Ohio Environmental Protection Agency

Decision Document
for the
Remediation of the Ground Water

Ramp Creek Site
Heath, Ohio

October, 1999

DECISION DOCUMENT

RAMP CREEK GROUND WATER
MSL# 145-0654
LICKING COUNTY
SEPTEMBER 7, 1999

DECLARATION

This document presents the Ohio Environmental Protection Agency's (Ohio EPA's) selected remedial action for the ground water at the Ramp Creek Site, located in the city of Heath, Licking County, Ohio (see Figure 1). Because of the large areal extent of this site and its various land uses, Ohio EPA split the site into two major land-use areas: residential and non-residential. In general, residential areas are located south of Heath Road and non-residential areas are located north of Heath Road. The non-residential areas are dominated by the Licking County Airport and the Ashland, Inc. Bulk Terminal. Active remedial actions will be implemented in residential areas to reduce remediation time frames; monitored natural attenuation (MNA) will be implemented in non-residential areas; free-phase petroleum hydrocarbons will be removed from the intermediate aquifer on Ashland, Inc. property; and, institutional controls will prevent the potable use of ground water.

The selected remedial actions are protective of human health and the environment, attain applicable state requirements, and are cost-effective. The remedies utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Ohio EPA will monitor the status of the remedial actions to ensure that the remedies continue to adequately protect human health and the environment. The remedial actions will be required to meet the performance standards contained in this document.

Cynthia Hafner, Chief
Division of Emergency and Remedial Response
Ohio Environmental Protection Agency

10/25/99
Date

DECISION SUMMARY

The site encompasses a 350-acre area in western Heath, where the shallow ground water was contaminated with petroleum hydrocarbons and its constituents. Petroleum hydrocarbons were first reported in a water well in 1961. In 1970, visible petroleum was reported seeping into Ramp Creek. In 1972, Ohio EPA determined that the petroleum entering Ramp Creek was migrating in the ground water from the former Pure Oil Refinery, which was owned by the Ashland Petroleum Company. Ohio EPA informed Ashland that petroleum migrating from their property in the ground water was entering Ramp Creek. In response, Ashland installed a recovery well at the southeast corner of their property during 1973, which recovered a total of 87,000 gallons of petroleum. However, the seepage into Ramp Creek continued, so Ohio EPA requested federal assistance in 1975. US EPA administered a clean up program from 1975-1981 and recovered approximately 310,000 gallons of petroleum from Ramp Creek and the ground water.

The State of Ohio filed a complaint with the Licking County Court of Common Pleas against Ashland and Union Oil Company of California (Unocal) in 1990 to address the ongoing ground water problem. In 1991, Ashland and Unocal entered into a Consent Order for Preliminary Injunction (COPI) with the State of Ohio to characterize the nature and extent of the ground water contamination. Two addenda to the consent order, which specified additional investigations, were eventually filed with the court. From 1991-1998 Ashland/Unocal, with Ohio EPA oversight, conducted three phases of environmental investigations. The Phase I Investigation defined the nature, magnitude and extent of the ground water contamination. The Phase II Investigation determined the risks to human health and the environment, identified appropriate remedial action objectives (RAOs), and identified general response actions. The Phase III Investigation defined the fate and transport mechanisms and evaluated the feasibility of potential remedial action alternatives.

The site investigations revealed that the contaminant plume occurs in a regionally unconfined aquifer, 2-13 feet below the ground surface from the northern end of Ashland's property south to Ramp Creek . The plume consists of three phases of petroleum hydrocarbons: (1) light non-aqueous phase liquid (LNAPL); (2) sorbed phase petroleum hydrocarbons; and (3) dissolved-phase chemical constituents. A description of these phases is provided below:

- LNAPL floats on top of the ground water table as a mass of petroleum hydrocarbons and does not readily dissolve in water. LNAPL is also referred to as "free product," "free phase," and "separate phase."

- The sorbed-phase petroleum hydrocarbons adsorb to the soil particles, sand, and gravel that make up the aquifer material. The sorbed phase is also referred to as the "smear zone" and "stained soil" because the aquifer material appears to have been smeared or stained with petroleum.

- The dissolved phase chemical constituents are individual chemicals that have dissolved to the ground water from LNAPL and the smear zone. Dissolved phase chemicals detected in the ground water include benzene, ethylbenzene, toluene, and xylenes (BTEX) and some semi-volatile organic compounds.

The contaminant mass can transform among all of these three phases as the subsurface conditions change. The principal cause for transformation is the fluctuating ground water table and the dissolution of dissolved-phase constituents from percolating rainwater. LNAPL and sorbed phase petroleum hydrocarbons transfer BTEX to the ground water as dissolved phase constituents, where the dissolved BTEX naturally biodegrades. The dissolution of BTEX from the smear zone and natural biodegradation are thought to be the principal natural attenuation mechanisms at this site. A mathematical model of this process predicts that the BTEX will be removed to acceptable levels in 13-42 years (see *Appendix A, Groundwater Feasibility Study Report*). This time range is largely dependent on the thickness of the smear zone and BTEX concentration in a given area. In general, the longer time frames are predicted for the center of the contaminant plume and areas where LNAPL is present.

According to the human health risk assessment, the concentration of benzene in the ground water exceeds risk criteria for potable water use. Currently, the aquifer is not being used, so the risks are actually potential future risks. Based on the results of the risk assessment, remedial action objectives (RAOs) were developed for the ground water pathway (see Attachment 1). RAOs are developed to establish goals that will protect human health and the environment. The ultimate goal of Ohio EPA at this site is to restore the aquifer so that it is useable as a source of potable water; that is, to reduce the concentration of benzene to meet the maximum contaminant levels (MCLs) for individual chemicals established by the US EPA under the Safe Drinking Water Act. Because potable water is currently supplied by the city of Heath and use of the aquifer is prohibited by city of Heath Ordinance 100-93, achieving RAOs is not time-critical.

Based on the information gathered during the three phases of site investigations, Ohio EPA evaluated the potential remedial alternatives and chose the preferred alternative. Ohio EPA's evaluation is provided in the *Preferred Plan for Groundwater at the Ramp Creek Site-Heath, Ohio*. The following six alternatives were evaluated in the Preferred Plan.

1. No Action
2. Monitoring and Institutional Controls
3. Monitored Natural Attenuation and Institutional Controls
4. Enhanced Biodegradation, Monitoring and Institutional Controls
5. Phytoremediation, Monitoring and Institutional Controls
6. Vacuum Technologies with Vapor Phase Treatment, Monitoring and Institutional Controls

These alternatives were compared to each other using evaluation criteria (see Table 1). The Preferred Plan recommended a combination of Alternative numbers 2, 3, 4, and 6. Alternative 2

is a component of the other remedial alternatives. Alternatives 4 and 6 were recommended for residential areas and Alternative 3 was recommended for non-residential areas. This approach was necessary because of the large areal extent of the site, the varying hydrogeologic conditions, and the various land uses.

Ohio EPA published notice of the Preferred Plan on April 23, 1999 and held a public meeting and hearing at the Heath Municipal Building on May 26, 1999. The public comment period ended on June 2, 1999. A summary of the community response is provided in the Responsiveness Summary (see Appendix A). Based on the community response, Ohio EPA determined that the Preferred Plan is generally acceptable to the local community. However, one property owner, the Van Voorhis Trust, objected to MNA as the preferred alternative for their property. Ohio EPA evaluated the Van Voorhis' comments and determined that they do not require substantial changes to the Preferred Plan.

The chosen remedies for the ground water at the Ramp Creek Site are summarized below. Figure 2 provides a graphical depiction of the locations of the remedial actions.

Shallow Aquifer in Residential Areas: Vacuum enhanced recovery (VER), will be implemented to actively reduce the volume of LNAPL and BTEX concentrations in the shallow aquifer. VER reduces the remediation time-frame by extracting LNAPL and introducing atmospheric oxygen into the subsurface. The introduction of oxygen into the subsurface enhances aerobic biodegradation, which is a more active process than anaerobic biodegradation. The VER system will operate until long-term RAOs are achieved or bioventing is phased in, if it is determined that VER is no longer effective or efficient. Bioventing uses the same equipment as VER, but the vacuum is reduced for the sole purpose of introducing oxygen into the subsurface to promote aerobic biodegradation. MNA may be phased in when bioventing is no longer effective or efficient. MNA monitors the mechanisms and rate of natural biodegradation of BTEX in the subsurface. Institutional controls that prevent the potable use of the shallow aquifer will be in place until long-term RAOs are met. The effectiveness of these controls will be monitored.

Shallow Aquifer in Non-Residential Areas: The existing VER system, located north of Heath Road on Licking County Airport property, will be expanded to the east and transect the ground water plume. The VER system will operate until long-term RAOs are achieved or bioventing is phased in, if it is determined that VER is no longer effective or efficient. MNA may be appropriately phased in when it is determined that bioventing is no longer effective or efficient so long as RAOs can still be achieved. The remainder of the contaminated shallow aquifer in non-residential areas, an area of approximately 160 acres, will be addressed through MNA. MNA monitors the mechanisms and rate of the natural biodegradation of BTEX in the subsurface. Institutional controls that prevent the potable use of the shallow aquifer shall be in place until long-term RAOs are met. The effectiveness of these controls will be monitored.

Additional information concerning the northwest portion of the site will need to be gathered for the purpose of completing the remedial design. Areas where MNA is implemented not currently

subject to the city of Heath Ordinance 100-93 will need to be included under the ordinance, or obtain other deed restrictions, or otherwise be controlled as necessary to meet applicable RAOs.

Intermediate Aquifer: The LNAPL recovery system currently in place consists of a network of six recovery wells. The wells recover LNAPL with pneumatically-powered or 12-volt DC-powered hydrocarbon-only pumps that are installed at the base of the upper glacial till in areas where LNAPL is trapped. This recovery system will continue to operate until the volume of LNAPL is reduced to the point that it is no longer feasible to extract it. At that time, the intermediate aquifer shall be monitored to ensure that dissolved phase constituents are not migrating beyond the Ashland Facility's boundary.

Performance Standards

Performance standards are applicable standards and criteria for the remedial design/remedial action and operation and maintenance of the remedial alternatives. Ohio EPA identified applicable standards that specifically address the remedial actions or circumstances for each component of the chosen remedy. The chosen remedies are expected to achieve these standards; if they do not, then additional work, remedy modifications, or contingent remedies will be considered.

Performance Standards for Monitored Natural Attenuation and Institutional Controls. A performance monitoring and evaluation program will be developed and implemented in accordance with RAOs to establish the following:

- natural attenuation is occurring according to the predicted time frames described in Appendix A of the ground water Feasibility Study Report;
- the plume is not expanding;
- there are no impacts to downgradient receptors;
- institutional controls that were put in place to protect potential receptors are effective; and,
- the attainment of RAOs has been achieved.

Performance Standards for VER/Bioventing, LNAPL Recovery Systems, Monitoring, and Institutional Controls. A performance monitoring and evaluation program will be developed and implemented to establish the following:

- the VER/bioventing and LNAPL recovery systems are operating in accordance with design specifications;

- the VER/bioventing system is remediating the ground water according to the predicted time frames described in the Ground water FS Report;

- institutional controls that were put in place to protect potential receptors are effective; and

- the attainment of the clean-up objectives has been achieved.

Performance standards for the intermediate aquifer recovery system consist of operating and maintaining the current system in accordance with its design.

Contingent Remedy Process

Contingent remedies may be employed if the selected remedy fails to perform as anticipated or there is a change in the conditions at the site. A contingent remedy may specify a technology that is different from the selected remedy or may be a modification of the selected remedy.

Contingent remedies may be employed if the selected remedy cannot be implemented as designed, fails to perform as anticipated, or there is a change in the conditions at the site. A contingent remedy may specify a different technology or may be a modification of the preferred remedy. The general process by which the remedial program may be modified or changed is as follows:

- evaluate which condition triggered the performance standard;

- evaluate the need for and/or extent to which the existing remedial process may be modified or changed to address the triggering condition, and the time frame for an appropriate response action;

- implement the selected remedial program modification or change; and,

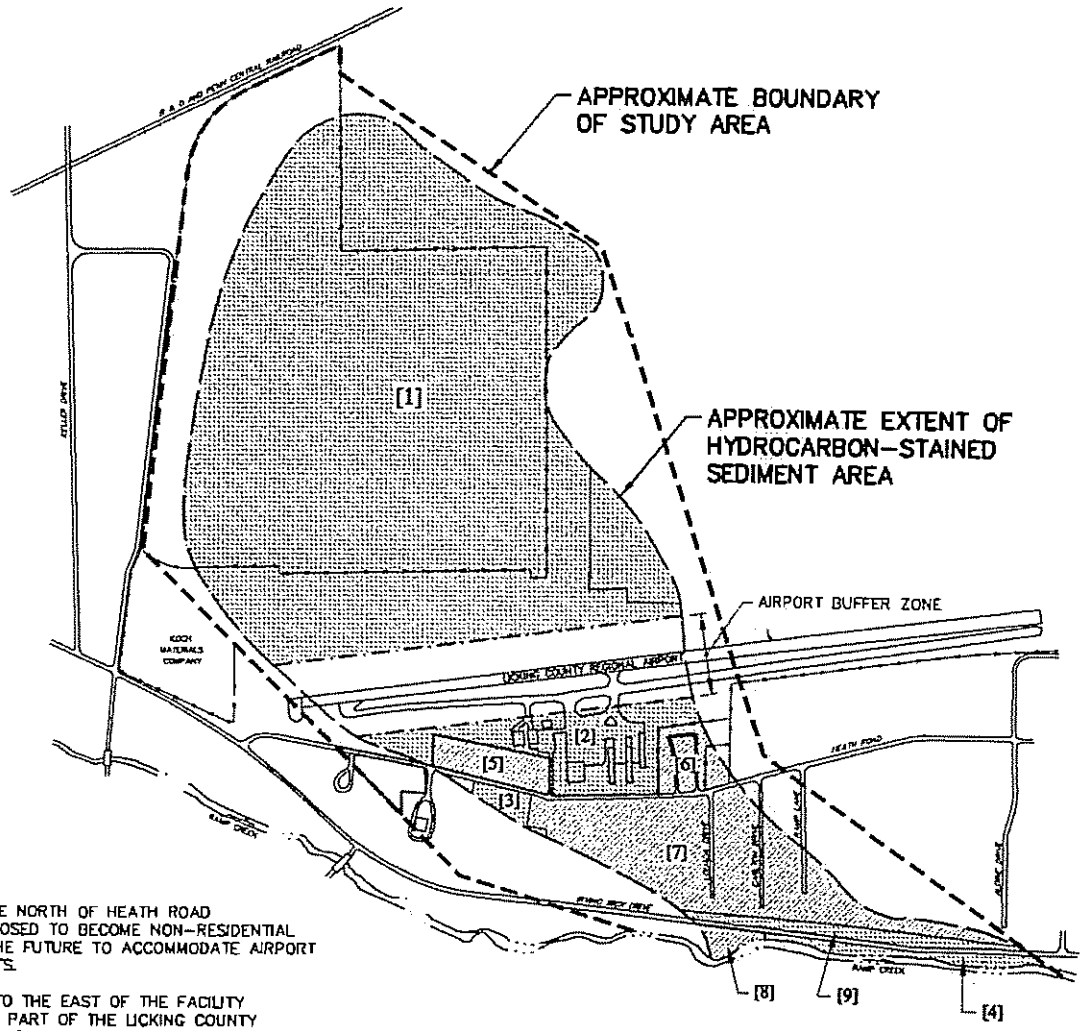
- document the modifications or changes that were made to the remedial program.

Potential contingent technologies will be identified and screened according to implementability, effectiveness, and cost. Ohio EPA will compare the technologies and select the most cost-effective technology that will achieve the performance standards. Ohio EPA may review and change the performance standards if it is determined that the standards are not technically feasible.

Table 1
Evaluation of Final Alternatives
Ground water

Alternative / Criteria	Alternative 1 No Further Action	Alternative 2 Monitoring and Institutional Controls	Alternative 3 Monitored Natural Attenuation	Alternative 4 Enhanced Biodegradation	Alternative 5 Phytoremediation	Alternative 6 Vacuum Technologies
Overall Protection of Human Health and the Environment	Remains the same	Risk to human health is reduced; environmental benefit is not documented	Risk to human health and environment is mitigated in <42 years	Risk to human health and environment is mitigated in <33 years	Risk to human health and environment is potentially mitigated	Risk to human health and environment is mitigated in <13 years
Compliance with Regulatory Requirements	Does not comply	Does not comply	Complies	Complies	Complies	Complies
Long-Term Effectiveness and Permanence	Not effective or permanent	Effective if controls are enforced	Effective and permanent; requires long-term O&M	Effective and permanent; requires long-term O&M	Potentially effective and permanent; requires long-term O&M	Effective and permanent; requires long-term O&M
Reduction in Toxicity, Mobility, Volume through Treatment	No reduction	No reduction	Reduces toxicity	Reduces toxicity	Reduces toxicity and volume	Reduces toxicity and volume
Short-term Effectiveness	No added risk	Little or no added risk during construction and O&M	Little or no added risk during contruction and O&M	Some added risk during construction (<6 months) and O&M until RAOs met (<33 years)	Little or no added risk during constuction and O&M	Some added risk during construction (<6 months) and O&M until RAOs are met (<13 years)
Implementability	Easily implemented	Easily implemented	Easily implemented	Easily implemented, but not site-wide due to geology and property access issues	Easily implemented on Ashland Property; more difficult elsewhere; exper-imental	Easily implemented but not site-wide due to geology and property access issues
Estimated Cost	$0.00	$260,000	$1,176,000	$7,689,000	$3,954,000	$6,301,000

Figure 1



AREA NUMBER	ACREAGE	AREA DESCRIPTION
NON-RESIDENTIAL AREAS		
[1]	158.4	NORTH OF AIRPORT RUNWAY CENTERLINE
[2]	13.1	SOUTH OF AIRPORT RUNWAY CENTERLINE AND NORTH OF HEATH ROAD
[3]	1.3	SOUTH OF HEATH ROAD
[4]	2.3	BETWEEN IRVING WICK DRIVE AND RAMP CREEK
RESIDENTIAL AREAS		
[5]	3.7	WEST OF ENTRANCE TO LICKING COUNTY AIRPORT
[6]	3.5	TRAILER COURT NORTH OF HEATH ROAD
[7]	23.8	SOUTH OF HEATH ROAD AND NORTH OF IRVING WICK DRIVE
[8]	1.1	BETWEEN IRVING WICK DRIVE AND RAMP CREEK
[9]	3.1	IMEDIATELY NORTH OF IRVING WICK DRIVE

NOTES:

1. RESIDENTIAL AREAS TO THE NORTH OF HEATH ROAD (AREAS 5 & 6) ARE PROPOSED TO BECOME NON-RESIDENTIAL (AIRPORT PROPERTY) IN THE FUTURE TO ACCOMMODATE AIRPORT OPERATIONAL REQUIREMENTS.
2. NON-RESIDENTIAL AREAS TO THE EAST OF THE FACILITY PROPERTY WHICH ARE NOT PART OF THE LICKING COUNTY AIRPORT COULD BE DEVELOPED FOR EITHER RESIDENTIAL OR NON-RESIDENTIAL USES IN THE FUTURE.
3. THE AIRPORT BUFFER ZONE INCLUDES A DISTANCE OF 250 FEET FROM THE RUNWAY CENTER LINE WHERE ABOVEGROUND REMEDIATION SYSTEM CONSTRUCTION WOULD BE SEVERELY RESTRICTED.

LEGEND

NON-RESIDENTIAL AREA WITH HYDROCARBON-STAINED SEDIMENT

RESIDENTIAL AREA WITH HYDROCARBON-STAINED SEDIMENT

SCALE, FEET

0 400 800 1600

REFERENCE:

CHAPMAN & LEWIS ENVIRONMENTAL SERVICES, INC. DRAWING FROM: PHASE II SUPPLEMENTAL GROUNDWATER INVESTIGATION REPORT, HEATH, OHIO, MARCH 1998. DRAWING NUMBER ASH001-B138, DATED 10/20/98.

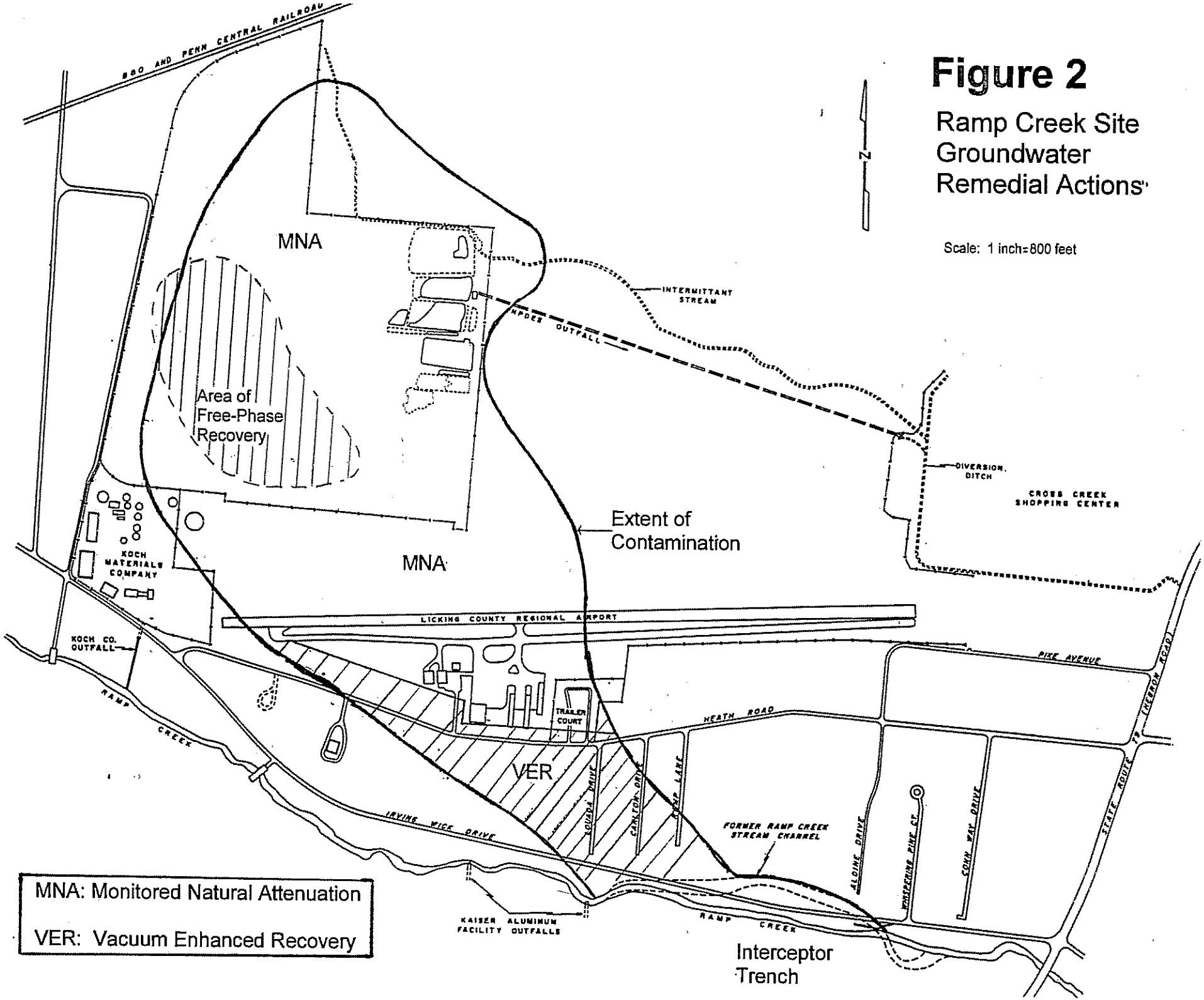


Figure 2

Ramp Creek Site Groundwater Remedial Actions

Scale: 1 inch=800 feet

Attachment 1

Remedial Action Objectives and Possible Response Actions

4.0 REMEDIAL ACTION OBJECTIVES AND POSSIBLE RESPONSE ACTIONS

4.1 Overview

This section presents Remedial Action Objectives (RAOs) and possible response actions for On-Facility and Off-Facility shallow ground water. As stated in Section 1.0, RAOs and corresponding target concentrations presented in this document may be modified based on information identified during subsequent remedial design or remedial action activities if it is determined that they cannot be feasibly achieved. The RAOs and corresponding target concentrations in this document represent goals to be utilized along with other criteria that will be considered in the feasibility study, e.g., implementability, short-term effectiveness, long-term effectiveness, and cost. Constituents of potential concern and associated target concentrations for On-Facility and Off-Facility shallow ground water are identified in Section 5.0.

4.2 On-Facility Shallow Ground Water

The following RAOs have been identified for On-Facility shallow ground water:

a. Prevent migration of constituents of potential concern in On-Facility shallow ground water such that applicable RAOs for Off-Facility shallow ground water will be attained and the timeframe for achieving long-term Off-Facility shallow ground water RAOs will not be adversely impacted.

b. Ensure that current and future On-Facility worker inhalation and dermal contact exposures to 95% UCL on the mean concentrations of constituents of potential concern in On-Facility shallow ground water are within a target risk range of 1×10^{-6} to 1×10^{-4} for individual carcinogens and an HQ range of 0.1 to 1.0 for individual noncarcinogens (see Section 5.0).

c. Ensure that current and future Off-Facility resident and worker inhalation exposures to 95% UCL on the mean concentrations of constituents of potential concern in On-Facility shallow ground water are within a target risk range of 1×10^{-6} to 1×10^{-4} for

individual carcinogens and an HQ range of 0.1 to 1.0 for individual noncarcinogens (see Section 5.0).

d. Prevent potable use of On-Facility shallow ground water unless Maximum Contaminant Levels[1] (MCLs) are met.

e. Prevent adverse impacts on the City of Heath municipal wastewater treatment plant caused by the infiltration of petroleum hydrocarbons in shallow ground water.

The following possible response actions have been identified for shallow ground water:

- Institutional controls
- Monitoring
- *In situ* treatment
- *Ex situ* treatment
- Extraction of light non-aqueous phase liquids (LNAPLs)
- Containment
- No further action

4.3 Off-Facility Area Shallow Ground Water

The following RAOs have been identified for Off-Facility Area shallow ground water:

a. Ensure that the lateral extent of Off-Facility shallow ground water impacted by constituents of potential concern originating from the Facility is not expanding, taking into account factors such as fluctuations in the ground water table and constituent concentrations, sampling and analytical variabilities, and potential sources other than the Facility.

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[1] In this document, Maximum Contaminant Levels (MCLs) correspond to values established by USEPA under the Safe Drinking Water Act.

b. In the residential areas depicted in Figure 1, and in any additional areas developed for residential use in the future, achieve long-term abatement of constituents of potential concern in Off-Facility shallow ground water, with the goal of meeting MCLs within reasonable timeframes. These timeframes will take into consideration actual exposures arising from existing and reasonably expected land and ground water uses in different portions of the Off-Facility Area.

c. In the non-residential areas depicted in Figure 1, and in any additional areas developed for non-residential use in the future, achieve long-term abatement of constituents of potential concern in Off-Facility shallow ground water such that worker exposures to 95% UCL on the mean concentrations of constituents of potential concern in shallow ground water are within a target risk range of 1×10^{-6} to 1×10^{-4} for individual carcinogens and an HQ range of 0.1 to 1.0 for individual noncarcinogens for permissible ground water uses (see Section 5.0).

d. Until ultimate target concentrations consistent with Section 4.3(b) are achieved, ensure that current and future Off-Facility resident inhalation, ingestion, and dermal exposures to 95% UCL on the mean concentrations of constituents of potential concern in Off-Facility Area shallow ground water are within a target risk range of 1×10^{-6} to 1×10^{-4} for individual carcinogens and an HQ range of 0.1 to 1.0 for individual non-carcinogens for permissible ground water uses (see Section 5.0).

e. Until ultimate target concentrations consistent with Section 4.3(c) are achieved, ensure that current and future Off-Facility worker inhalation and dermal contact exposures to 95% UCL on the mean concentrations of constituents of potential concern in Off-Facility Area shallow ground water are within a target risk range of 1×10^{-6} to 1×10^{-4} for individual carcinogens and an HQ range of 0.1 to 1.0 for individual non-carcinogens for permissible ground water uses (see Section 5.0).

f. Prevent adverse impacts on the City of Heath municipal wastewater treatment plant caused by infiltration of petroleum hydrocarbons which originated at the Facility.

The following possible response actions have been identified for the shallow ground water:

- Institutional controls;
- Monitoring;
- *In situ* treatment;
- *Ex situ* treatment;
- Extraction of light non-aqueous phase liquids (LNAPLs);
- Containment; and
- No further action.

Appendix A

Responsiveness Summary and Public Comments

Responsiveness Summary on Comments Received on the Preferred Plans for the Ground water and Impoundment Area at the Ramp Creek Site, Heath, Ohio.

The Van Voorhis Trust Comments*

Comment 1*: *The principal flaw of the ground water plan is its imposition upon innocent down-gradient landowners of the burden of enduring contamination on their property for a very long period of time. Response: The burden of contamination on down gradient property owners was not imposed by the Preferred Plan; rather, it already exists. The Preferred Plan simply identifies Ohio EPA's preferred method of addressing the ground water at this site. See Ohio EPA's response to Comment 3 below for the remediation time-frame on Van Voorhis Property.

Comment 2: Natural attenuation is unsuitable where the ground water will be disturbed due to construction during the period prior to achievement of remedial action objectives. Response: According to the *Human Health and Ecological Risk Assessment*, the risk to construction workers from contact with contaminated ground water and sediments is within acceptable standards. However, since there are uncertainties associated with risk assessments, workers will need to take precautions if they excavate in the affected area.

Comment 3: Ohio EPA's remedy selection criteria favor active remediation of ground water contamination on the Van Voorhis property. Response: According to Ohio EPA's remedy selection criteria, the principal difference between monitored natural attenuation (MNA) and active remedial technologies are that active measures have the potential to reduce the remediation time-frame. Whether or not active measures will actually reduce the remediation time-frame on Van Voorhis property is not known at this time.

There is, apparently, some misunderstanding of the predicted MNA remediation time-frame in the northern area of the contamination. The forty-two year time-frame is predicted for the center of the plume, not for the entire site. The affected part of the Van Voorhis property is on the northern and eastern fringe of the plume. According to the Natural Attenuation Time Frame Model, the remediation time-frame is predicted to be achieved in 13-17 years (based on study area data for the northern portion of Ashland, Inc. property). Considering the current and anticipated future land use, and the fact that the Van Voorhis property currently meets risk-based remedial action objectives (RAOs), this is considered a reasonable time-frame.

Comment 4: The selection of monitored natural attenuation for the Van Voorhis property does not conform to US EPA's recent directive on the appropriate use of that remedy. Response: Ohio EPA uses the US EPA's Directive 9200.4-17P as guidance in evaluating the appropriateness of MNA in nonresidential areas. Ohio EPA concluded that the nonresidential area of this site meets the criteria set forth in the guidance. Ohio EPA considered the current and

potential use of ground water and the reliability of institutional controls when evaluating MNA. This is consistent with US EPA's directive. Ground water is not currently being used on Site, and it is not likely that it will be used in the near future because the city of Heath supplies water in the area, and Heath Ordinance 100-93 prohibits its use. While the estimated remediation time-frame of 13-17 years for the Van Voorhis property is considered reasonable, there is some uncertainty. However, this is only one factor that is considered when balancing many factors. The uncertainty factors at this site are not a sufficient reason to eliminate MNA as a remedial alternative.

Some residual petroleum hydrocarbons may remain in the smear zone below Van Voorhis property after the BTEX biodegrades, but the concentrations will not likely exceed human health risk criteria. Should an appreciable volume and concentration of heavier constituents remain in the subsurface on Van Voorhis property and pose an unacceptable risk, then additional actions will be considered and implemented through the contingent remedy process.

Comment 5: The contingent remedy of shifting to active remediation is not sufficient to justify the selection of natural attenuation. Response: The contingent remedy process is not a justification for any remedial alternative. The contingent remedy process is inherent in all remedial actions in the event that the remedial alternative does not perform as anticipated or the situation at the site changes. At this site the contingent remedy process is identified now, as opposed to when it might be needed.

Comment 6: The impoundments are a current source of ground water contamination beneath the Van Voorhis property and should be removed for the following reasons: (1) the bases of the impoundments are in contact with ground water and leach contaminants; (2) highly contaminated soils surround the impoundments and are a continuing source of hydrocarbons to the ground water; and (3) free-product occurs in lenses in the soil around the impoundments and is a source of hydrocarbons to the ground water. Alternative 3 will not prevent contaminant migration to ground water, and the impoundment area will continue to pollute Van Voorhis property, if this alternative is implemented. Response: The bases of the impoundments are occasionally in contact with the ground water, so it is possible that the impoundments leach contaminants to the ground water. The data obtained during the site investigations indicate that the impoundment area is not a significant source of ground water contamination relative to the smear zone. The data indicates the ground water quality is not any worse downgradient from the impoundments when compared to the upgradient ground water quality. Also, the extent of the ground water plume has remained stable over the past several years in the downgradient (east) from the impoundments, which indicates the impoundments are not contributing a significant amount of BTEX. Based on this information, Ohio EPA concludes that the volume of contaminants that leach out has minimal effect on the overall ground water quality in the area.

Ohio EPA has no evidence of highly contaminated soil in the impoundment area. Petroleum-related constituents are found in the soil around the impoundments, but the distribution and

concentration of soil contamination are less than in the smear zone. Therefore, Ohio EPA considers the smear zone as the principal source of ground water contamination in the area. In addition, free product (LNAPL) was not detected in lenses in the soil around the impoundments based on the results of the site investigations. While undetected pockets of free product in the soil may be present, these would be a minor source of ground water contamination relative to the smear zone and the impoundment bottom material. Therefore, there is no evidence to support the allegation that "highly" contaminated soils surround the impoundments and act as a continuing source of contamination. The preferred alternative will address the soil that forms the narrow dikes in between each of the impoundments through consolidation, solidification, stabilization, and a soil cap. Ohio EPA expects that this remedy will further reduce any leaching of contaminants from the soil. Finally, the removal of the impoundment soil and bottom material is not necessary to achieve RAOs and would be an unjustifiable expense.

Comment 7: Free-product occurs around the impoundments. Free-product acts as a continuing source to the ground water, so the estimated remediation time frame is not accurate. MNA is not appropriate where free- product is present, so it needs to be removed. Response: Free product was detected around the north-center pond in monitoring wells MW-21, MW-22, and TW-5. The thicknesses of free product in these wells range from 0.1-1.8 feet. However, the upper aquifer is confined in the impoundment area, so the thicknesses in the well casings are not the true thicknesses in the aquifer. This is because free product enters the well screen and displaces the water above the confining unit. Because the bottom of the free product is above the base of the confining unit in these wells, the true thickness is a thin film and is not measurable.

MW-21, MW-22, and TW-5 were hydrocarbon-recharge tested during June 1994. The free product in MW-21 and TW-5 did not recover and MW-22 recovered slowly during the test, which indicates that the recoverable volume of free-product is small. Based on these results, it does not appear that there is a sufficient volume of recoverable free product in the impoundment area to justify the construction of a free-product recovery system. Ohio EPA agrees that free product removal is an important component of MNA, but it must be feasible to remove it.

Comment 8: The land surface (on Van Voorhis Property) will be greatly altered through pavement, buildings, and other structures when it is developed. This will reduce infiltration and increase the time for natural attenuation to achieve RAOs. Response: Since the affected area on Van Voorhis property is at the northern and eastern fringe of the plume and occupies a relatively small portion of the total plume area, development will not significantly alter infiltration rates and remediation time frames for the site as a whole. Ohio EPA agrees that structures and paving have the potential to alter surface water infiltration locally and may have an effect on the local attenuation rate. However, the smear zone is nearly submerged beneath the water table at the northeastern edge of the plume where most of the affected portions of the Van Voorhis property are located; a vertical dissolution of BTEX by percolating surface water is not as an important attenuation mechanism in that area compared to the southern portion. Based on these area-specific factors, Ohio EPA does not believe that development will significantly

decrease the rate of natural attenuation on the affected portion of the Van Voorhis property.

Comment 9: Methane gas from anaerobic biodegradation creates an unacceptable explosive risk, and this factor was not evaluated or considered in the Preferred Plan. Response: Since the types and locations of structures that may be built on the Van Voorhis property are unknown at this time, the impact of methane cannot be reliably evaluated. Data on the production and movement of methane will be collected during monitoring of natural attenuation processes at the site. Based on previous studies, aerobic processes are expected to be predominant along the fringe of the ground water plume; therefore, production of methane is expected to be relatively low on the Van Voorhis property compared to the axis of the plume. If monitoring shows that methane poses a hazard, then it will be addressed through the contingent remedy process.

Soil-gas profiles indicate that methane degrades within a few feet above the smear zone, so for methane to be a risk, the foundations of buildings would have to be set in or near the smear zone. Finally, there are several structures, including residential housing with basements, currently built over the ground water plume. Explosive gas monitoring has indicated that there is no explosive hazard in these structures. Therefore, Ohio EPA does not anticipate methane to be a problem at this site.

Comment 10: Natural aerobic biodegradation of the hydrocarbons needs to be enhanced by the use of air sparging, introduction of oxygen release compounds and nutrient addition in order to reduce the methane risk. Response: Air sparging was considered in the FS and was eliminated because of implementability issues. Some of the problems with air sparging at this site include the following: high ground water table, local confining conditions, iron precipitation and bacterial clogging, obtaining permits, and overall effectiveness. Artificial nutrient addition may be implementable at a small site, but it is not feasible for a site this large.

Comment 11: The affected portions of the Van Voorhis property could be zoned residential in the future. Response: If land-use changes or the affected portion of the Van Voorhis property is zoned residential, then active remediation methods will be evaluated under the contingent remedy process.

Comment 12: MNA is an economical approach that relies on the Van Voorhis property as a "treatment system" by allowing waste hydrocarbons to migrate and degrade on Van Voorhis property. Response: The Preferred Plan does not allow hydrocarbons to migrate to the Van Voorhis property and degrade; the petroleum hydrocarbons have been beneath the Van Voorhis property for several years. The hydrocarbons are entrained in the smear zone and are the residual left over from releases during refinery operations. The hydrocarbons are, therefore, degrading in place and the BTEX plume will shrink toward its center, which is west of the Van Voorhis property.

Comment 13: Ohio EPA considered the economic cost to the PRPs but did not consider the cost impact to the Van Voorhis. Response: The evaluation criteria are not permitted to take into

consideration the economic impacts to individual land owners when choosing the preferred alternative at remedial response sites. Ohio EPA must choose the most effective remedial alternative that will achieve RAOs for the entire site. See the Preferred Plan for a description of how remedies are weighed and selected.

Comment 14: Van Voorhis recommend free product recovery from the water table using interception trenches and sumps. Response: Ohio EPA agrees that free-product recovery is necessary if a sufficient volume of mobile free product is present, but this is not the case in the impoundment area (See Comment 7). During the 1970's US EPA and the US Coast Guard installed interception trenches and sumps near Ramp Creek in an effort to recover free product from the shallow aquifer. These efforts were generally unsuccessful. In 1991, Ashland/Unocal installed a passive trench system adjacent to Ramp Creek at an active seep area. To date no recoverable free product has ever accumulated in the system. Based on these experiences and the current subsurface conditions at this site, interception trenches and sumps would not be effective in recovering free-product.

Comment 15: Van Voorhis recommend the excavation and on-site treatment of hydrocarbon saturated soils in the impoundment area. Response: Excavation and on-site treatment were considered in the preferred plan, but it was not chosen because it is not the most effective alternative to achieve RAOs. See the Preferred Plan for an explanation of how this alternative compared to the other alternatives.

Comment 16: After free product and soil removal, the natural aerobic biodegradation process should be augmented. Response: If free product removal is feasible, augmenting the biodegradation process may be considered. Enhancement of aerobic biodegradation on Van Voorhis property is not likely to substantially decrease the remediation time-frame because of the high water table and relatively thin smear zone beneath Van Voorhis property.

*Ohio EPA summarized Comment Numbers 6 through 17.

Ashland, Inc. and Union Oil Company of California (Unocal) Comments*

Comment 1: Ashland/Unocal stated that all of the Alternatives, except for Alternative 1 for the Impoundment Area are protective of human health and the environment. Solidification/ stabilization remediation provides additional protection, but is not required to be protective. Response: Ohio EPA agrees that solidification/stabilization may not be required to be protective. However, solidification/stabilization is recommended to improve support of a soil cap and help to reduce possible contaminant leaching to ground water from the impoundment bottom material.

Comment 2: Ashland/Unocal stated that a specific chemical composition for the binding agent should not have been included in the Preferred Plan to maintain flexibility. Response: Ohio EPA referenced the specific chemical composition because that was the most effective mixture based on the results of the pilot-scale studies. Ohio EPA will not reference a specific chemical composition in the Decision Document to maintain flexibility; although the effectiveness of the binding agent that is used must meet the performance standard.

Comment 3: Ashland/Unocal believe that Section 4.0 of the Preferred Plan contains statements that could be misinterpreted to suggest existing conditions present unacceptable risks to human health. Response: Ohio EPA has not identified any such statements in the Preferred Plan.

Comment 4: Ashland/Unocal believe that Section 7.2 of the Preferred Plan can be misinterpreted to imply that there is a potential for expansion of the hydrocarbon affected area. Ashland/Unocal states that studies indicate that the hydrocarbons are not spreading into unaffected areas and that conditions will improve overtime. Response: Ohio EPA agrees that the plume has not been actively spreading and conditions should improve over time for the site as a whole. We do not agree, however, that there is absolutely no potential for the contamination to spread to unaffected areas. There is a potential for unforeseen circumstances where the ground water contamination could spread in an area. That is one of the reasons for continued monitoring until RAOs are met.

Comment 5: Ashland/Unocal state that Section 7.6 of the Preferred Plan is in error concerning propane as a fuel source. The thermal oxidizer will use propane as a temporary fuel, but over the long term natural gas will be the fuel source for the thermal oxidizer. Also, carbon or other technologies may be used for air treatment. Response: Ohio EPA was evaluating the short-term risks when discussing propane. If propane is used as a temporary fuel, then there is some short-term risk associated with its use. This short-term risk was identified in the Preferred Plan.

Comment 6: Ashland/Unocal state that affected properties not currently covered under the city of Heath Ordinance 100-93 do not pose a risk to human health and environment based on current and reasonably expected future land use. Response: The only area of the site that is not covered is the northwest corner of the Van Voorhis property, where no analytical data are

available. Without data, any conclusions regarding this part of the site are conjecture. Field studies will be required to characterize the magnitude and extent of contamination in order to determine the human health and environmental risks.

At the public hearing one resident commented that he recently noticed oil on Ramp Creek on three occasions. On two of these occasions he noticed oil on his dog's fur, and on one occasion he noticed a distinctive rainbow pattern in the creek. Because of this he believes, Ramp Creek should continue to be studied and monitored. Response: Ohio EPA will continue to monitor Ramp Creek for visible oil. It is possible that some LNAPL could seep out into Ramp Creek occasionally, but we have not received any complaints on visible oil in Ramp Creek for several years. Also, water quality investigations of Ramp Creek conducted by Ohio EPA in 1995 did not identify adverse effects to aquatic life from this site. Overall, Ramp Creek meets Ohio Water Quality standards and is described as a very good habitat to an exceptional warm water habitat. One very localized area in the creek sediment did not have as many bottom dwelling species as expected, but Ohio EPA could not determine a specific cause.

Ashland Chemical

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June 2, 1999

Mr. Fred Myers
Ohio Environmental Protection Agency
Division of Emergency and Remedial Response
Central District Office
3232 Alum Creek Road
Columbus, Ohio 43207-3417

Re: Submittal of Comments on Ohio EPA's
Preferred Plans for the Ramp Creek Site

Dear Mr. Myers:

Ashland Inc. and Union Oil Company of California (Companies) have reviewed Ohio Environmental Protection Agency's (Ohio EPA's) April 1999 Preferred Plans for the Impoundment Area and Remediation of Groundwater for the Ramp Creek Site located in Heath, Ohio. Based on this review, the Companies have prepared comments for each of the Preferred Plans. Our comments are provided below.

Preferred Plan for the Impoundment Area

1. Section 6.1 of the Phase III Feasibility Study Report summarized the approved Risk Assessment and stated that materials in the Impoundment Area, under the current and reasonably foreseeable future use of the Facility, do not pose a risk to human health and environment with the possible exception of periodic exposure of individual waterfowl to floating hydrocarbon material. Therefore, all alternatives except Alternative No. 1 are protective of human health and the environment and any remediation conducted provides additional protection to human health and the environment. Thus, while solidification/stabilization of Impoundment Area bottom layer materials is proposed to be undertaken, it is not required to protect human health and the environment at the Ramp Creek Site.

2. Section 9.0 of the Preferred Plan specifies the chemical composition of the binding agent to be used for solidifying/stabilizing bottom layer materials. The Companies believe that the performance standard for the binding material provided in Section 10.0 of the Preferred Plan should be referenced rather than a specific chemical composition. This approach will provide both consistency and flexibility so that the most cost-effective material meeting the performance standards can be used during the solidification/stabilization process.

Preferred Plan for the Remediation of Groundwater

1. The Companies are in general agreement that the Ohio EPA's preferred alternative for remediation of groundwater at the Ramp Creek Site will be cost-effective and protective of human health and the environment.

2. Section 4.0, Results of the Risk Assessment, contains statements that could be misinterpreted to suggest that existing conditions present unacceptable risks under applicable law. However, the approved Risk Assessment did not identify unacceptable risks associated with subsurface hydrocarbons at the site, provided that shallow groundwater is not used as a potable water source. Potable use of shallow groundwater does not currently occur, and is not reasonably expected to occur in the future.

3. In the discussions in Section 7.0 which describe the remedial alternatives, statements were made which could be misinterpreted to imply that there is some potential for expansion of the hydrocarbon-affected area (see, for example, Section 7.2, Overall Protection of Human Health and the Environment, and Short-Term Effectiveness). Although in Section 3.0 (Environmental Conditions), the Ohio EPA stated, "The contamination is not currently spreading or entering Ramp Creek", the Companies also wish to emphasize that studies conducted at the site have demonstrated consistently that subsurface hydrocarbons are not migrating or spreading into unaffected areas and available information indicates that conditions are expected to improve, rather than worsen, over time.

4. The description under Short-Term Effectiveness in Section 7.6 states that "propane is used as a fuel source for the thermal oxidizer, so there will be a propane tank and lines on-site". Although propane may be used on a temporary basis during pilot testing of a vacuum system, natural gas will be used as the permanent fuel source for the thermal oxidizer. Additionally, the Companies wish to clarify that vapor-phase carbon or other technologies may also be used for air treatment, if appropriate.

5. Groundwater underlying properties not currently addressed by the City of Heath Ordinance does not pose a risk to human health and the environment based on current and reasonably expected future land use.

Should you have any questions regarding these comments, please call me at 614/790-4651 or Bob Hopkins of Unocal at 614/882-7670.

Sincerely,

Mark W. Metcalf /AER

Mark W. Metcalf
Ashland Inc.

MWM:AER:hms

cc: R. Hopkins, Unocal
J. Rego, Jones, Day, Reavis & Pogue
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HAND DELIVERY

June 2, 1999

Fred Myers
Central District Office
Ohio EPA
3232 Alum Creek Drive
Columbus, Ohio 43207

Re: Ramp Creek Site---Preferred Plan

Dear Fred:

I have enclosed comments in opposition to the preferred plans for ground water and for the impoundment area at the Ramp Creek Site (Heath Refinery) submitted on behalf of the owners of the Van Voorhis Property located to the north and east of the refinery.

Thank you for your consideration of the enclosed.

Yours truly,

David E. Northrop

David E. Northrop

cc: Jessica Ditullio (w/encl.)
Margaret A. Malone (w/encl.)
John A. Rego (w/encl.)
Richard P. Fahey (w/encl.)

RAMP CREEK SITE
HEATH, OHIO

COMMENTS OF THE OWNERS OF THE VAN VOORHIS PROPERTY IN OPPOSITION TO THE PREFERRED PLANS FOR THE REMEDIATION OF THE IMPOUNDMENT AREA AND THE GROUND WATER

I. INTRODUCTION

These comments are offered in accordance with Ohio EPA's public notice of April 23, 1999, by the owners of the Van Voorhis Trust property that abuts the Heath Refinery property to the north and east. The joint owners of the property are Bank One Trust Company, N.A., as trustee of the Van Voorhis Trust, and two individuals, Susan Christiansen and Sally Rogers (referred to below collectively as "the Van Voorhis owners"). The Van Voorhis owners oppose both remedies, and request Ohio EPA to reconsider both as insufficient to achieve remedial action goals on the Van Voorhis property at the earliest practicable time.

This document, authored by legal counsel for the Van Voorhis owners, sets forth a general discussion of the flaws in the preferred plan for ground water. These comments are amplified in the attached comments prepared by the Van Voorhis owners' technical consultant, Michael E. Renz of Renz and Associates. Mr. Renz' comments also address the flaws in the preferred plan for the impoundment area.

For the reasons set forth below and in the attached, the Van Voorhis owners urgently request Ohio EPA to reconsider both preferred plans, and to substitute for them plans better suited to a prompt and effective remediation of both areas.

II. THE PRINCIPAL FLAW OF THE GROUND WATER PLAN IS ITS IMPOSITION UPON INNOCENT DOWNGRADIENT LANDOWNERS OF THE BURDEN OF ENDURING CONTAMINATION ON THEIR PROPERTY FOR A VERY LONG PERIOD OF TIME.

The petroleum hydrocarbon contamination that has flowed in the ground water from the refinery onto neighboring properties is the result of the refinery's faulty design and maintenance of the impoundments in the "impoundment area". Had the refinery owners properly managed the impoundments, and spent sufficient funds to prevent the loss of petroleum into the ground water, the neighboring property owners would not have the accute problem of carcinogenic compounds in the soil and ground water on their property. The refinery owners' failure to expend sufficient funds to prevent this problem is the sole cause of the problem. They are solely at fault. And yet the preferred plan for ground water---solely to save the refinery owners money---proposes to allow the refinery owners to dispense with active remedial measures on the Van Voorhis property. The

lack of such measures will allow hazardous conditions to remain on the Van Voorhis property for an estimated period of forty-two years. By contrast, according to the agency's ground water preferred plan document, the active remedial measure of vacuum enhancement will achieve remedial action objectives elsewhere in the impacted area in less than thirteen years. Other active remediation methodologies may work even faster.

Why then must the Van Voorhis owners endure these conditions for so long? According to the discussion on pages 11 through 13 in the ground water preferred plan document, there appears to be no technical infeasibility of wider use of vacuum enhanced remediation. Property access is noted as a potential problem, but it is not an impediment for areas where the owners are willing to grant access. That leaves only cost. But why should the refinery owners---who have no financial difficulty in paying more to clean up their mess---be allowed to save money, when they are the sole cause of this problem? And why should the Van Voorhis property owners bear the burden of this contamination for decades merely to save the refinery owners money? There are no satisfactory answers to these questions. To adopt a passive remediation plan for this area simply to save money is enormously unjust to the downgradient landowners. Moreover, the preferred plan sets a very dangerous precedent in Ohio EPA's property remediation program that will be relied upon by future soil and ground water polluters in an effort to minimize remediation costs. If the preferred plan is not altered, Ohio EPA will most likely regret setting such a precedent.

III. NATURAL ATTENUATION IS UNSUITABLE WHERE THE GROUNDWATER WILL BE DISTURBED DUE TO CONSTRUCTION DURINGTHE PERIOD PRIOR TO ACHIEVEMENT OF REMEDIAL ACTION OBJECTIVES.

Natural attenuation is unsuitable on the Van Voorhis property due to plans to develop the property. The property is agricultural now, but it will not be so for very long. The Van Voorhis owners and the City of Heath are working on a comprehensive development plan for the property that will result in substantial construction on the property within the next five to twenty years. Thus, the contaminated ground water will not remain undisturbed. Construction and utility workers will come into contact with it in the process of dewatering for, and performance of, foundation construction and utility line installation. The presence of the benzene and other dangerous compounds in the ground water will present a hazard when that occurs. Thus, where natural attenuation may make sense if the ground water will not be disturbed during the period prior to achieving remedial action objectives, it certainly does not make sense on the Van Voorhis property where substantial subsurface disturbance will occur in the near term.

IV. OHIO EPA's REMEDY SELECTION CRITERIA FAVOR ACTIVE REMEDIATION OF GROUND WATER CONTAMINATION ON THE VAN VOORHIS PROPERTY.

Ohio EPA's eight criteria for selecting a remedy, taken as a whole, favor active remediation of ground water on the Van Voorhis property. Of the eight, only one, cost, favors natural attenuation. Another, community acceptance, is difficult to judge at this time, although it is reasonable to assume that the community would prefer quicker achievement of remedial action objectives through active remediation, especially since that would likely result in quicker economic development of the property and the resultant creation of jobs. Two, long term effectiveness and implementability, are essentially satisfied by both remedial approaches. Once remedial action goals are achieved by either method, and if the source of the contaminant "plume" is removed, both approaches will be effective in the long term. And, both are implementable.

The remaining four criteria---overall protection of human health and the environment; compliance with regulatory requirements; reduction in toxicity, mobility, and/or volume through treatment; and short-term effectiveness---all strongly favor active remediation.

Overall protection of human health and the environment. Natural attenuation, under the current estimate, will attain remedial action objectives (i.e., concentrations of contaminants that are considered non-hazardous to human health under non-residential exposure assumptions) in forty-two years. Vacuum enhanced remediation or another active remediation method will work much quicker in achieving objectives. The preferred plan document estimates a compliance period of eight to thirteen years in residential areas with lower concentration objectives using VER. Thus, that time frame may be even shorter in areas that are currently non-residential. Clearly, human health and the environment are better protected the sooner the hazard is removed, thus strongly favoring active remediation. In addition, as noted above, ground water on the Van Voorhis property will be disturbed through construction well before forty-two years elapse. That construction will present a potential hazard. Thus, to avoid such a hazard, non-hazardous concentrations should be achieved, if possible, prior to such human exposure to the ground water. Thus, this criterion strongly favors achieving remedial action objectives as soon as possible through employment of active remediation of ground water.

Compliance with regulatory requirements. This is, again, a question of how to attain clean water goals the quickest, and thus restore the quality of ground water to that required by law. Compliance in forty-two years should be unacceptable to Ohio EPA, when compliance can be achieved much sooner.

Reduction of toxicity, mobility, or volume through treatment. Natural attenuation involves no treatment. Active remediation does. This criterion thus favors active remediation.

Short-term effectiveness. This criterion favors a method that abates hazardous conditions quickly, and achieves remedial objectives as soon as practicable. Active remediation is clearly preferred on this criterion.

Given this clear preference of the selection criteria for active remediation, it is very difficult to understand why Ohio EPA has proposed to select passive natural attenuation in the non-residential properties, including the Van Voorhis property. There can be but one explanation. Ohio EPA has elevated the cost criterion to a position that is more important than the others combined, including the protection of human health during the forty-two year passive remediation period. This might be understandable if the refinery owners had limited funds available for remediation, or if the likelihood of human intrusion into the ground water during the forty-two year period was remote. But neither is true. The refinery owners are surely financially capable of funding active remediation throughout the impacted area. And, the protection of human health requires as prompt achievement of health-protective standards as possible.

Ohio EPA should discard its result-oriented evaluation of the remedy selection criteria, and apply them rationally and objectively to require active remediation on all properties containing ground water that is not compliant with remedial action objectives.

V. THE SELECTION OF MONITORED NATURAL ATTENUATION FOR THE VAN VOORHIS PROPERTY DOES NOT CONFORM TO USEPA'S RECENT DIRECTIVE ON THE APPROPRIATE USE OF THAT REMEDY.

On April 21, 1999, USEPA issued a directive authored by its Office of Solid Waste and Emergency Response entitled, "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites", (Directive Number 9200.4-17P). The purpose of the directive is to describe those circumstances in which selection of natural attenuation as a remedy for soil and ground water contamination is appropriate. The directive, as applied to the Van Voorhis property, dictates against use of natural attenuation.

The directive recognizes that monitored natural attenuation (referred to in the directive as "MNA") can be an appropriate remedy, but only "under a limited set of site circumstances" (Directive, at 25). The directive notes that MNA has important disadvantages, including the length of time needed to attain remedial action objectives, and the need for "institutional controls" to prevent exposure to the contamination during the remediation period (Directive at 10). Thus, the directive provides that those sites where MNA is appropriate are those at which

the timeframe to complete remediation "is reasonable . . . compared to timeframes required for other more active methods", and is inappropiate at sites where "human health . . . may be adversely impacted as a consequence of selecting MNA as the remediation option." (Directive, at 17). As to the Van Voorhis property, both points dictate against natural attenuation. The remediation time frame of forty-two years is clearly unreasonable when compared to vacuum enhanced remediation of less than one-third of that time. And, as noted above, construction on the property will involve human exposure to the contaminants during the remediation period. Indeed, at page 12, the directive reasserts USEPA's continuing commitment to a remedy selection criterion of "prevent[ing] exposure to the contaminated groundwater". Both factors render natural attenuation unsuitable for this site.

Other provisions of the directive illustrate the impropriety of natural attenuation in this circumstance. As to the assessment of whether the remediation time for MNA is reasonable, the directive indicates that uncertainty in estimating that time frame is a negative factor that dictates against selection of MNA (Directive at 20). Ohio EPA's preferred plan document indicates the agency's lack of confidence in the accuracy of the forty-two year estimate by providing for implementation of a "contingent remedy" if the pace of the remediation is too slow. Thus, the time needed for MNA to achieve nonhazardous levels of contamination may prove to be longer than forty-two years, and thus even more unreasonable.

As to human exposure to contaminants, the directive addresses petroleum contamination as uniquely inappropriate for MNA if there is any likelihood of human contact with the contamination. The directive, at page 7, describes a residue of "heavier petroleum hydrocarbons", often left after remediation of the BTEX compounds, that pose a hazard if contacted by humans, and may continue to leach to ground water. The directive states, "For these reasons, MNA alone is generally not sufficient to remediate petroleum release sites. Implementation of source control measures in conjunction with MNA is almost always necessary. Other controls (e.g., institutional controls), in accordance with applicable state and federal requirements, may also be necessary to ensure protection of human health and the environment." This reference to "institutional controls" means the prevention of human access to the contamination through restrictions on use of the site or by other means. The Van Voorhis property, however, has no such restrictions, and, indeed, development plans will make human exposure to the ground water likely. In these circumstances, as indicated by the directive, MNA is inappropriate.

The directive also emphasizes that MNA is appropriate only if the source of the contamination is eliminated so as to prevent further migration of contaminants into the area undergoing MNA (Directive, at 21, 22). The attached comments of Mr. Renz raise serious questions regarding the sufficiency of

source control at this site, due to inadequacies in the lagoon remediation plan. Those inadequacies are another reason to reject MNA at this location.

Ohio EPA should carefully review the directive prior to choosing a remedy at this site, and should conclude that natural attenuation is inconsistent with the directive and thus inappropriate for this site.

VI. THE CONTINGENT REMEDY OF SHIFTING TO ACTIVE REMEDIATION IS NOT SUFFICIENT TO JUSTIFY THE SELECTION OF NATURAL ATTENUATION.

The preferred plan, at 15 and 16, discusses contingent remedies to be employed if the remedies chosen in the preferred plan do not perform as expected. This implies that if natural attenuation is not reducing contaminant concentrations at the predicted rate, Ohio EPA will require the refinery owners to shift to an active remediation method such as vacuum enhancement. This, however, is insufficient to justify natural attenuation, for, as a practical matter, it may not significantly accelerate achievement of remedial action objectives. The preferred plan states that vacuum enhanced remediation will achieve objectives in less than thirteen years, as compare to forty-two years for natural attenuation. But several years---perhaps ten or more---may pass before Ohio EPA concludes that attenuation is proceeding too slowly. Then, additional years will be devoted to negotiations, dispute resolution and contingent remedy design prior to implementing the active remedy. Thereafter, the active remedy will be implemented for up to thirteen additional years. The result of all this is that it may be well over twenty years---even as long as thirty---before the contingent remedy achieves objectives. This compares poorly to the lesser time frame involved in employing active remediation in the first instance. Thus, the presence of such a contingent remedy as a "backup" to natural attenuation is of little value to the Van Voorhis owners, and is insubstantial support for the choice of natural attenuation as the preferred remedy.

VII. CONCLUSION

Natural attenuation has considerable cost advantages to the refinery owners, but nearly nothing else positive to support its choice. Cost savings to the companies that caused this problem is insufficient to support a remedy that forces the property owners to endure the presence of the companies' contaminants for over forty years. More importantly, construction and utility installation on the Van Voorhis property will disturb the ground water and cause human exposure to it, thus rendering natural attenuation unsuitable.

These reasons, and those discussed in the attached comments of Mr. Renz, should cause Ohio EPA to require active remediation of the Van Voorhis property.

Respectfully submitted,

DATED: June 2, 1999

David E. Northrop

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RE: Ramp Creek Site, Heath, Licking County, Ohio
Comments Regarding Ohio EPA Preferred Plans
for the Remediation of Impoundment Area and Ground
Water at the Ramp Creek Site, Heath, Ohio, April 1999

Dear Mr Northrop.

In accordance with your request I have reviewed the Preferred Plans for the Impoundment Area and for the Remediation of Ground Water for the Ramp Creek Site in Heath, Ohio. The purpose of this effort was to determine how the preferred plans would impact the Van Voorhis family's land which adjoins the refinery and is considered part of the Site. The presence of petroleum impacted soil and ground water on the Van Voorhis family property presents a number of practical problems and impediments to the planned development of the land. The depth to ground water and the "Smear Zone" of the soil in which petroleum contamination are present is very shallow. Measurements on-site indicate that the ground water is as little as two feet below grade in the area directly down-gradient from the impoundments. As a result, petroleum contaminated materials will be encountered during site development activities such as excavation or cut and fill operations. Soil generated in the impacted areas will require chemical characterization, special transportation, staging and storage procedures and treatment and/or disposal. The presence of petroleum contaminants at such shallow depths limit the land use options. These impacts of the release are not considered by the Ohio EPA Preferred Plans.

Impoundment Area

The Van Voorhis property is situated immediately down-gradient from the refinery property. As a result the property has been impacted by the release of contaminants from the refinery. The specific sources of contamination were never identified, however, two known sources remain: the impoundments containing liquids and sludge and the fugitive petroleum in the soils and ground water. Abatement of these known sources is vital to the restoration of the Van Voorhis family's property as contamination will continue to cross the property line and impact the site. Therefore removal of these continuing sources of contamination is needed to restore the Van Voorhis land within a reasonable period of time. The depth to ground water in the area of the impoundments is approximately two to three feet below grade. As a result, the impoundments and their contents are in contact with the ground water. Effective hydraulic communication between the contents of the impoundments and the shallow ground water is apparent by the fact that the fuel wastes have been migrating out of the impoundments and into the ground water. Free product has been previously detected around the impoundments and is likely to still be present in lenses around the impoundments.

The Ohio EPA Preferred Plan for the Impoundment Area (Alternative 3), consists of de-watering, stabilizing the contents with binding agents, skimming off the floating hydrocarbons and installing a cap Institutional controls, including deed restrictions, are planned to be used as well This option does not remove the highly contaminated soils around the impoundments These soils are likely to be saturated with fuel wastes and will be a continuing source of contamination Based on the fact that free product was detected in down-gradient wells on the Van Voorhis property, it is probable that free-product is present around the impoundments The presence of free-product around the impoundments has not been ruled out and is not addressed by the preferred plan

If the cap extends beyond the limits of each impoundment, the flux of water infiltrating through the surrounding soils will be reduced However, these residual materials will still be exposed to ground water and contaminants will be advected down-gradient onto the Van Voorhis property This option will also not achieve the Remedial Action Objectives in this area as it does not treat the surrounding soils

Ground Water

The Ohio EPA Preferred Plan for the Remediation of Ground Water for the Van Voorhis Property is Monitored Natural Attenuation

The Ohio EPA preferred remedy should be reconsidered for a number of reasons The estimated time frame for natural attenuation is 42 years This is an extremely long time frame for remediation and the estimate does not take into account the presence of free-product around the impoundments The mass of petroleum present as free-product has not been determined and therefore the prediction of the remedial time frame is likely to be underestimated Furthermore, the estimated time frame for natural attenuation is based upon the assumption that precipitation will be free to penetrate the soils and leach fuel compounds from the smear zone into the ground water where they will be biologically degraded The off-site area will be developed in the near future and the land surface will be greatly altered through pavement, building foundations and other structures which will dramatically reduce infiltration Therefore the time for natural attenuation to achieve the ultimate Remedial Action Objectives is likely to be significantly greater than predicted

The evaluation of the remedial options does not take into account the fact that free-product has been detected around the impoundments and may be present on the Van Voorhis property Natural Attenuation is not appropriate when free-product is present and acting as a source for continuing dissolution of hydrocarbons into ground water Recovery of hydrocarbons in the form of free-product yields the greatest environmental benefit per unit cost of all remedial methods and therefore should be employed The removal of free-product and highly contaminated soils from the source area will greatly reduce the remedial time frame at a relatively reasonable cost

The studies performed on the site have shown that natural degradation has been taking place under anaerobic conditions Anaerobic degradation produces methane gas and is much slower than aerobic degradation When the Van Voorhis land is developed, methane will accumulate under the paved

surfaces and building foundations and may intrude into the structures Although methane is not toxic or carcinogenic, it is a flammable gas and a simple asphyxiant The impacts and risks associated with this degradation product once the adjoining Van Voorhis property is developed have not been considered Enhancing the natural degradation process and facilitating aerobic break down of the hydrocarbon contamination would reduce the amount of methane generated and significantly reduce the remedial time frame The only method of enhancement considered by the Preferred Plan is the induction of air into the subsurface by Vacuum Enhanced Recovery (VER) Induction of air or "BioVenting" is an associated benefit of VER, and not its primary function The natural degradation process could be augmented with simpler and less costly methods such as air sparging or the injection of oxygen releasing compounds and nutrients The extremely shallow depth to ground water and geology of the site in the up-gradient area makes the use of such methods practical Augmented natural attenuation would also be less susceptible to disruption by the effects of development of the Van Voorhis property

As indicated on Figure 2 of the Ohio EPA Preferred Plan for the Remediation of Ground Water, the Van Voorhis property constitutes a large portion of the impacted, off-site area As such, the remediation of this area should be given greater consideration Although the use of the airport will not likely be residential, the use of the Van Voorhis property as residential land cannot be ruled out Given the apparent rate of population growth in Licking County, a wide number of development and land use options is possible

Recommendations

The remedy currently preferred by Ohio EPA presents a very economical approach to the task of remediating the release However, the method basically relies on the Van Voorhis property as a treatment system by allowing the residual wastes to migrate into the ground water and be carried off the refinery site to degrade on the adjoining property Although significant consideration was given to the economic cost relative to the oil companies, no consideration of the cost impact on the adjoining land owner was included in the evaluation of remedial options

I recommend that Ohio EPA be requested to require that location and volume of free product be determined around the impoundment area and along the fence line This can be easily and quickly accomplished by the use of a Geoprobe™ and the installation of temporary wells It should be noted that due to the viscosity of free-product, phase separated hydrocarbons will not immediately appear in the wells and some period of time must be allotted for the material to accumulate The occurrence of the free-product is likely to be discontinuous in the form of lenses and this should be considered when exploring the extent of free-product Free-product should be recovered from the water table Due to the shallow depth of ground water, simple recovery devices like interception trenches and sumps can be practically installed Areas where the soil is saturated with hydrocarbons, excavation and treatment of the impacted soil should be considered On-site treatment of petroleum contaminated soil is a straight forward process and generally not cost prohibitive Highly impacted soils could be excavated and stockpiled on the refinery property and treated through enhanced biological degradation

With the free-product and grossly contaminated soil removed, the natural degradation process should be augmented to facilitate aerobic decay. A broad range of augmentation methods should be considered such as installing a trench infiltration gallery for the injection of oxygen releasing compounds and nutrients or the installation of air sparging units.

Respectfully submitted,
Renz & Associates, Inc

Michael E. Renz
Geologist

OHIO ENVIRONMENTAL PROTECTION AGENCY

PUBLIC MEETING

REGARDING: RAMP CREEK PREFERRED PLANS

- - -

Heath Municipal Building
1287 Hebron Road
Heath, Ohio
Wednesday, May 26, 1999
6:30 p.m.

- - -

Met, pursuant to assignment, at 6:30 p.m.

BEFORE:

Ms. Tracy Freeman, Public Hearing Officer.

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- - -

Wednesday Evening Session,
May 26, 1999.

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HEARING OFFICER FREEMAN: I'd like to welcome everyone to the public hearing portion of tonight's meeting. The purpose of this hearing to is accept comments for the official record regarding the proposed preferred plans for remediation of petroleum contamination at Ramp Creek in Licking County, Ohio.

There are two preferred plans proposed, one for cleanup of petroleum-based contaminants that accumulated in the bottom of five surface impoundments, the other is for groundwater contamination affecting the City of Heath, the sanitary sewer system and water falling near the Ashland facility. Additional details of the proposal are outlined on the fact sheet available at the sign-in table. Complete copies of the preferred plans can also be obtained through Mr. Myers.

Oral comments received at tonight's hearing and written comments received during the public comment period will receive the same consideration. Written comments should be directed to Ohio Environmental Protection Agency, Central District Office, attention Fred Myers, 3232 Alum Creek Drive, Columbus, Ohio 43207. This address is also printed at the bottom of

the agenda for tonight's meeting.

All written comments must be received by the close of business on June 2nd, 1999.

There is no question-and-answer period during tonight's public hearing session. These hearings are held to allow citizens the opportunity to provide input to Ohio EPA's decision-making process.

All testimony is recorded on the official record by a court reporter. If you have a question, please include it in your testimony and your questions, along with your comments, will be responded to in writing.

The Responsiveness Summary will be provided to everyone who attended tonight's hearing and also to those providing written comments. Ohio EPA will review all comments received during the comment period and at tonight's meeting before a staff recommendation is made to the director of Ohio EPA. All final decisions are appealable to the Environmental Review Appeals Commission, which is a separate board from Ohio EPA that reviews cases in accordance with Ohio's laws and rules.

An order issued by the Environmental Review Appeals Commission may be appealed to the Court of Appeals of Franklin County. Lots of "appeals" in that sentence.

If you would like to present testimony at the hearing and have not filled out a blue card, I would ask you to do so at this time. I will call the names on the cards in the order in which I receive them.

A court reporter is here to make a stenographic record of tonight's proceedings. When I call your name, I would ask that you stand, state your name for the record and then proceed with your testimony.

Everyone will have one opportunity to testify, so I would ask that you use your time wisely. You are limited to ten minutes. I will let you know when your time is almost up, if you get close, so that you can complete any concluding remarks.

The only card that I have at this time is from Mr. Frank Hartzell. You can either come up here or you can stay at your seat, it's up to you, as long as the court reporter can hear you.

MR. HARTZELL: I live at 1257 Hebron Road, and so just hearing this I thought I should offer what I knew about it, which I take the dog for a walk every day up the back here along City Hall along Ramp Creek, so I go along Ramp Creek a lot.

I've seen oil on Ramp Creek on three occasions. The dog one day, it was during the winter, went in the water, it was ice on the water but the river was up, and

he come back with a whole bunch of oil stuck in his fur. I had to take him home and get the oil out of his fur. I didn't know anything about this at that time.

Another time he had a little bit on him when I got back, and it was also high water. But just about two weeks ago I took my mountain bike and went through there and I was rolling through and I saw some distinctive pattern of rainbow come up when I was going along there, you know. It was about two weeks ago, and I hadn't even heard about this yet.

So that was my -- what I wanted to give as input. So I think you should continue to look at Ramp Creek.

HEARING OFFICER FREEMAN: Do we have any other citizens that wanted to make comments or testimony for the official record?

(No response.)

HEARING OFFICER FREEMAN: Okay. Well, seeing no further requests to present testimony, I would like to remind you that the public comment period, again, is open through the close of business on June 2nd, which means you may submit any written comments through till 5:00 on that day.

Also, you may review the plans and related materials at Ohio EPA's Central District Office in

Columbus by calling Mr. Myers at the Division of Emergency & Remedial Response, the number is located at the bottom of the fact sheet available at the registration table.

As I stated before, we will be around for a few minutes after the meeting, go through some of the maps and explain anything if you have questions you'd like answered.

I would like to thank you very much for attending tonight's meeting. We really do appreciate your input into the decision process, and all comments are taken very seriously. Thank you, and good night.

(The hearing concluded at 7:42 p.m.)

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CERTIFICATE

I do hereby certify that the foregoing is a true and correct transcript of the proceedings taken by me in this matter on Wednesday, May 26, 1999, and carefully compared with my original stenographic notes.

Maria DiPaolo Jones

Maria DiPaolo Jones, Registered Diplomate Reporter and CRR.

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