1130-3780	S-2	907
antimony	M-6	3/41	17.6-56.0	M-3(c)	9.6	1/9	41.3	M-1	18.2	0/11	--	M-0	ND
arsenic	M-50	14/41	2.9-71.2	M-1	11.5	7/9	3.8-71.2	M-1	47.2	1/11	5.2	M-0	2.0
barium	M-2000	39/41	30.3-1190	M-0	461	9/9	478-1160	M-0	937	10/11	21.9-292	M-0	168
iron	S-300	28/41	217-11,400	S-25	3180	9/9	217-11300	S-8	10,700	4/11	462-7330	S-4	1716
manganese	S-50	37/41	4.1-1830	S-34	650	9/9	110-1390	S-9	1380	6/11	99.9-273	S-6	162
nickel	M-140	11/41	11.2-39.8	M-0	13.9	6/9	10.0-39.8	M-0	34.8	1/11	14.3	M-0	10.1
potassium	--	39/41	843-49,500	--	12,700	9/9	6660-28,700	--	24,300	10/11	1120-3620	--	2592
sodium	--	39/41	3280-130,000	--	49,700	9/9	53,600-127,000	--	102,000	10/11	3610-14,100		11,500
chloride	S-250000	41/41	3000-230,000	S-0	89,000	9/9	77,000-230,000	S-0	183,000	11/11	9000-31,000	S-0	22,800
TDS	S-500000	41/41	280000-5600000	S-24	1130000 (d)	9/9	630000-1100000	S-9	980,000	11/11	370000-870000	S-3	672000

Notes: (a) The MCL for benzo(a)pyrene is 0.2 µg/l. b) In one well sample in one round, ten PAHs were found at concentrations ranging from 1 to 4 µg/l. c) The detection limit for antimony ranged from about 17 µg/l (for most samples) to about 53 µg/l, well above the MCL. d) If the results for well MW-21C are not included, the UCL 95 is 668,000 µg/l. 1) In the MCL, SMCL column, M represents a maximum contaminant level (MCL) value, S represents a secondary maximum contaminant level (SMCL) value. 2) In the detect freq. column, the number of detects is given as well as the number of sample results. 3) In the range column, the range of concentrations for the detects is given. 4) In the No. exceed M or S column, the number of detects that exceed the MCL (M) or the SMCL (S) is given. 5) In the UCL 95 column, the 95% upper confidence limit value is given; if this value exceeds the maximum average value for any well, the maximum value for the wells is listed. 6) The downgradient wells are all the wells except the five background wells and well MW-15A. 7) The background wells are MW-9A, MW-12A, MW-13A, MW-18A, and MW-19C. 8) The northwest corner wells are wells MW-10A, MW-11B, MW-14A, and MW-16A; these wells are included in the downgradient wells. 9) Data qualifiers have not been included in the table. 10) B(a)P-TE is the benzo(a)pyrene toxic equivalent for the carcinogenic PAHs. 11) DNOC is 4,6-dinitro-2-methylphenol.

Table 2: Selected Results--Groundwater as a Water Supply

Item	RME		CTC	
	Total Aquifer	Northwest Wells	Total Aquifer	Northwest Wells
		Cancer Risk Estimate Exposure of an Adult		
Total risk	7.4(10 -4)	9.8(10 -4)	1.4(10 -4)	2.1(10 -4)
Risk, Arsenic	2.4(10 -4)	9.7(10 -4)	5.0(10 -5)	2.0(10 -4)
Risk, B(A)P-TE (PAHs)	4.9(10 -4)	NC	9.2(10 -5)	NC
Risk, dieldrin	3.7(10 -6)	NC	7.7(10 -7)	NC
Risk, aldrin	5.3(10 -6)	6.0(10 -6)	1.1(10 -6)	1.3(10 -6)
		Noncarcinogenic Hazard Estimates Exposure of a Child (0 to 6 years old)		
HI	22.	49.	16.	34.
HQ, antimony	1.5	18.	1.1	13.
HQ, arsenic	2.4	10.	1.7	7.1
HQ, barium	0.4	0.9	0.3	0.6
HQ, iron	0.7	2.3	0.5	1.6
HQ, manganese	8.3	18.	5.8	12.
HQ, nickel	0.04	0.1	0.03	0.08
HQ, carbon disulfide	0.6	NC	0.6	NC
HQ, DNOC	8.6	NC	6.0	NC

DNOC is 4,6-dinitro-2-methylphenol

* * * * *

Table 3. Costs

Alternative	Capital Costs	Annual O & M	Total Present Net Worth
1-no action	$0	$0	$0
2-cover	$3,800,000	$260,000	$7,000,000
3A-cover, leachate off	$4,300,000	$520,000	$10,700,000
3B-cover, leachate on	$5,100,000	$560,000	$12,000,000
4A-cover, groundwater, leachate off	$6,000,000	$870,000	$16,800,000
4B-cover, groundwater, leachate on	$6,300,000	$880,000	$17,300,000
5A-cover, leachate off, waste	$4,900,000	$520,000	$11,300,000
5B-cover, leachate on, waste	$5,700,000	$560,000	$12,600,000
6A-cover, groundwater, leachate off, waste	$6,600,000	$870,000	$17,400,000
6B-cover, groundwater, leachate off, waste	$6,900,000	$880,000	$17,900,000

These are the costs from the PRP Technical Committee's feasibility study report submittal. Some of the descriptions of the alternatives have been changed, most notably the change from a "repaired" cover to an installed cover. These will change the cost estimates, but the relative costs will be similar to the above.

Table 4. Major Identified
Applicable or Relevant and Appropriate Requirements

Chemical Specific

- Safe Drinking Water Act (SDWA) National Primary Drinking Water Regulations (40 CFR 141)
- Clean Air Act (CAA) National Emissions Standards for Hazardous Air Pollutants (40 CFR 61)
- Indiana Water Quality Standards (327 IAC 2)

Action Specific

- Clean Water Act (CWA) EPA Administered Permit: Programs: The National Pollutant Discharge Elimination System (NPDES)(40 CFR 122)
- CWA Criteria and Standards for the National Pollutant Discharge Elimination System (40 CFR 125)
- CWA General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR 403)
- CWA Section 401, Certification, Permits and Licenses
- Clean Air Act (CAA) Requirements for Preparation, Adoption, and Submittal of Implementation Plans (40 CFR 51)
- CAA Approval and Promulgation of Implementation Plans (40 CFR 52)
- CAA Standards of Performance for New Stationary Sources (40 CFR 60)
- CAA Section 101, Findings and Purposes, Air Quality and Emissions Limitations
- Resource Conservation and Recovery Act (RCRA) Air Emission Standards for Process Vents (Subpart AA in 40 CFR 264)
- RCRA Air Emission Standards for Equipment Leaks Subpart BB in 40 CFR 264)
- Toxic Substances Control Act (TSCA) Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions (40 CFR 761)
- RCRA Criteria for Classification of Solid Waste Disposal Facilities and Practices (40 CFR 257)
- RCRA Criteria for Municipal Solid Waste Landfills (Eff. 10-9-93) (40 CFR 258)
- RCRA Identification and Listing of Hazardous Waste (40 CFR 261)
- RCRA Standards Applicable to Generators of Hazardous Waste (40 CFR 262)
- RCRA Standards Applicable to Transporters of Hazardous Waste (40 CFR 263)
- RCRA Land Disposal Restrictions (40 CFR 268)
- RCRA Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST) (40 CFR 280)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as Amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA)
- CERCLA National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300)
- CERCLA Designation, Reportable Quantities, and Notification (40 CFR 302)

Table 4, cont., Major ARARs

- CERCLA Worker Protection (40 CFR 311)
- Occupational Safety and Health Act (OSHA) Occupational Safety and Health Standards (29 CFR 1910)
- OSHA Safety and Health Regulations for Construction (29 CFR 1926)
- Department of Transportation (DOT) Hazardous Materials Program Procedures (49 CFR 107)
- DOT General Information, Regulations, and Definitions (49 CFR 171)
- DOT Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements (49 CFR 172)
- Indiana Solid Waste Land Disposal Facilities (32 IAC 10)
- Indiana Hazardous Waste Management Permit Program and Related Hazardous Waste Management (329 IAC 3.1)
- Indiana Water Well Drilling (310 IAC 16)
- Indiana Wastewater Treatment Facilities; Issuance of Permits; Construction and Permit Requirements (327 IAC 3)
- Indiana Wastewater Treatment Facilities; Overload Condition (327 IAC 4)
- Indiana Industrial Wastewater Pretreatment Programs (NPDES) (327 IAC 5)
- Indiana Management of Sewage Disposal System Wastewater 327 IAC 7)
- Indiana Public Water Supply (327 IAC 8)
- Indiana NPDES General Permit Rule Program (327 IAC 15)
- Indiana Ambient Air Quality Standards (326 IAC 1-3)
- Indiana Fugitive Dust Emissions (326 IAC 6-4 and 6-5)
- Indiana VOC Emissions (326 IAC 8-1-6)

Location Specific

- National Environmental Policy Act (NEPA) Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy Act (40 CPR 6) (also consider Fish and Wildlife Coordination Act and Scenic Rivers Act)
- CWA Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR 230)
- CWA Section 404(c) Procedures (40 CFR 231)
- Endangered Species Act (50 CFR 17; 50 CFR 402)
- Indiana Construction in a Floodway (IC 14-28-1 and 410 IAC 6-1)

To Be Considered Criteria

- CWA Maximum Contaminant Level Goals (Subpart F of 40 CFR 141)
- CWA Federal Water Quality Criteria (FWQC)
- CAA National Primary and Secondary Ambient Air Quality Standards (40 CFR 50)
- Indiana Solid Waste Management (329 IAC 2, repealed in 1996)

Note: A particular ARAR may belong to more than one category.

<IMG SRC 97078B>
<IMG SRC 97078C>

Attachments

Responsiveness Summary

September 29, 1997 Letter of Concurrence, Indiana Department of Environmental Management

Administrative Record Index, Original

Administrative Record Index, Update #1

Responsiveness Summary
Tippecanoe Sanitary Landfill, Inc. Site
Tippecanoe County, Indiana

1. Overview

The U.S. Environmental Protection Agency (USEPA) issued a Proposed Plan in July 1997 for the Tippecanoe Sanitary Landfill, Inc. site (the Site) and began a 30-day comment period that ended on August 28, 1997. The remedial investigation (RI) and feasibility study (FS) that provided the information used for deciding on a preferred remedy had been performed by a group of some of the potentially responsible parties (PRPs) as the result of a settlement reached with USEPA and the Indiana Department of Environmental Management (IDEM), which is contained in an Administrative Order on Consent (AOC). This group of PRPs included the city of Lafayette, Indiana, the city of West Lafayette, Indiana, Tippecanoe County, Indiana, Purdue University, and several industrial companies. USEPA's preferred alternative contained in the Proposed Plan addressed all of the site conditions warranting response action that have been identified so far for this former sanitary landfill. This preferred alternative included: deed restrictions and fencing; a barrier cover for the waste disposal area; leachate collection and discharge to the local privately owned treatment works (POTW); a landfill gas system; and contingent groundwater remediation. If the leachate could not be sent to the POTW for treatment, then the leachate would be treated on or near the Site and the water would be discharged to Wildcat Creek or the Wabash River. Also, if those doing the remedial work believed that it would be advantageous, the wastes near the hillside in the northwest corner of the Site could be moved to another portion of the waste disposal area.

Judging from the comments received, both at the August 6, 1997 public meeting and by mail, there is general agreement with the primary components of USEPA's preferred alternative and encouragement that the remediation begin. There was an objection to the proposed excavation of some of the wastes because of the possible odor problems, and this option has been removed from the selected remedy. A concern was raised about the discharge of the leachate to the POTW for treatment because of possible capacity problems and possible effects on the sludge produced, but it is believed that those concerns can be overcome. If they cannot, then the alternative of on-site treatment of the leachate will have to be used. One person did question the need for leachate extraction and contingent groundwater remediation components, and this is addressed below.

II. Background on Community Involvement

Community interest in this landfill arose while the landfill was operating (it closed in 1989) because of various disputes that the operator had with the State and because of several denials of the operating permit by the State.

Community interest has increased over the past few years largely due to a local income tax which was initiated and is being collected from the residents of Tippecanoe County to raise funds for the remediation of the Site. Some people have objected to this and the tax has been opposed in the courts. USEPA has taken no position with regard to this tax. Usually in the cases of Superund sites, when USEPA reaches an agreement with one or more potentially responsible parties (PRPs) that have been named for the site, it is the responsibility of these parties to determine how the work that they have agreed to do will be financed. Community interest has also increased due to the amount of time taken by the PRPs to complete the RI and FS.

III. Summaries of Comments Received and USEPA's Responses

This section summarizes the comments received during the comment period. The Administrative Record contains a complete copy of the transcript for the public meeting as well as all written comments.

1. Comment. At the public meeting, Mayor Sonya Margerum of West Lafayette, Indiana, submitted a letter dated August 5, 1997 with some comments on behalf of the group of PRPs that had performed the work under the AOC

(Tippecanoe Sanitary Landfill (TSL) PRP Group (PRP Group)), and she summarized the contents for those attending the meeting. The letter first summarizes some of the history of the Superfund related work. It mentions that over $2.5 million has been spent by the PRP Group. They are pleased that the Proposed Plan has been issued. They state their view that the conclusions drawn from the RI and FS by USEPA and IDEM are substantially the same as the conclusions reached by this group of PRPs, that differences of opinion with USEPA over the course of the study were rather minor, and that on major points the differences were more over form than substance. They state that the June 1997 sampling shows an overall improvement in the quality of the groundwater and expect that future monitoring will continue to show such improvement. They believe the majority of items in the components of the proposed remedy needing clarification will be clarified during the remedial design phase.

USEPA Response: USEPA appreciates the overall agreement of this group of PRPs with the conclusions of USEPA and IDEM regarding the remediation of the Site. USEPA looks forward to cooperative efforts that will lead to timely and effective remediation of the Site.

USEPA notes that, at times, there were substantive differences with the TSL PRP Group (PRP Group) during the performnnce of the RI and FS.

USEPA has concluded that the May 1997 sampling results do not indicate any practical improvement in the quality of the groundwater downgradient of the Site. This is not surprising since Site conditions have not changed substantially. Arsenic in one well is above the maximum contaminant level (MCL). Sodium concentrations are well above acceptable limits; directly west of the Site, the sodium levels have increased significantly. There are still significant numbers of detects of semivolatile organic compound (SVOC) tentatively identified compounds (TICs) in some downgradient wells.

If there are items in the components of the remediation selected that need clarification, these will be resolved during the negotiations and before the PRPs are permitted to do any remedial action. Any uncertainties need to be cleared up at that time so that all components of the work to be done will be clearly defined in the settlement document. Waiting until the design phase could merely cause further delays in what should be a relatively straightforward process.

2. Mayors Sonya Margerum of West Lafayette and David Heath of Lafayette, as Co-Chairs of the TSL PRP Group, submitted comments on the Proposed Plan. Enclosed with the letter, dated August 22, 1997, was information concerning the additional groundwater sampling conducted during May 1997 at the request of USEPA. This includes a copy of the July 14, 1997 ENSR data transmittal letter and a copy of a revised data validation report (still dated July 1997 and carrying the same document number, but containing three revised memos in Attachment B; the report still does not contain tables providing the validated results for tentatively identified compounds (TICs), and these have not yet been submitted). The following summarizes the points raised and the responses of USEPA.

a. Comment. Regarding the May 1997 sampling event, the TSL PRP Group believes it is unfounded to indicate, as the Proposed Plan (page 4 of the full text) does, that the results of the May 1997 sampling have not indicated any improvement in the quality of the groundwater; indeed, the PRP Group claims that a definite improvement was shown. They present a table showing some comparisons. For example, they say that in May 1997 no volatile organic compounds (VOCs) were detected and 4 detects were found in 1992. In May 1997, six SVOCs were found and no pesticides were found, and in 1992 thirteen SVOCs and four pesticides were found. In May 1997 no antimony was found and in 1992 antimony was found twice. They compare the arsenic results in well MW-14A and MW-16A and state, "In the remaining 22 wells, arsenic was either not detected or reported as an estimated, low value." Regarding manganese, they say, " . . . the concentration of manganese decreased in the other 3 wells (MW-4AR, MW-10A and MW-16A) which had showed elevated levels of manganese during the 1992 sampling events." They point out that USEPA had stated in the Proposed Plan that nickel was found at 119 ppb in well MW-10A, which was incorrect; this concentration was found in the center of the south border of the landfill in well MW-3AR. Also, they point out that there were a total of 9 detects of nickel in May 1997 whereas there were detects in 8 wells in one sampling event and in 3 wells in the other event in 1992. They also claim that chemicals in the leachate samples are significantly lower, in general, in 1997 compared to the earlier samplings.

USEPA Response. As stated in item 1, USEPA adheres to its conclusion that the May 1997 sampling results do not indicate any practical improvement in the quality of the groundwater downgradient of the Site. Actually there was one VOC detect in the 1997 sampling (toluene in well MW-17C); for the split samples that IDEM took from 8 downgradient wells, IDEM reported detects of a total of four VOCs in four wells. There are still significant numbers of SVOC TICs in some downgradient wells. There were significant numbers of pesticides detected in May 1997 blank samples, so the results for pesticides have to be used cautiously when trying to

draw conclusions. Arsenic is present in well MW-14A above the MCL. In 1997 arsenic was detected in 6 of the 19 downgradient wells; in 1992, based on the average concentrations, calculated per well, it was found in 9 wells. Although the implication is that manganese was found at elevated levels in 1992 in only 4 wells, an examination of the average concentrations of manganese per well, based on the 1992 data, reveals that 9 of the downgradient wells had concentrations in excess of the 1992 95% upper confidence limit for the 5 background wells of 162 Ig/l; in 1997, the manganese concentrations in 10 of the downgradient wells exceeded 162 Ig/l. The maximum nickel concentration of 119 Ig/l was indeed erroneously reported in the Propospd Plan as being found in well MW-19A instead of well MW-3A, which is near the center of the southern border of the Site but is more properly described as being near the eastern extent of the waste disposal area along the southern boundary. However, the important aspect of this nickel concentration is that the maximum concentration of nickel detected in 1992 was just 39.8 Ig/l. In summary, while improvements can be cited, consideration of the overall picture does not indicate any practical improvement in the quality of the groundwater downgradient of the Site between 1992 and 1997.

With regard to the leachate results, there was only a 12% decrease in the average concentrations of sodium in the leachate wells and a 5.3% decrease in the arsenic concentrations. The barium concentrations increased in 2 of the 3 wells and the manganese concentrations increased in 1 of the 3 wells.

b. Comment. Concerning well MW-14A, which the PRP Group points out has been discussed frequently, primarily because arsenic has been consistently found there at levels higher than elsewhere, the TSL PRP Group notes that this well is on the TSL property right at the refuse border. Because of this, they claim that its results do not represent a true picture of the ground water as it could be tainted with leachate. They also say that, because of the low concentration of arsenic in the leachate, the arsenic in this well could be at least partially attributed to naturally occurring arsenic in the geologic formation in that area. They point out that the arsenic level decreases as one moves away from this well. They conclude that arsenic is not a concern in the aquifer as a whole.

USEPA Response. There are a number of other wells that are also close to the waste boundary (MW-1AR, MW-17A, MW-3AR, and MW-4AR. and, one could also say, MW-21A), some of which may be even closer than well MW-14A. All of the contaminated wells have been tainted with leachate, but it is believed that at the wells the leachate has mixed with the groundwater. There is no basis to assume that leachate is being sampled in well MW-14A. There was no indication that well MW-14A was drilled through wastes. A 1971 aerial photograph of the Site shows that the building next to well MW-14A existed then. Thus, there is no information to cause USEPA to disregard the results from well MW-14A.

It is possible that the arsenic found in well MW-14A is coming from naturally occurring arsenic in the geological formation. However, it is present in the groundwater in this area at concentrations above background levels, and is probably related to the Site.

Arsenic in the northwest corner is a concern. Concentrations above the MCL are being found. The carcinogenic risk when using the water as a drinking water source is well above the USEPA acceptable carcinogenic risk range for exposure to potentially carcinogenic substances. The carcinogenic risk for the aquifer downgradient of the landfill as a whole also exceeds this risk range.

C. Comment. Regarding the risk assessment, the TSL PRP Group says that the risks resulting from the following substances could be taken out or revised because of the May 1997 results: antimony, carbon disulfide, 4,6-dinitro-2-methylphenol, dieldrin, aldrin, and most polycyclic aromatic hydrocarbons (PAHs). They comment on USEPA's statement that not including the TICs in the risk assessment might mean that the risk has been underestimated by saying that no health information is available for the TICs (except one). They say that USEPA's comment ". . . active or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present an imminent and substantial endangerment to public health, welfare or the environment" is unfounded.

USEPA Response. There would be some changes in the results of the risk assessment if the results of the May 1997 sampling were included; however, the results of the 1992 sampling cannot be disregarded, absent any information that they did not represent the conditions at the Site. In any event, the USEPA acceptable carcinogenic risk range for exposure to potentially carcinogenic substances would still be exceeded at this Site.

The fact that no health information is available for the TICs, except for the one, does not change the fact that it is possible that the risks may have been underestimated by not including the TICs in the risk assessment.

There are unacceptable carcinogenic and noncarcinogenic risks present using the groundwater as a drinking water source. The MCL for arsenic is being exceeded. Therefore the Site may present an imminent and substantial endangerment to public health, welfare, or the environment.

d. Comment. The TSL PRP Group says that various components of the proposed remedial alternative will need to be clarified during the design phase. They say that in the USEPA Section 6.1 for the feasibility study report, it is stated that the treatment of the extracted groundwater will be accomplished through precipitation, flocculation, and settling for the removal of metals and that the cost estimate presented reflects this treatment scheme. They then claim that "it is impossible to remove the low 1evels of arsenic anticipated by the U.S. EPA to be present in the extracted groundwater, by the treatment process stated by the U.S. EPA." They say that the correct treatment scheme is discussed in the Draft Feasibility Study Report submitted by the PRPs June 1996, and therefore, the cost of groundwater treatment might be significantly higher if such treatment for arsenic were found to be necessary. They also say that requiring a useless technology would not be consistent with the National Contingency Plan (NCP).

USEPA Response. As stated in item 1, any clarifications concerning the work to be done will be determined during the negotiations for implementing the remedy.

In USEPA's Section 6.1.5 of the feasibility study report, it says, "The possibility that additional treatment might be needed for reduction of arsenic and organics has not been included in this cost estimate." The cost estimate that USEPA used in the Proposed Plan is the one that the TSL PRP Group provided in their June 1996 Draft Feasibility Study Report (PRP FS draft report), so it includes what they thought was necessary (only a lump sum dollar amount was provided). It is possible that the cost estimate for groundwater treatment may be less reliable because of treatment for arsenic.

It is uncertain whether this treatment would have to be done by the process the TSL PRP Group presented in the PRP FS draft report. In Manual: Ground-Water and Leachate Treament Systems, USEPA, January 1995 (EPA/625/R-94/005), arsenic is included in a table of example precipitation treatment methods in the section on chemical precipitation of metals. If groundwater remediation becomes necessary and there was a concern about the treatment system, treatability studies will be undertaken. If a treatment to meet discharge requirements is not possible, it may be necessary to revisit the Record of Decision and accomplish the desired result (a groundwater downgradient of the Site that meets the requirements of the ARARs) by some other means. A useless technology would not be required, and none is presently being required.

e. Comment. The TSL PRP Group says that they do not object to the inclusion of the May 31, 1996 letter from USEPA to Keramida Environmental, Inc. in the documents that constitute the single entity that is the remedial investigation report for the Site. They do object to the statement ". . . disapproving PRP's RI report. . .", appearing in the July 9, 1997 letter providing the conditional approval for a remedial investigation report. They state, "The inclusion of such wording in the July 9, 1997 letter is contrary to the conditional approval granted by the letter, and contrary to the level of cooperation enjoyed between the U.S. EPA and the PRPs. We would appreciate a statement from U.S. EPA that such wording was neither intended to be included nor to imply that PRP RI report is not approved with the conditions incorporated."

USEPA Response. The phrase "disapproving the PRP RI report" was included to summarize the subject of the May 31, 1996 letter from USEPA. It is important to point out that documents listed in the July 9, 1997 letter constitute the remedial investigation report for this Site. There can never be a representation made that the February 1996 version of the remedial investigation report submitted by the TSL Site PRP Technical Committee (Volumes I, II, IIIA, and IIIB) (PRP RI report) has been "approved" or "accepted" by USEPA.

f. Comment. Referring to the July 11, 1997 letter from USEPA granting conditional approval to a group of documents, listed there, as a single entity to constitute the feasibility study report, the TSL PRP Group objects to a comment on page 4 of Ecology and Environment's (E&E's) [USEPA's oversight contractor] comments saying, "Furthermore, based on the past responsiveness of the PRPs, significant contamination of the qroundwater from the leachate could occur in the time it would take to get the PRPs to move on to the second step if this was not included in the first step." The TSL PRP Group "strongly object[s] to this editorial comment as untrue, unfounded and completely opposite to the way the PRPs have functioned during the RI/FS process." They mention that they have spent over $2.5 million for the RI and FS. They state that they have met all the deadlines imposed by USEPA. They "would appreciate a statement from the U.S. EPA saying the U.S. EPA does not endorse the opinion expressed by E&E."

USEPA Response. The Administrative Order on Consent (AOC) which began the RI and FS work at this site was signed on March 8, 1990. It is presently September 1997 and the work is only now being finished. Much of the delay in getting this work finished must be attributed to the TSL PRP Group. Approval of the Project Plans

took much longer than it should have. There were four drafts of the RI report, and none were approvable. The AOC required that the second submittal (the revision) had to incorporate all USEPA comments and modifications; this was not done.

Another delay was caused by the initial refusal of the TSL PRP Group to install leachate wells in the landfill in order to study the leachate; this delay resulted in the leachate wells being installed after the groundwater sampling that had been planned for the RI had been completed. Once or twice, the TSL PRP Group unilaterally suspended work when it objected to what the USEPA required. Thus deadlines were missed and work was delayed.

3. Wayne Chambers, whose residence lies on the property of the Site, in the northwest corner, submitted some comments at public meeting.

a. Comment. Mr. Chambers stated that it was unrlealistic to consider the possibility of digging up the wastes. He indicated that there are 11 families in that area, and the odors from exposed wastes if they are excavated would be unbearable. He recommended that, for any excavation, USEPA should require relocating the families while the work is being done.

USEPA Response. USEPA has withdrawn the option that the partial waste relocation could be done as part of the remediation if the parties doing the remediation work found that this would be desirable. It is expected that the landfill gas system, it properly designed, should be capable of providing the necessary control of gas migration. Monitoring of the effectiveness of the gas control system will be required to ensure the safety of the residents.

b. Comment. Mr. Chambers said that the information about the landfill level being at the field level is incorrect. He said that they (the operators) had dug down 50 feet and laid down some plastic. He also mentioned, since the first waste disposal was closest to his house and rules at the time the landfill was started were not as strict, that this is another reason wastes toward the northwest corner should not be dug up.

USEPA Response. Claims that there was some excavation, of the existing soil to such depths as 50 feet before wastes were placed have been made orally before, but there has been nothing that USEPA has seen that documents this. The water table in that area is approximately 5 feet below the surrounding farmland. Excavation to 50 feet would have resulted in ponds unless the water was pumped from the excavations as it flowed in and discharged somewhere. Historical aerial photographs, while they do sometimes show some small areas of liquid present at the site, do not indicate any extensive excavations. The State inspection reports do not mention any ponds present; they do mention problems with standing water because of the flooding problems in the area. Wastes were not allowed to be disposed of in water,

c. Comment. Mr. Chambers said that he does not believe that the taxpayers should pay for the remediation, only the PRPs. Others have also expressed this opinion.

USEPA Response. When a settlement is reached with a group of PRPs for work in the Superfund program, USEPA does not dictate how the group of PRPs is to obtain the funds that it will use to pay for its share of the work. The tax that has been imposed on the local taxpayers was something that was brought about by one or more of the local government bodies. USEPA cannot prevent this method of financing from being used.

d. Comment. Mr. Chambers said that the methane gas is at 60% at a point 5 feet from his house. He described the procedures that he is to follow if the methane meters installed by IDEM in his house are triggered. Because of the threat, he believes that it is necessary to get the remediation started as soon as possible. He said to deal with the groundwater if you must. He also complimented IDEM on the work that they have done reqarding the methane meters.

USEPA Response. It is the intention of USEPA that the remediation work selected in this ROD be started as soon as possible.

e. Comment. Mr. Chambers said that there has been a lot of cancer in the area. He does not know if it is related to the landfill.

USEPA Response. USEPA has not been made aware of a belief that there might be an incidence of elevated cancer cases in the area in the past. This report will be brought to the attention of the Agency for Toxic Substances and Disease Registry.

4. Tom Peyton of AmTech provided a number of comments at the public meeting and in a letter dated August 26, 1997.

a. Comment. Mr. Peyton wanted to know why the landfill was not capped immediately. He said that an estimated 0.5 billion gallons have leached through the landfill since it was closed. Mr. Peyton said that there was a court order that was never fulfilled. He said that someone should be responsible for the delay if this results in the necessity for surface treatment of ground water.

USEPA Response. At the closure of the landfill there was a court order in effect that called for the capping of the landfill. USEPA was not a party in this court order. Some capping of the landfill did take place as a result of this court order, but it was not completed, apparently because sufficient funds were unavailable.

USEPA has not assessed the quantity of leachate which may have been generated since the landfill was closed. However if 0.5 billion gallons (0.5 x 10 9 gal) has passed out of the landfill, which covers about 59 acres, since 1989 (about 8 years), this amounts to about 39 inches per year per acre. However, the normal and median precipitation rates for West Lafayette are only about 36 inches per year. Not all precipitation infiltrates the earth. There is runoff, especially on significant slopes, and evaporation through various mechanisms that account for a lot of the moisture that falls. The volume that infiltrates depends on the type of soil and the setting. Here, there was an attempt to provide something that would at least approximate a cap on at least part of the landfill. So it is doubtful that there was 0.5 billion gallons that passed through the landfill in these 8 years. It was more likely in the neighborhood of an order of magnitude less.

While USEPA could have tried to get the TSL PRP Group to install a cap or complete the cap shortly after the closure of the landfill, it was thought that with the cap that was there it was best to investigate the Site prior to implementing any remediation. A hastily implemented cap could have made the gas problem worse, so it would have been necessary to also address the gas problem then. USEPA expectation in 1990 was for the PRP Group to quickly complete the remedial investigation and feasibility study for the Site so that a final remedy could be implemented.

There are no plans to pursue any individuals that contributed to the delay in the completion of this project as PRPs to provide the funds for surface treatment of groundwater, if this should be needed. Such involvement with a site does not make a party a PRP.

b. Comment. Mr. Peyton asked why USEPA or IDEM do not require that qualified environmental professionals be hired from within Tippecanoe County when the tax to supply the money for the remediation is imposed on the local citizens?

USEPA Response. When USEPA reaches a settlement with a group of PRPs, as long as the settlement does not include the federai government furnishing some of the funds, USEPA can not dictate who the PRP Group employs or how they go about getting their contractors, as long as the PRP Group complies with all applicable laws. In these settlements, however, USEPA does usually have a right to approve or disapprove a contractor the PRPs had selected, but USEPA could not disapprove a contractor just to force the PRPs to select a contractor that USEPA preferred.

c. Comment. Mr. Peyton asked why USEPA or IDEM do not restrict the use of the funds from the tax to site cleanup and not legal fees.

USEPA Response. As stated above, USEPA does not take a position, on the local tax that has been imposed to generate funds for the remedial action.

d. Comment. Mr. Peyton asked why the risk for cancer from arsenic is nearly 10 -3 for the northwest corner wells when there has been only one exceedance of the MCL of 50 Ig/l?

USEPA Response. The MCL that has been set for arsenic is not based strictly on the cancer slope factor that has been established for arsenic. Arsenic is reportedly being studied further, both with regard to the MCL and the cancer risk.

5. Comment. Bill Baitinger, West Lafayette, discussed the history of the Site at the public meeting. He said that he had read the materials about the Site. He said that it was unfortunate that the landfill had been located by Mr. Chambers home. He said that we should now move forward, that there is now a reasonable plan and he thinks that the community in general is behind it. He does believe the Site needs remediation. He urged flexible implementation. USEPA has chosen 4A, but he could live with 3B [he probably meant 3A] and 4B. He said to do only what is necessary. He would not recommend moving any of the wastes. The community, in his

view, can always argue about who should pay. He stated that if resources were expended trying to pursue purported white-collar criminals (as someone else at the meeting advocated), a lot of time and money would be spent but this would probably accomplish nothing.

USEPA Response. USEPA appreciates Mr. Baitinger's remarks. USEPA is interested in moving forward quickly. USEPA is interested in flexible implementation of the remedy, and calling for a contingent groundwater remediation component does provide for flexible implementation. If groundwater remediation is not needed then essentially Alternative 3A has become the remedy instead of Alternative 4A.

6. Comment. Darrell Leap, a geologist, said at the public meeting that he was glad to see things finally moving, that the plan is a reasonable one. One concern is that the two aquifers (the transcript does not record this word, but this is probably what was meant) may coalesce west of the landfill. He believes that more information is needed about the groundwater to the west and southwest of the landfill, more monitoring wells are needed in that area.

USEPA Response. USEPA agrees that more information will be needed downgradient of the landfill to fully characterize the plume and determine how it will be changing in the first few years after the source control measures have been implemented. This will indeed require more wells further from the landfill than have been used so far. Although the TSL PRP Group in the June 1996 draft feasibility study report (PRP FS draft report) said that groundwater monitoring would be carried out using only some of the present wells in only parts of the aquifers, USEPA has stated that this is not acceptable. A monitoring network acceptable to the agencies that will cover the entire plume, including any part of the plume that has reached the deeper parts of the aquifers, will have to be designed. What has been learned so far has been sufficient to propose and select a method of remediation.

7. Comment. Dorothy Alabach, of Valparaiso, Indiana, asked at the public meeting if this was going to be a "stage show", a cover-up. She then went on about pursuing white collar crime and using RICO (racketeer influenced and corrupt organization) in doing this. She criticized the State of Indiana. She said that the general assembly has no business passing a special tax to pay for this clean-up.

She also brought up that she had submitted a freedom of information act (FOIA) request some time ago that she said was not properly responded to, and she was here resubmitting it. The FOIA request dealt with who besides Schlossberg was involved in the decision making concerning the operation of the landfill.

USEPA Response. USEPA has followed its usual procedures in trying to determine who might be liable at this Site and should be named a PRP. So far 30 to 40 parties have been named PRPs. Since these were named, USEPA has continued to try to obtain information on all parties that have been mentioned in regard to the site. The information collected will be used to see if any more should be named PRPs.

In her FOIA request of 9/12/96, Ms. Alabach asked who besides Mr. Schlossberg was listed and identified in public records as the operators of the Site. USEPA was only able to identify a part of the Administrative Order on Consent (AOC) as being responsive to Ms. Alabach's request. A copy of the AOC was sent to her. Unfortunately, the transmittal letter did not direct her to the part that USEPA had identified, which was Article V of the A0C.

8. Comment. Jeff Symmes, West Lafayette, at the public meeting stated that he has periodically been watching the landfill for the last ten years. He said that the landfill was a toxic waste dump for a number of years, till the mid 1980s. He believes that there are millions of pounds of toxic wastes in the landfill. He claimed that two companies that hauled wastes to the landfill were connected with organized crime in Pennsylvania. He talked about some other landfills. He said that out-of-state wastes went to the Tippecanoe landfill. He asked where the money generated from taking in out-of-state wastes went. He claimed that Mr. Schlossberg destroyed monitoring wells that were contaminated with PCBs and noted that PCBs are not found in any samples during the RI. Mr. Symmes also carried on a dialogue with a couple of the USEPA representatives concerning information responses from PRPs, enforcement investigations, enforcement procedures, and operation of the landfill without a permit from the State that have not been considered as comments.

Mr. Symmes also commented on the hearings that led to the closure of the landfill, that these were held behind closed doors and USEPA should be aware of this.

USEPA Response. USEPA has not received any documentation to show that considerable quantities of hazardous or toxic wastes have gone into the landfill. The results of the groundwater monitoring do not indicate that this might be the case.

In the 1984 edition of 330 IAC 4 (Refuse Disposal Act; Solid Waste Management Permits; Industrial Waste Hauler Permits), 330 IAC 4-5-14 states, "Under no circumstances shall hazardous wastes be accepted at a sanitary landfill unless authorized in writing by the Board or its designated solid waste management agent." It also said that this was filed August 15, 1974. Thus there was an awareness back then, at least, that hazardous wastes did not generally belong in a sanitary landfill.

USEPA is aware that some out-of-state wastes were deposited in the landfill and has been provided with the names of some alleged haulers of these wastes. USEPA had no control over what happened to the money that the landfill received for taking these wastes and has not investigated this matter.

USEPA is aware that some monitoring wells were lost when Mr. Schlossberg was operating the landfill. This would have no connection with whether or not polychlorinated biphenyls (PCBs) are now found in the groundwater around the landfill.

USEPA appreciates the information that Mr. Symmes has provided.

9. Comment. Dan Duncan, Lafayette Waste Water Treatment Plant [Manager, Water Pollution Control Department], commented at the public meeting that he did not want to see the risks from the landfill transferred to the wastewater treatment plant. He mentioned the possibility of additional costs for monitoring, that they have no rate structure for that. He did say that there is currently in their ordinance a set fee for those kind of independant monitoring things from landfill leachate. He also said that they recycle their biosolids [incorrectly stated as biosolvents in the transcript) (sewage sludge) and wanted to know what the risks were to these.

USEPA Response. It is not unusual for leachate from a sanitary landfill to be sent to a wastewater treatment plant. If this can be done (the main obstacle might be the capacity of the wastewater treatment plant, but the amount being sent there eventually might be only on the order of 10 to 20 gallons per minute, and it could be less), it will be necessary that the details be worked out so that the water discharge from the plant and the biosolids are protected and that the added costs for accepting the leachate are fully covered by the charges imposed. If it is necessary, the leachate will have to be pretreated for the protection of the wastewater treatment plant, just as industrial discharges are often treated.

10. Comment. Francis Kovach commented by letter dated, July 28, 1997 that, if discoveries are made during the cleanup that would result in the removal or treatment of extraordinary substances such as radioactive materials or highly toxic, chemicals every effort should be made to identify the sources of the materials and require these sources to pay for the additional costs rather than have the tax money cover them.

USEPA Response. As has been stated previously, if a settlement is reached whereby a group of PRPs agrees to perform the remedial action, USEPA does not expect to direct how this group will allocate among its members the respective shares of the costs.

11. Comment. Lotte Hirsch commented in a message received August 1, 1997 that they accept the USEPA preferred alternative, that the groundwater should be protected. Once this alternative is implemented, it should take care of the problem.

USEPA Response. USEPA appreciates the comments.

12. Comment. David Easterwood commented in a message received August 6, 1997 that it should not be the responsibility of the local taxpayers to clean up the landfill. It should be the responsibility of the businesses and factories and Purdue University whose chemicals and contaminants have been put in there.

USEPA Response. As stated above, if an agreement is reached for a group of PRPs to implement the remedial action, USEPA will not specify how they pay for their share. The Superfund law requires USEPA to identify as PRPs any parties who may have contributed hazardous substances to the site. If anyone affected by this tax does not believe that the tax should be used for the cleanup, that person will have to contact those responsible for imposing the tax or controlling the use of the funds.

13. Comment. Norbert Fisher in a message received August 26, 1997 agrees that the Site must come to some sort of proper closure. He agrees with the cover and the gas system. He disagrees about the leachate collection system and the groundwater remediation. If there is a proper cover and surface water can no longer seep down into the landfill, he cannot see why leachate would continue to seep out. He does say that the groundwater must be safe, and if it takes leachate collection and groundwater remediation to make it so, then this should be done. He said to only do as much as is appropriate.

USEPA Response. The cover that is required for this landfill will reduce the amount of infiltration that would take place through wastes or some soils or some other shapes. However, it will not completely prevent the infiltration of water. Because of this and the necessity to remove the leachate already present so that it will not all get into the groundwater, a leachate extraction system has been selected. The groundwater remediation will only be implemented if it is necessary because the source controls have not been sufficient.

<IMG SRC 97078D>
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live

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September 29, 1997

Mr. David Ullrich, Acting Regional Administrator
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

Dear Mr. Ullrich,

RE: Record of Decison
Final Site Remedy
Tippecanoe Sanitary Landfill, Inc.
Lafayette, Indiana

The Indiana Department of Environmental Management has reviewed the U.S. Environmental Protection Agency's Proposed Plan for the Tippecanoe Sanitary Landfill, Inc. Superfund Site. IDEM fully concurs with the major components of the selected remedy for this site, which include:

- Deed restrictions and fencing;
- Barrier cover;
- Landfill gas collection and control system;
- Remediation of contaminated ground water;
- Leachate collection, treatment, and discharge to a publicly owned treatment works;

We also agree that this alternative attains Federal and State requirements that are applicable, or relevant and appropriate to this remedy. Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate treatment of contaminants as well as protection of human health and the environment. If it is discovered that the remedy is failing in these regards, then another remedy will need to be instituted. Please be assured that IDEM is committed to accomplishing clean up of all Indiana sites on the NPL and intends to fulfill all obligations required by law to achieve this goal.

<IMG SRC 97078E>

cc: Robert Moran, IDEM
Patricia Carrasquero, IDEM
Christopher J. Brown, IDEM
Bernard Schorle, US EPA Region V

<IMG SRC 97078F>
U.S. ENVIRONMENTAL PROTECTION AGENCY
ADMINISTRATIVE RECORD FOR TIPPECANOE SANITARY LANDFILL SITE LAFAYETTE, INDIANA
ORIGINAL JULY 24, 1997

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1	03/08/90	U.S. EPA	Respondents	Administrative Order on Consent re: Remedial Investigation and Feasibility Study for the Tippecanoe Sanitary Landfill Site	63
2	06/14/90	ENSR Consulting and Engineering	U.S. EPA	Preliminary Site Evaluation Report for the Tippecanoe Sanitary Landfill Site	82
3	04/17/91	Schorle, B., U.S. EPA	File	Conversation Record re: Connections to City Water w/B. Trillingham (Lafayette Water Works)	2
4	05/00/91	U.S. EPA	Public	Superfund Fact Sheet re: Tippecanoe Sanitary Landfill Site	7
5	09/00/91	ENSR Consulting and Engineering	U.S. EPA	Project Plans for the Remedial Investigation/ Feasibility Study at the Tippecanoe Sanitary Landfill Site	505
6	11/14/91	Meschede, L. and G. Kulma; ENSR Consulting and Engineering	B. Schorle, U.S. EPA	Letter re: Addendum to the Monitor Well Instal-lation Standard Operating Procedures	3
7	01/00/92	ENSR Consulting and Engineering	U.S. EPA	Quality Assurance Project Plan for the Remedial Investigation/ Feasibility Study at the Tippecanoe Sanitary Landfill Site	580
8	02/00/92	ENSR Consulting and Engineering	U.S. EPA	Source Characterization Technical Memorandum for the Tippecanoe Sanitary Landfill Site	324
9	04/00/92	ENSR Consulting and Engineering	U.S. EPA	Migration Pathway Assessment for the Tippecanoe Sanitary Landfill Site	360
10	04/28/92	Schorle, B., U.S. EPA	Meschede, L., ENSR Consulting and Engineering	Letter re: U.S. EPA and Ecology & Environment's Comments on the Source Characterization Technical Memorandum	11

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12	05/26/92	Schorle, B., U.S. EPA	Meschede, L., ENSR Consulting and Engineering	Letter re: U.S. EPA Comments on the Migration Pathway Assessment Technical Memorandum	7
13	05/29/92	Schorle, B., U.S. EPA	Meschede, L., ENSR Consulting and Engineering	Letter re: Ecology and Environment's Comments on the Migration Pathway Assessment Technical Memorandum	3
14	06/23/92	Schorle, B., U.S. EPA	Keramida, V., Ontario Environmental, Inc.	Letter Forwarding Attached IDEM Comments on the Migration Pathway Assessment Technical Memorandum and Dates for Events in the Remedial Investigation	5
15	07/17/92	Schorle, B., U.S. EPA	Keramida, V., Ontario Environmental, Inc.	Letter re: Sampling at the Tippecanoe Sanitary Landfill Site	3
16	07/21/92	Symonds, S., ENSR Consulting	B. Schorle, U.S. EPA	Letter re: Round 1 Sample Designation	2
17	07/31/92	Meschede, L., ENSR Consulting and Engineering	B. Schorle, U.S. EPA U.S. EPA	Telephone Call Summary: Chemical Characterization Sampling Activities	2
18	11/25/92	Meschede, L., ENSR Consulting and Engineering	B. Schorle, U.S. EPA	Letter re: Installation of Three Leachate Monitoring Wells for the Remedial Investigation	5
19	12/04/92	Schorle, E., U.S. EPA	Meschede, L., ENSR Consulting and Engineering	Letter re: Landfill Cover Investigation and Miscellaneous Remedial Investigation	2
20	12/11/92	Schorle, B., U.S. EPA	Meschede, L., ENSR Consulting and Engineering	Letter re: U.S. EPA's comments on the Revised Addendum for the Field Sampling Concerning Leachate Wells	3
21	12/18/92	Meschede, L., ENSR Consulting and Engineering	B. Schorle, U.S. EPA	Letter Forwarding Attached Addenda to the Field Sampling and Health and Safety Plans for Additional Investigation	12

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23	05/14/93	Meschede, L., ENSR Consulting and Engineering	Schorle, B., U.S. EPA	Letter Forwarding Attached Draft Addendum to Field Sampling Plan for Additional Landfill Cover Investigation	9
24	05/28/93	Schorle, B., U.S. EPA	Meschede, L., ENSR Consulting and Engineering	Letter re: U.S. EPA Approval of Addendum C to the Phase II Landfill Cover Investigation	1
25	06/07/93	Gorski, W., U.S. EPA/ Wetlands Regulatory Unit	Figiulo, I., U.S. EPA/ Water Divsion	Memorandum re: WRU's Comments Concerning the Tippecanoe Sanitary Landfill Site	3
26	06/10/93	Meyer, D., U.S. EPA/Air Toxics and Radiation Branch	Schorle, B., U.S. EPA	Memorandum re: ATR's Comments on the Draft RI Report for the Tippecanoe Sanitary Landfill Site	2
27	06/24/93	Watters, E., U.S. EPA/Safe Drinking Water Branch	Traub, J., U.S. EPA/WMD	Memorandum re: WD's Review of the Draft RI Report for the Tippecanoe Sanitary Landfill Site	3
28	08/03/93	Kasarabada, P., IDEM	Wehrman, D., Lafayette Bank & Trust	Letter re: Installation of Methane Detectors in Residences Near the Tippecanoe Sanitary Landfill Site	1
29	08/13/93	Schorle, B., U.S. EPA	Meschede, L., ENSR Consulting and Engineering	Letter re: Phase II Landfill Cover Investigation	2
30	09/00/93	U.S. EPA/ OSWER	U.S. EPA	Memorandum re: Presumptive Remedies Directives	72
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32	10/29/93	Keramida, V., Keramida Environmental Inc.	Schorle, B. U.S. EPA	Letter re: U.S. EPA Comments on the Air Pathway Analysis	5

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34	01/27/95	Kasarabada, P., IDEM	Schorle, B., U.S. EPA	Letter: IDEM's Comments on the Final RI Report and the Alternatives Array Documents	2
35	03/00/95	U.S. EPA	File	Areas to be Considered for ARARs and TBCs at the Tippecanoe Sanitary Landfill Site w/Attached March 1995 Alternatives Array Document (U.S. EPA Version)	35
36	03/24/95	Schorle, B. U.S. EPA	Keramida, V. Keramida Environmental Inc.	Letter re: U.S. EPA's Comments on Revision 2 (November 1994) to the Alternatives Array Document	64
37	03/28/95	Adamkus,V., U.S. EPA	Prosser, K., IDEM	Letter re: U.S. EPA Request for Indiana ARARs for the Tippecanoe Sanitary Landfill Site	1
38	04/11/95	Schorle, B. U.S. EPA	Addressees	Memorandum re: Request for ARARs and TBC's for the Tippecanoe Sanitary Landfill Site	194
39	05/19/95	Schorle, B. U.S. EPA	Keramida, V. Keramida Environmental, Inc.	Letter re: Possible ARARs for the Tippecanoe Sanitary Landfill Site	6
40	05/19/95	Greensley, J. U.S. EPA	Schorle, B. U.S. EPA	Memorandum re: TSCA Applicability to the Tippecanoe Sanitary Landfill Site	2
41	05/25/95	Schorle, B. U.S. EPA	Kasarabada, P., IDEM	Letter re: Possible ARARs at the Tippecanoe Sanitary Landfill Site	2
42	05/26/95	Schorle, B. U.S. EPA	Kasarabada, P., IDEM	Letter re: Possible ARARs at the Tippecanoe Sanitary Landfill Site	1
43	06/01/95	U.S. EPA/ Integrated Risk Information System	U.S. EPA	Health Risk Assessment Information re: Arsenic, Inorganic	21
44	06/22/95	Schorle, B. U.S. EPA	Keramida, V. Keramida Environmental, Inc.	Letter re: Potential Federal ARARs for the Tippecanoe Sanitary Landfill site	5

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47	08/02/95	Schorle, B. U.S. EPA	Keramida, V. Keramida Environmental, Inc.	Letter re: Feasibility Study for the Tippecanoe Sanitary Landfill Site	2
48	09/12/95	Schorle, B., U.S. EPA	File	Gas Emissions Estimation for the Tippecanoe Sanitary Landfill Site w/Attached Handwritten Notes and Calculations	11
49	09/21/95	Simmons, J., Tippecanoe Sanitary Landfill PRP Group	Schorle, B. U.S. EPA	Letter re: Notice of Dispute and Statement of Position w/Attached Exhibits	123
50	10/02/95	Schorle, B., U.S. EPA	Keramida, V., Keramida Environmental, Inc.; et al.	Letter re: U.S. EPA's Statements of Position on the September 1995 Dispute Issues	25
51	10/20/95	Schorle, B. U.S. EPA	Keramida, V., Keramida Environmental, Inc.; et al.	Letter re: Various Issues Concerning the RI Report w/Attachments	30
52	10/23/95	Czajka, T., Tippecanoe Sanitary Landfill PRP Group	Schorle, B. & T. Williams, U.S. EPA	Letter re: Understanding of Agreements Reached at the October 11, 1995 Meeting	3
53	02/00/96	ENSR Consulting and Engineering/ Keramida Environmental,	U.S. EPA	Remedial Investigation Report for the Tippecanoe Sanitary Landfill Site: Volume 1: (Text, Tables and Figures)[FINAL]	340
54	02/00/96	ENSR Consulting and Engineering/ Keramida Environmental Inc.	U.S EPA	Remedial Investigation Report for the Tippecanoe Sanitary Landfill Site: Volume 2(Appendices A-M) [FINAL]	489
55	02/00/96	ENSR Consulting and Engineering/ Keramida Environmental, Inc.	U.S. EPA	Remedial Investigation Report for the Tippecanoe Sanitary Landfill Site: Volume 3A (Appendices N-V) [FINAL]	385

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57	02/29/96	Keramida, V., Keramida Environmental Inc.	Schorle, B., U.S. EPA	Letter re: Revised Table 5-1 for the Remedial Investigation Report	7
58	05/31/96	Schorle, B., U.S. EPA	Keramida, V., Keramida Environmental, Inc.	Letter re: U.S. EPA's Disapproval of the February 1996 Remedial Investigation Report for the Tippecanoe Sanitary Landfill Site w/Attached U.S. EPA Comments	55
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60	07/01/96	Schorle, B., U.S. EPA	Kasarabada, P., IDEM	Letter re: U.S. EPA's Comments on the Draft Feasibility Study for the Tippecanoe Sanitary Landfill Site	18
61	07/10/96	Schorle, B., U.S. EPA	Kasarabada, P., IDEM	Letter re: U.S. EPA Comments on the Revised Draft Feasibility Study for the Tippecanoe Sanitary Landfill Site	2
62	08/15/96	Kasarabada, P., IDEM	Schorle, B., U.S. EPA	Letter: IDEM's Comments on the ARARs Section of the Draft Feasibility Study	2
63	10/20/96	U.S. EPA/ Integrated Risk Information System	U.S. EPA	Health Risk Assessment Information re: Manganese	34
64	02/25/97	Keramida, V., Keramida Environmentai, Inc.	Schorle, B., U.S. EPA	Letter re: U.S. EPA Recommendation to Use Two CLP Laboratories for the Analyses of the Proposed Sampling	1
65	03/17/97	Keramida, V., Keramida Environmental, Inc.	Schorle, B., U.S. EPA	Letter re: ENSR's Proposal for Sampling Activities	16
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U.S. ENVIRONMENTAL PROTECTION AGENCY
ADMINISTRATIVE RECORD
FOR
TIPPECANOE SANITARY LANDFILL SITE
LAFAYETTE, TIPPECANOE COUNTY, INDIANA

UPDATE #1
SEPTEMBER 30, 1997

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