OhioEPA

*State of Ohio*
*Environmental Protection Agency*

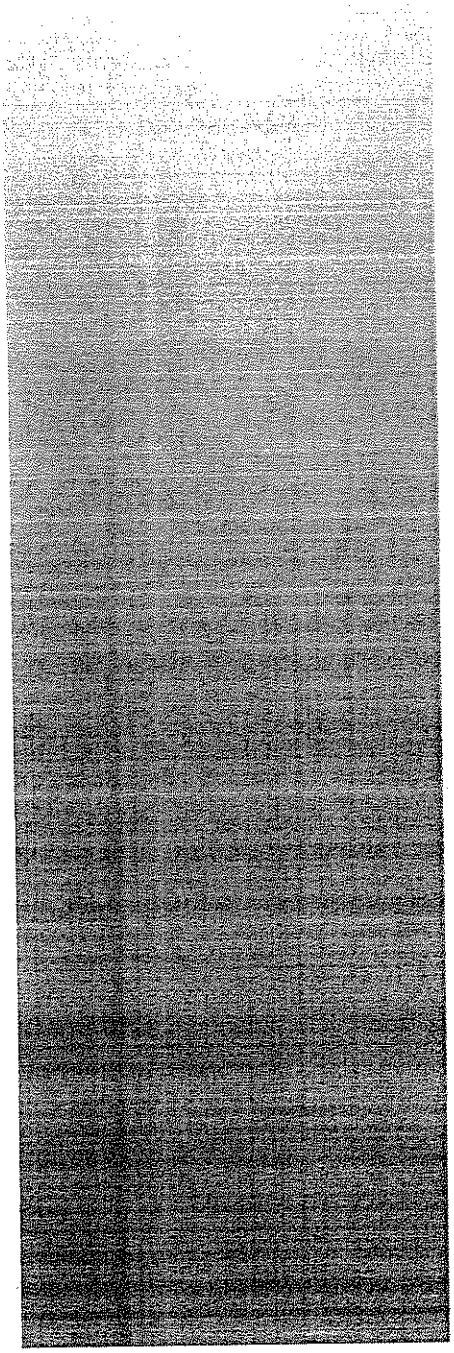


**Division of Emergency and Remedial Response**

# DECISION DOCUMENT

## FOR THE REMEDIATION OF
## Marathon Oil Bulk Plant #0279
## Sandusky County, Ohio

**prepared by**
**THE OHIO ENVIRONMENTAL PROTECTION AGENCY**



**Date:** December 2008

Ted Strickland, Governor
Chris Korleski, Director, *State of Ohio Environmental Protection Agency*

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

By: _____ Date: 12-23-08

# DECLARATION

## SITE NAME AND LOCATION

The former Marathon Oil Bulk Plant
2416 West State Street, Fremont, Sandusky County, Ohio.

## STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the former Marathon Oil Bulk Plant in Fremont, Sandusky County, Ohio, chosen in accordance with the policies of the Ohio Environmental Protection Agency, statutes and regulations of the State of Ohio, and the National Contingency Plan, 40 CFR Part 300.

## ASSESSMENT OF THE SITE

Marathon began operations at the Site in 1954 as a storage facility consisting of above ground storage tanks (ASTs) used to store leaded and unleaded gasolines, diesel fuel, heating oil and lubricating oil. These petroleum products were temporarily stored at the Site and transported by truck to retail outlets and privately owned locations. The facility ceased operations in 1989, and the facility was decommissioned in 1991.

On January 23, 1995, a Consent Order was issued by Ohio EPA to Marathon Oil Company also known as Marathon Ashland Petroleum LLC (Marathon). The Consent Order established cleanup levels for benzene, toluene, ethylbenzene, and xylenes in both soil and ground water and lead in ground water. A remedial investigation/feasibility study (RI/FS) was completed at the Marathon facility to comply with this Order.

Sources of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) detected in soil and ground water beneath the facility appear to originate from one source area at the Site. This source area is within or near the former AST area, where seven ASTs were formerly located (referred to as the "former AST area"). The former AST area was identified prior to the RI as the only potential source of contamination. Constituents of concern (COCs) associated with the facility are benzene, toluene, ethylbenzene, and xylenes (BTEX) in both soil and ground water, and lead in ground water.

## DESCRIPTION OF THE SELECTED REMEDY

The selected remedial action includes:

- Monitored natural attenuation;
- Ground water monitoring program, including data evaluation;
- Monitoring well abandonment;

- Reporting;
- Risk management plan (RMP) for protection of construction and excavation workers from exposure to contaminated subsurface media;
- Environmental covenant to establish activity and use limitations.

More specifically, the components of the selected remedy consist of the following: monitoring well abandonment (abandonment of monitoring wells that will not be used for the purpose of collecting ground water samples); collection of ground water samples on a semiannual basis for the first three years and on an annual basis for two more years. It will also consist of implementation of an environmental covenant, in general, to prohibit excavation of soils beneath a depth of 4 feet without implementation of an Ohio EPA-approved Risk Management Plan (RMP) to prevent human exposure to contamination in environmental media; to prohibit the removal of ground water for any use except for investigatory or remedial purposes or dewatering (i.e., no use of ground water for potable purposes); and to restrict the use of the property to only industrial / commercial uses. The activity and use limitations are intended to prevent exposure to contaminated soil or ground water at the Site.

Additionally, the existing pathway for exposure to ground water will be eliminated by properly abandoning some of the existing monitoring wells. Potential future uses of ground water will be further restricted through an environmental covenant. After five years of ground water monitoring and reporting, Ohio EPA in conjunction with Marathon will evaluate the data and determine if natural attenuation processes are continuing and if additional monitoring is warranted.

Ohio EPA finds that the selected remedy will protect public health and the environment by reducing risk to acceptable levels once the remedial action objectives have been achieved.

## STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with legally applicable state and federal requirements, is responsive to public participation and input and is cost-effective. The remedy uses permanent solutions to the maximum extent practicable to reduce toxicity, mobility and volume of hazardous substances at the Site. The effectiveness of the remedy will be reviewed regularly.

Chris Korleski, Director of Ohio EPA

DEC 23 2008
Date

TABLE OF CONTENTS

FIGURES

# DECISION SUMMARY

For the former Marathon Oil Bulk Plant
Fremont, Sandusky County, Ohio

## 1.0 SUMMARY OF SITE CONDITIONS

### 1.1 Site History

The former Marathon Oil Bulk Plant (Site) is located at 2416 West State Street, in Fremont, Sandusky County, Ohio between West State Street (Rt. 20) and the Norfolk and Southern Railroad tracks. Fremont is located in an agricultural area and has a population of about 18,000 people.

The Site encompasses some 1.5 acres of land presently unoccupied and unused. Two (2) small buildings exist on the property, a small brick office and steel warehouse.

The Site is bound by the Old Orchard Motel to the northwest, Fredrick Garden Equipment to the south and southeast, and by several large industrial facilities to the east and northeast across the Norfolk and Southern Railroad tracks. Marathon began operations at the Site in 1954, ceased operations in 1989, and decommissioned the facility in 1991. The Site has been vacant since the late 1980's when bulk storage operations ceased. The storage facility consisted of above ground storage tanks (ASTs) used to store leaded and unleaded gasolines, diesel fuel, heating oil and lubricating oil. These petroleum products were temporarily stored at the Site and transported by truck to retail outlets and privately owned locations.

On January 23, 1995, a Consent Order was issued by Ohio EPA to Marathon Oil Company also known as Marathon Ashland Petroleum LLC (Marathon). The Consent Order established cleanup levels for benzene, toluene, ethylbenzene, and xylenes in both soil and ground water and lead in ground water. A remedial investigation/feasibility study (RI/FS) was completed at the Marathon facility to comply with the Order.

The Site is zoned I-2 for "General Industrial", as are many of the properties to the east and northeast across the Norfolk and Southern Railroad tracks. Properties immediately surrounding the Site in all other directions are zoned B-2 for "General Commercial".

### 1.2 Summary of the Remedial Investigation

The Remedial Investigation (RI) was conducted by Marathon with oversight by Ohio EPA.

The RI included a number of tasks to identify the nature and extent of site-related chemical contaminants. The RI, Revision III, Report was updated on August 15, 2003, and approved by Ohio EPA on November 12, 2003. The tasks included sampling of soil and ground water. The data obtained from the investigation were used to conduct a baseline risk assessment and to determine the need to evaluate remedial alternatives.

The nature and extent of contamination at the former Marathon Oil Bulk Plant in each environmental medium and the contaminants of concern attributable to the Site are described below.

### 1.2.1 Soil Contamination

Sources of VOCs and semi-volatile organic compounds (SVOCs) detected in soil and ground water beneath the facility appear to originate from one source area at the Site. This source area is within or near the former AST area, where seven ASTs were formerly located (referred to as the "former AST area"). The former AST area was identified even prior to the RI as the only potential source of contamination. Constituents of concern (COCs) associated with the facility are benzene, toluene, ethylbenzene, and xylenes (BTEX) in both soil and ground water and lead in ground water.

| **Soil Clean Up Levels* (Per January 23, 1995 Director's Final Findings and Orders)** | | | | | |
|---|---|---|---|---|---|
| Benzene | Toluene | Ethylbenzene | Xylenes | TPH | Lead |
| 0.5 | 12.0 | 18.0 | 85.0 | 105 | Background |

* Levels reported in mg/kg.

The vertical extent of contamination above Site clean up levels in the soil appears to be limited to depths of approximately six to eight feet below grade. The lateral extent of soil contamination with BTEX and/or TPH concentrations above the site-specific clean up levels is limited to the area of the former ASTs and the area immediately to the west.

### 1.2.2 Ground Water Contamination

The COCs associated with the facility are BTEX in both soil and ground water and lead in ground water. Site clean up levels for ground water are as follows:

| **Ground Water Clean Up Levels* (Per January 23, 1995, Director's Final Findings and Orders)** | | | | | |
|---|---|---|---|---|---|
| Benzene | Toluene | Ethylbenzene | Xylenes | TPH | Lead |
| 0.005 | 1.0 | 0.7 | 10.0 | N/A | 15.0 |

* Levels reported in mg/l.

The following table notes ground water analytical results from those shallow monitoring wells within the center of the shallow ground water contaminant plume. The wells represent maximum concentrations of COCs associated with the former AST area and are screened within a silty clay unit directly overlying bedrock. Shallow ground water occurs within 2-4 feet below ground surface at the facility.

| Parameter / Well | benzene (ug/l) | toluene (ug/l) | ethylbenzene (ug/l) | xylene (ug/l) | total lead (mg/l) |
|---|---|---|---|---|---|
| **MW-2** | | | | | |
| 01/12/91 | **550** | 160 | 150 | 581 | <1 |
| 07/31/91 | **817** | 163 | 55 | 163 | <0.16 |
| 10/4/95 | **3200** | 930 | **810** | 5300 | 0.005 |
| 12/19/97 | **1990** | 60 | 520 | 2820 | NS |
| 09/15/98 | **2800** | 160 | 290 | 1480 | 0.013 |
| 06/28/00 | **1480** | 18 | 67 | 278 | <0.003 |
| 12/13/01 | **2200** | 122 | 26 | 369 | NS |
| **MW-3** | | | | | |
| 01/12/91 | **22000** | **1000** | **14000** | 6700 | 0.003 |
| 07/31/91 | **70734** | **25367** | **4208** | **24994** | **0.340** |
| 10/3/95 | **3200** | 930 | **810** | 5300 | 0.005 |
| 12/19/97 | **30500** | **1350** | **16800** | **70800** | NS |
| 09/15/98 | **22000** | 350 | **1800** | 7830 | <0.05 |
| 06/28/00 | **15000** | 258 | **1270** | 5600 | <0.03 |
| 12/13/01 | **13000** | **1490** | 267 | 4000 | NS |
| **MW-9R** | | | | | |
| 09/15/98 | **3400** | <250 | <250 | 1800 | <0.005 |
| 06/28/00 | **341** | 13 | 81 | 316 | <0.003 |
| 12/13/01 | **2900** | 445 | 54 | 873 | NS |

| Parameter / Well | benzene (ug/l) | toluene (ug/l) | ethylbenzene (ug/l) | xylene (ug/l) | total lead (mg/l) |
|---|---|---|---|---|---|
| **MW-13R** | | | | | |
| 09/15/98 | **14000** | <250 | **700** | 3100 | <0.005 |
| 06/28/00 | **11000** | 149 | **1290** | 2900 | <0.003 |
| 12/13/01 | **3500** | 330 | 50 | 490 | NS |
| | | | | | |
| **MW-20** | | | | | |
| 09/15/98 | 12000 | 530 | 800 | **6500** | **<0.005** |
| 06/28/00 | **13000** | 316 | **1410** | **6400** | **<0.003** |
| 12/13/01 | **7400** | **1080** | **146** | **1550** | **NS** |

**Notes**

NS: Not sampled.

Bold: Concentrations exceed corresponding ground water clean up level.

There are additional shallow monitoring wells (MW-18R, MW-4, MW-5, MW-14, and MW-8) further downgradient of wells MW-2 and MW-13R and the former AST area which were non-detect for BTEX during the last (December 13, 2001) sampling event at the facility. Ground water in monitoring wells MW-11 and MW-12, screened within the underlying dolomitic bedrock, has not indicated the presence of COCs during the last two sampling events. Based upon the aforementioned data, there is no indication that the contamination in the shallow saturated zone and in the shallow soils have impacted the dolomitic bedrock saturated zone.

Ohio EPA is currently satisfied that the rate, extent, and concentrations of COCs associated with the former AST area have been adequately delineated in the shallow saturated zone.

### 1.3 Interim or Removal Actions Taken to Date

To date, the only remedial action taken at the facility was the removal of all ASTs at the Site, including: three (3) 15,000-gallon ASTs, two (2) 12,000-gallon ASTs, one (1) 20,000-gallon AST, and one (1) 6,000-gallon AST, used to store petroleum products, including leaded and unleaded gasoline, diesel fuel, heating oil, and lubricating oil. The removal of the ASTs was conducted by Marathon as part of the facility decommissioning process in 1991.

### 1.4 Summary of Site Risks and Need for Remedial Action

The site-specific risk assessment contained a risk analysis specific to site conditions (August 2002). The site-specific risk assessment involved the elimination of potable use pathways in the commercial and residential scenarios both on- and off-Site. This was appropriate due to the demonstration that the COC-impacted upper saturated zone is not used for potable use and is incapable of producing water in volumes suitable for future potable use. Therefore, the potential human exposure pathways in the commercial and residential scenarios were only those via the indoor air pathways. The construction worker scenario evaluated all potential exposures that may occur during a hypothetical construction project.

Additionally, the site-specific risk assessment included the development of Risk-Derived Numerical Standards (RDNS) for benzene in ground water, which could serve as a COC.

#### 1.4.1 Risks to Human Health

The purpose of a baseline risk assessment is to assess the magnitude of potential risk to human health and the environment from detected constituents in environmental media. The results provide the basis for determining whether or not remedial action is necessary.

A baseline risk assessment was conducted to assess constituents detected in soil as part of the RI. The baseline risk assessment concluded that there were limited potential

pathways of exposure to constituents detected in Site soil. Shallow soil constituents had been excavated, while deeper soil constituents were at depths that would not be encountered under normal facility operations. As part of the risk assessment, an exposure assessment was conducted to evaluate the type and magnitude of potential pathways by which humans may be exposed to constituents detected in environmental media at the Site. Pathways that are considered complete represent a potential for exposure. Incomplete pathways represent situations in which exposure is not expected. Without exposure, there is no risk of adverse health effects associated with the constituents.

Potential risks associated with direct contact with soil were evaluated for the Site. There is minimal potential exposure to site-related COCs under current site-use conditions, as explained below. Estimates of carcinogenic (cancer causing) and non-carcinogenic risks from exposure to COCs in the soils were calculated.

Cancer risk is defined as the probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen as compared with a person not exposed to the Site.

### 1.4.2 Commercial Worker

Based on all the information presented in the Revised Risk Assessment Report (August 2002), a potable use scenario where ground water from the shallow 10-foot clayey silt saturated zone is very unlikely to occur. For this reason, ground water ingestion and related potable use exposure pathways were justifiably eliminated from the site-specific commercial worker scenario. For example, dermal contact with ground water while showering will not occur since a potable well scenario has been eliminated. Based on the same reasoning, the chance of inhalation of ground water volatiles while showering is also not expected.

The exposure to volatiles from COCs in subsurface soil migrating to indoor air is theoretically higher than exposure to vapors emanating to outdoor, ambient air. The COCs can accumulate indoors as opposed to the outdoors where conditions exist that would dilute the concentration (e.g. the wind). As a result, indoor exposure (volatiles from subsurface soil migrating into buildings to adult human receptor populations) is a more conservative exposure pathway and was used in the commercial worker scenario instead of the outdoor exposure pathway (inhalation of ambient vapors from subsurface soil, to adult receptors, outdoors). The same rationale can be used to justify an indoor inhalation pathway for vapors emanating from contamination in ground water. The following pathways were therefore evaluated in the commercial worker scenario:

a) Inhalation of vapors from ground water migrating into buildings;

b) Inhalation of volatiles from subsurface soil migrating into buildings.

As shown in the Revised Risk Assessment Report, the total site noncarcinogenic risk for the commercial scenario was determined to be 0.0013. This risk is well below unity or one (1), the acceptable noncarcinogenic risk level. The total site carcinogenic risk was calculated to be 1.4E-8, which is below the 1E-5 carcinogenic risk threshold.

### 1.4.3 Off-Site Resident

The potable use of ground water from the shallow 10-foot clayey silt saturated zone is unlikely to occur. For this reason, ground water ingestion and related potable use exposure pathways are justifiably eliminated from the site-specific off-site residential worker scenario.

In contrast, exposure to volatiles from COCs in subsurface soil migrating to indoor air is theoretically higher than exposure to vapors outdoors. The vapors can accumulate indoors as opposed to the outdoors where conditions exist that would dilute the concentration (e.g. the wind). As a result, indoor exposure (volatiles from subsurface soil migrating into buildings, exposed to adult human receptors) is a more conservative exposure pathway and is used in the residential scenario instead of the outdoor exposure pathway. The same rationale can be used to justify an indoor inhalation pathway for vapors from COCs in ground water. The pathways that were evaluated in the residential scenario are listed below:

a) Inhalation of vapors from ground water migrating into buildings;

b) Inhalation of volatiles from subsurface soil migrating into buildings.

Since it is uncertain as to whether the COCs have migrated from the facility property to the adjacent motel property, this residential scenario evaluation served as a conservative measure of potential risk to motel occupants.

As shown in the Revised Risk Assessment Report, the total noncarcinogenic risk for the off-site residential scenario was determined to be 0.037. This risk is well below one (1), the acceptable noncarcinogenic risk level. The total carcinogenic risk was calculated to be 1.8E-7, which is below the 1E-5 carcinogenic risk threshold.

Therefore, because the risks calculated for this scenario were determined to be below the acceptable thresholds, remediation does not need to occur based on risks to this receptor.

### 1.4.4 Construction/Excavation Worker

There exists a potential for exposures to a construction worker at this property. The depth of the excavation pit was conservatively estimated to be 10 feet. Therefore, exposures to ground water infiltrating the trench and accumulating as surface water could potentially occur.

Exposures by direct contact with COCs in soil are also expected. The following exposure pathways were evaluated in the construction worker scenario in the Revised Risk Assessment Report (August 2002):

a) Incidental ingestion of soil;
b) Inhalation of volatiles from soil;
c) Inhalation of soil particulate;
d) Inhalation of vapors from ground water accumulating in a trench;
e) Dermal contact with soil;
f) Dermal contact with ground water.

As shown in the Revised Risk Assessment Report (August 2002), the total site noncarcinogenic risk for the construction worker scenario was determined to be 3.5, versus one (1). The total site carcinogenic risk was calculated to be 7.9E-6.

The carcinogenic risk does not exceed the risk threshold of 1E-5. The noncarcinogenic risk calculated in the Revised Risk Assessment Report (August 2002) exceeds the threshold of one (1). The majority of the noncarcinogenic risk associated with the construction worker scenario is from dermal exposure to benzene in ground water. Of the noncarcinogenic hazard index of 3.5 applicable to the construction worker, the resulting risk value of 3.375 is due to dermal exposure to benzene in ground water. Therefore, an RMP to be approved by Ohio EPA and implemented by Marathon is necessary to protect construction or excavation workers from exposure to contamination in environmental media.

### 1.4.5 Risk-Derived Numerical Standards

The current exposure point concentrations for COCs in soil do not exceed risk thresholds (carcinogenic risk of 1E-5 or non-carcinogenic hazard index of 1) for the residential, commercial worker or construction worker scenarios. Therefore, there are no COCs at concentrations above risk thresholds in soil at this Site. No risk-derived numerical standards were derived for any of the COCs found in soil.

The current exposure point concentrations for COCs detected or potentially existing in the ground water do not exceed risk thresholds (carcinogenic risk of 1E-5 or non-carcinogenic hazard index of 1) for the site-specific residential or commercial worker scenarios. However, the carcinogenic risk for the construction worker scenario was calculated to be 8.0E-6, and the noncarcinogenic risk is estimated to be 3.5. For the construction worker scenario, the carcinogenic risk does not exceed the threshold of 1E-5.

If any scenarios have a carcinogenic risk greater than 1E-5 (Ohio EPA standard) or a noncarcinogenic hazard index greater than 1, then a remedial goal must be established. The construction/excavation worker scenario has a hazard index of 3.5, which is greater than the 1.0 objective.

The only COC that contributed a non-cancer hazard index greater than 1 was benzene in ground water. Instead of calculating a risk-derived numerical standard (RDNS), the drinking water standard (MCL) of 5 ppb was selected as the remedial goal for benzene in ground water.

### 1.4.6 Risks to Ecological Receptors

Exposure of ecological receptors to site-related contaminants is unlikely; the impacts have not been discovered at the ground surface and the majority of the Site is paved. Additionally, the Site is located in a commercial and industrial area that does not support important ecological receptors. Furthermore, the impacted ground water is not hydraulically connected to the ditch that is situated to the north of the Site. Therefore, potential exposures to ecological receptors are expected to be minimal.

## 2.0 REMEDIAL ACTION OBJECTIVES

As part of the remedial investigation/feasibility study (RI/FS) process, remedial action objectives (RAOs) were developed in accordance with the National Contingency Plan (NCP), 40 CFR Part 300, which was promulgated under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and U.S. EPA guidance. The RAOs are goals that a remedy should achieve in order to ensure the protection of human health and the environment.

The goals are designed specifically to mitigate the potential adverse effects of Site contaminants present in environmental media. For environmental media, remediation levels were developed for a range of potential residual carcinogenic risk levels (i.e., 1 in 100,000) and using a non-cancer hazard quotient (or index) of 1 and a range of potential exposed receptors.

For example, a 1 in 10,000 risk level means that if 10,000 people were chronically exposed to the carcinogens at the Site, there is a probability of one additional case of cancer. Note that these risks refer only to the incremental risks created by exposures from the Site. They do not include the risks of cancer from other non-site related factors to which people may be exposed.

Non-carcinogenic hazards are generally expressed in terms of a hazard quotient or index, which combines the concentration of chemical exposures with the toxicity of the chemicals (quotient refers to the effects of an individual chemical whereas index refers to the combined effects of all chemicals). A hazard index of 1 represents the maximum exposure at which no harmful effects are expected.

These carcinogenic risk levels refer to the increased likelihood that someone exposed to the chemical releases from the Site would develop cancer during his lifetime as compared with a person not exposed to the Site.

The RAOs were developed to ensure that remedial actions reduce the projected risk to humans to acceptable levels. Ohio EPA defines acceptable Site remediation goals for known or suspected carcinogens to be concentration levels that represent an upper bound excess lifetime cancer risk, above that of the background, to an individual as 1 in 100,000 using information on the relationship between dose and response. Non-carcinogenic risks are also to be reduced to an acceptable level, which corresponds to a hazard index of 1, at which harmful effects are generally not observed in exposed persons. In a similar manner, important ecological resources (e.g., waters of the state or endangered species) will also be protected.

The RAOs developed for this Site are identified below:

- Reduction of contaminant concentrations in Site ground water to levels less than the ground water clean up levels established for the Site; and,

- Restriction of property usage, access or exposure to contaminated media on the facility property until COC levels in soil and ground water meet the clean up levels established for the Site.

The RAOs were considered in the process for evaluating the remedial alternatives for the Site.

## 3.0 SUMMARY OF REMEDIAL ALTERNATIVES

A total of six (6) remedial alternatives were considered in the FS. A brief description of the major features of each of the remedial alternatives follows. More detailed information about these alternatives can be found in the FS.

### 3.1 Alternative 1: No Action

Alternative 1 consists of No Action and has been retained in accordance with the NCP. The No Action alternative provides no measures to prevent exposure to constituents in soil or ground water beneath the Site. Under Alternative 1, the existing Site monitoring wells would remain in place. Because existing wells are required to be maintained, maintenance of the Site monitoring wells is the only activity that would be conducted under Alternative 1.

### 3.2 Preferred Alternative (Alternative 7): Monitored Natural Attenuation with Institutional Controls

The preferred alternative (Alternative 7 as described in the Preferred Plan) consists of Alternative 5 (monitored natural attenuation) along with several activity and use limitations. The preferred alternative is described below:

a. Ground water samples will be collected from shallow monitoring wells MW-3, MW-5, MW-8, MW-13R, and MW-18R and bedrock well MW-12 on a semiannual basis

for three years. After three years, ground water samples shall be collected on an annual basis for two more years. After the fifth year, Ohio EPA in conjunction with Marathon shall evaluate the data and determine if natural attenuation processes are continuing and if additional monitoring is warranted.

In addition, a ground water risk assessment will be performed to determine if the remedial alternative is effective in reducing concentrations of COCs, namely, benzene, to a level below the standard.

b. Prohibit excavation on the property at depths below four feet of the ground surface except where an Ohio EPA-approved RMP is implemented to protect construction or excavation workers from exposure to BETX. The implementation of needed human health and safety precautions will prevent human contact with contamination at concentrations above the risk-based numerical standard for benzene in ground water.

c. Marathon and Ohio EPA would enter into an environmental covenant for the Site, pursuant to ORC 5301.80 thru 5301.92, to prohibit the extraction or use of ground water except for certain purposes, such as investigatory, remedial or trench dewatering purposes (i.e., no use of ground water for potable purposes), to restrict the use of the property to industrial/commercial purposes, and to prohibit excavation at the property at depths below four feet below land surface, without implementation of environmental protections for excavation or construction workers, who may be exposed to contamination, as noted above.

### 3.3 Alternative 2: Ground Water Pump and Treat

Ground water pump and treat technology involves the extraction and treatment of benzene-impacted ground water. Typically, submersible electric pumps are used to extract ground water from one or more extraction wells and the resulting liquid process stream is treated to discharge standards. A system of this type would not be effective due to the low hydraulic conductivity and ground water yield in the shallow ground water zone at this site.

In order to implement a pump and treat system, a pilot study would first need to be conducted. If this technology was deemed appropriate after completion of the pilot study, several months would be required for design, installation and permitting before remediation could begin.

### 3.4 Alternative 3: Dual Phase Extraction

Dual Phase Extraction (DPE) involves recovery of total fluids and soil vapor using induced vacuum. DPE systems typically use a blower to induce a vacuum in the recovery well/s, which enables recovery of fluids and soil vapor. Free product and water are segregated for treatment or containerization using mechanical separation, and the vapor phase is treated and discharged to the atmosphere. The effectiveness of this technology

would be reduced due to the shallow depth to impacted ground water (typically 1.5 to 4.0 feet below ground surface), and the inability of native soils to comprise an effective air permeability barrier. These factors would cause vacuum short-circuiting and result in unacceptably small radii of influence at recovery wells. As with pump and treat, a pilot study would be required prior to installing the system.

### 3.5 Alternative 4: In-situ Bioremediation

In-situ bioremediation involves the introduction of one or more commercially available bioremediation products into the subsurface in order to stimulate existing attenuation processes by optimizing subsurface conditions that regulate in-situ bioremediation. This technology would be relatively ineffective at this Site due to low soil permeability. In order to implement this technology, a bench scale study or pilot study would need to be conducted. This technology would also require the installation of an extensive network of closely spaced injection points.

### 3.6 Alternative 5: Monitored Natural Attenuation

Natural Attenuation utilizes the natural assimilative capacity of impacted media to reduce COC concentrations to below site action levels. Natural attenuation combines many chemical, physical, and biological processes that cause reduction of mass in soil and ground water over time.

Dissolved phase plumes are typically referred to as expanding, stable, or shrinking, depending on the geometry of the plume through time. As discussed above, significant natural attenuation is occurring at this Site, and the dissolved phase benzene plume is characterized as stable to shrinking.

At this Site, monitoring would consist of periodic analysis of ground water for benzene, and evaluation of laboratory data to determine if natural attenuation continues to meet the remediation objectives.

### 3.7 Alternative 6: Limited Source Area Removal

Limited source area removal would involve excavation and disposal of soil within areas with the highest concentrations of benzene in ground water in order to remove the source of mass loading to ground water and speed up natural attenuation of contaminants. The excavation would be backfilled to grade with clean aggregate, and select monitoring wells formerly present in the excavation area would be re-installed.

## 4.0 COMPARISON AND EVALUATION OF ALTERNATIVES

### 4.1 Evaluation Criteria

In selecting a remedy for a contaminated Site, Ohio EPA considers the following eight evaluation criteria as outlined in U.S. EPA's NCP promulgated under CERCLA (40 CFR 300.430):

1. Overall protection of human health and the environment – Remedial alternatives shall be evaluated to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by contaminants present at the Site.

2. Compliance with all applicable or relevant and appropriate requirements (ARARs) – Remedial alternatives shall be evaluated to determine whether a remedy will meet all of the ARARs of state and federal environmental laws.

3. Long-term effectiveness and permanence – Remedial alternatives shall be evaluated to determine the ability of a remedy to maintain reliable protection of human health and the environment over time once pollution has been abated and RAOs have been met. This includes assessment of the residual risks remaining from untreated wastes, and the adequacy and reliability of controls such as containment systems and institutional controls.

4. Reduction of toxicity, mobility, or volume through treatment – Remedial alternatives shall be evaluated to determine the degree to which recycling or treatment are employed to reduce toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the Site.

5. Short-term effectiveness – Remedial alternatives shall be evaluated to determine the following: (1) Short-term risks that might be posed to the community during implementation of an alternative; (2) Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures; (3) Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and (4) Time until protection is achieved.

6. Implementability – Remedial alternatives shall be evaluated to determine the ease or difficulty of implementation and shall include the following as appropriate: (1) Technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy;

   (2) Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for off-site actions); and (3) Availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional

resources; the availability of services and materials; and the availability of prospective technologies.

7. Cost – Remedial alternatives shall evaluate costs and shall include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operation and maintenance (O&M) costs; and (3) Net present value of capital and O&M costs.

   The cost estimates include only the direct costs of implementing an alternative at the Site and do not include other costs, such as damage to human health or the environment associated with an alternative. The cost estimates are based on figures provided by the Feasibility Study.

8. Community acceptance -Remedial alternatives shall be evaluated to determine which of their components interested persons in the community support, have reservations about, or oppose.

### 4.2 Analysis of Evaluation Criteria

This section looks at how each of the evaluation criteria is applied to each of the remedial alternatives and compares how the alternatives achieve the criteria. Evaluation Criteria 1 and 2 are threshold criteria required for acceptance of an alternative that has accomplished the goal of protecting human health and the environment and complied with the law. Any acceptable remedy must comply with both of these criteria. Evaluation Criteria 3 through 7 are the balancing criteria for selecting the best remedial alternative. Evaluation Criteria 8, community acceptance, will be determined, in part, by written responses received during the public comment period and statements offered at the public meeting.

#### 4.2.1 Overall Protection of Human Health and the Environment

The assessment of cancer risks and non-cancer hazards to human receptors requires that exposure pathways be identified and the risks and hazards of each pathway be numerically estimated.

As shown in the Revised Risk Assessment Report (August 2002), the total site noncarcinogenic risk for the construction worker scenario was determined to be 3.5. The total site carcinogenic risk was calculated to be 7.9E-6. The carcinogenic risk does not exceed the risk threshold of 1E-5. The noncarcinogenic risk calculated in the Revised Risk Assessment Report (August 2002) exceeds the threshold of one (1).

The exposure pathway for direct contact with constituents in soil would only be complete if excavation of greater than four feet below land surface was conducted at the Site. Therefore, a RMP approved by Ohio EPA would be required prior to excavation activities to prevent exposure to contaminants at the Site during the excavation activities. Adverse impacts to ecological receptors are identified as a hazard quotient and, when appropriate, a hazard index value greater than 1.0. The exposure pathway for ground

water exposure of ecological receptors to site-related contaminants is unlikely, as there are few complete exposure pathways.

### Alternative 1: No Action

The No Action alternative is not protective of human health or the environment in that it provides no means to prevent access to constituents in ground water beneath the Site.

### Alternative 2: Ground Water Pump and Treat

Alternative 2 does not provide overall protection of human health and the environment. Ground Water Pump and Treat system would not be effective due to the low hydraulic conductivity and ground water yield at this site. In order to implement a pump and treat system, a pilot study would first need to be conducted. After completion of the pilot study, several months would be required for design, installation and permitting before remediation could begin. This Alternative does not eliminate current and potential future access to soil and current access to constituents in ground water beneath the Site. It does not prevent future potential exposure to ground water because it does not incorporate a use restriction to prohibit use of ground water.

### Alternative 3: Dual Phase Extraction

Alternative 3 does not provide overall protection of human health and the environment. The effectiveness of Dual Phase Extraction technology would be reduced to the shallow depth to impacted ground water (typically 1.5 to 4.0 feet below ground surface), and the inability of native soils to comprise an effective air permeability barrier. These factors would cause vacuum short-circuiting and result in unacceptably small radii of influence at recovery wells. As with pump and treat, a pilot study would be required prior to installing the system.

### Alternative 4: In-situ Bioremediation

Alternative 4 would be relatively ineffective at this site due to low soil permeability. In order to implement this technology a bench scale study or pilot study would need to be conducted. This technology would also require the installation of an extensive network of closely spaced injection points. This technology is not recommended for use at this site due to its technical limitations.

### Alternative 5: Monitored Natural Attenuation

Monitored Natural Attenuation at this site would consist of periodic analysis of ground water for benzene, and evaluation of laboratory data to determine if natural attenuation continues to meet the remediation objectives. Natural Attenuation is not recommended for use as stand-alone alternative because it provides no means to prevent access to constituents in ground water beneath the Site. However, Monitored Natural Attenuation can be utilized with other alternatives to be a part of a remedial alternative.

### Alternative 6: Limited Source Area Removal

Alternative 6 would be relatively ineffective in eliminating exposure to contaminated ground water. Furthermore, Alternative 6 is not recommended for use as stand-alone alternative because it provides no means to prevent access to constituents in ground water beneath the Site and does not restrict the Site to commercial/industrial usage.

### Preferred Alternative (Alternative 7): Monitored Natural Attenuation with Institutional Controls

The Preferred Alternative is effective because it would eliminate some of the existing wells which will prevent exposure to Site contaminated ground water. The preferred alternative, as modified with respect to the future use of the property, will prevent exposure to contaminated soil and prohibit the use of ground water. Additionally, ground water monitoring will continue to monitor natural attenuation.

As noted in Section 4.2, Evaluation Criteria 1 (Overall Protection of Human Health and the Environment) and 2 (Compliance with ARARs) are threshold criteria required for acceptance of an alternative that has accomplished the goal of protecting human health and the environment and complied with the law. Any acceptable remedy must comply with both of these criteria. As Alternative 1 is not protective, Alternatives 2, 3, and 4 are not technically effective in achieving the RAOs, and Alternatives 5 and 6 provide only limited protection on their own, these Alternatives have not been carried forward in the evaluation under this Decision Document.

### 4.2.2 Compliance with ARARs

The Preferred Alternative complies with all identified ARARs.

### 4.2.3 Long-Term Effectiveness and Permanence

The Preferred Alternative provides the most long-term effectiveness and permanence because it uses an environmental covenant to restrict the Site to commercial/industrial usage, prevent excavation worker exposure to contaminated soil or ground water through implementation of an Ohio EPA-approved RMP, and prohibit the use of ground water for any potable purposes. Additionally, the recommended ground water monitoring will continue to provide data that will document that natural attenuation is effective at reducing the contamination to achieve the standard.

### 4.2.4 Reduction of Toxicity, Mobility or Volume by Treatment

The Preferred Alternative complies with this criterion by way of the natural attenuation processes occurring in ground water beneath the Site, the toxicity and volume of VOCs in ground water are being reduced. The further monitoring of the processes will evaluate whether the processes are continuing in an effective manner to achieve the standard.

### 4.2.5 Short-Term Effectiveness

The Preferred Alternative has short-term effectiveness because it restricts the Site to commercial/industrial usage, eliminates the existing monitoring wells, and prohibits the future use of ground water through an activity and use limitation.

Additionally, a separate activity and use limitation would restrict access and protect construction or excavation workers from exposure to constituents in the subsurface by prohibiting excavations below four feet in depth without implementation of an RMP that has been approved by Ohio EPA.

### 4.2.6 Implementability

The Preferred Alternative should be readily implementable because it requires some of the existing monitoring wells at the Site be properly abandoned. The Preferred Alternative also uses an environmental covenant to restrict the Site to commercial/industrial usage, prevent excavation worker exposures to the subsurface contamination through implementation of an Ohio EPA-approved RMP, and prohibit the use of ground water for potable uses. Additionally, ground water monitoring will continue to monitor natural attenuation.

### 4.2.7 Cost

Cost estimate to implement the Preferred Alternative is provided below.

| Alternative | Capital Cost | Annual Short-term O&M | Annual Long-term O&M | Present Worth |
|---|---|---|---|---|
| Alternative 7<br>**Monitored Natural Attenuation with Institutional Controls** | $ 5,000 (for environmental covenant development) | $ 30,000 (MNA) | $ 15,000 (MNA) | **$ 50,000** |

### 4.2.8 Community Acceptance

Ohio EPA has received no comments from any interested parties. Specifically, no comments were received during the public comment period extending until August 17, 2008, nor at the public meeting held on July 17, 2008, at the Birchard Public Library in Fremont, Ohio.

## 5.0 SELECTED REMEDIAL ALTERNATIVE

Ohio EPA has selected the Alternative 7 (Monitored Natural Attenuation with Institutional Controls) as its Preferred Alternative. Primarily, remedial actions are required to provide overall protection of public health and the environment and compliance with Federal and State ARARs. Additionally, a selected remedial action must be cost-effective and utilize innovative technologies to the maximum extent practicable.

Based on these factors, Alternative 7 is the alternative that satisfies the legal requirements applicable to the Site. Alternative 7 consists of the following elements: Institutional Controls and Monitored Natural Attenuation.

## 5.1 Environmental Covenant (Institutional Controls)

With an RAO of restricting property usage, access and exposure to contaminated media on the property until contaminant levels in soil and ground water meet site clean up levels, an environmental covenant will be established to: prohibit the extraction or use of ground water except for certain purposes, such as investigatory, remedial or trench dewatering purposes (i.e., no use of ground water for potable purposes); restrict the property to commercial/industrial usage only; and prohibit excavation on the property at depths below four feet without implementation of a risk management plan (RMP) approved by Ohio EPA.

Performance Standards

Enter into an environmental covenant that contains the following activity and use limitations:

- Prohibit the installation of any water supply wells or the withdrawal of ground water for potable use at the property (while allowing for continued assessment and remediation of the ground water, and site dewatering during any excavation activities);
- Restrict the property to commercial/industrial usage only; and
- Prohibit excavation on the facility property at depths below four (4) feet without implementation of an Ohio EPA-approved RMP (to protect construction workers from exposure to contamination in subsurface media).

The performance standard shall be achieved upon the recording of the environmental covenant in the same manner as a deed for the property at the Sandusky County Recorder's Office, its continued enforcement, and through submittal to Ohio EPA of a copy of the recorded environmental covenant.

The environmental covenant shall be recorded prior to the deadline established in the anticipated Remedial Design/Remedial Action Order.

## 5.2 Monitored Natural Attenuation

With an RAO of reducing COC concentrations in ground water to clean up levels for the Site, ground water samples will be collected from shallow monitoring wells MW-3, MW-5, MW-8, MW-13R, and MW-18R and bedrock well MW-12 on a semiannual basis for three years. After three years, ground water samples shall be collected on an annual basis for 2 additional years. After the fifth year, Ohio EPA shall evaluate the monitoring data and determine if natural attenuation processes are continuing and if additional monitoring is warranted.

Natural attenuation utilizes the natural assimilative capacity of impacted media to reduce COC concentrations to below site action levels. Natural attenuation combines many chemical, physical, and biological processes that cause reduction of mass in soil and ground water over time.

Dissolved phase plumes are typically referred to as expanding, stable, or shrinking, depending on the geometry of the plume through time. As discussed above, and in the RI and FS reports, significant natural attenuation is occurring at this site, and the dissolved phase benzene plume is characterized as stable to shrinking.

Performance Standards

- Conduct and report on periodic sampling and analysis of ground water per an Ohio EPA-approved sampling and analysis plan.

- Demonstrate via periodic ground water monitoring that natural attenuation of COCs in ground water is continuing and that the RAOs will be achieved by the conclusion of the 5 year monitoring period, or as otherwise agreed upon by Ohio EPA.

## 6.0 DOCUMENTATION OF SIGNIFICANT CHANGES

Ohio EPA received no comments during the public meeting and public comment period. Therefore, no changes were made to the selected remedial alternative as presented in the Preferred Plan.

## 7.0 RESPONSIVENESS SUMMARY

Ohio EPA did not receive any comments during the public meeting and public comment period. Therefore, no changes were made to the selected remedial alternative as presented in the Preferred Plan.

## 8.0 GLOSSARY

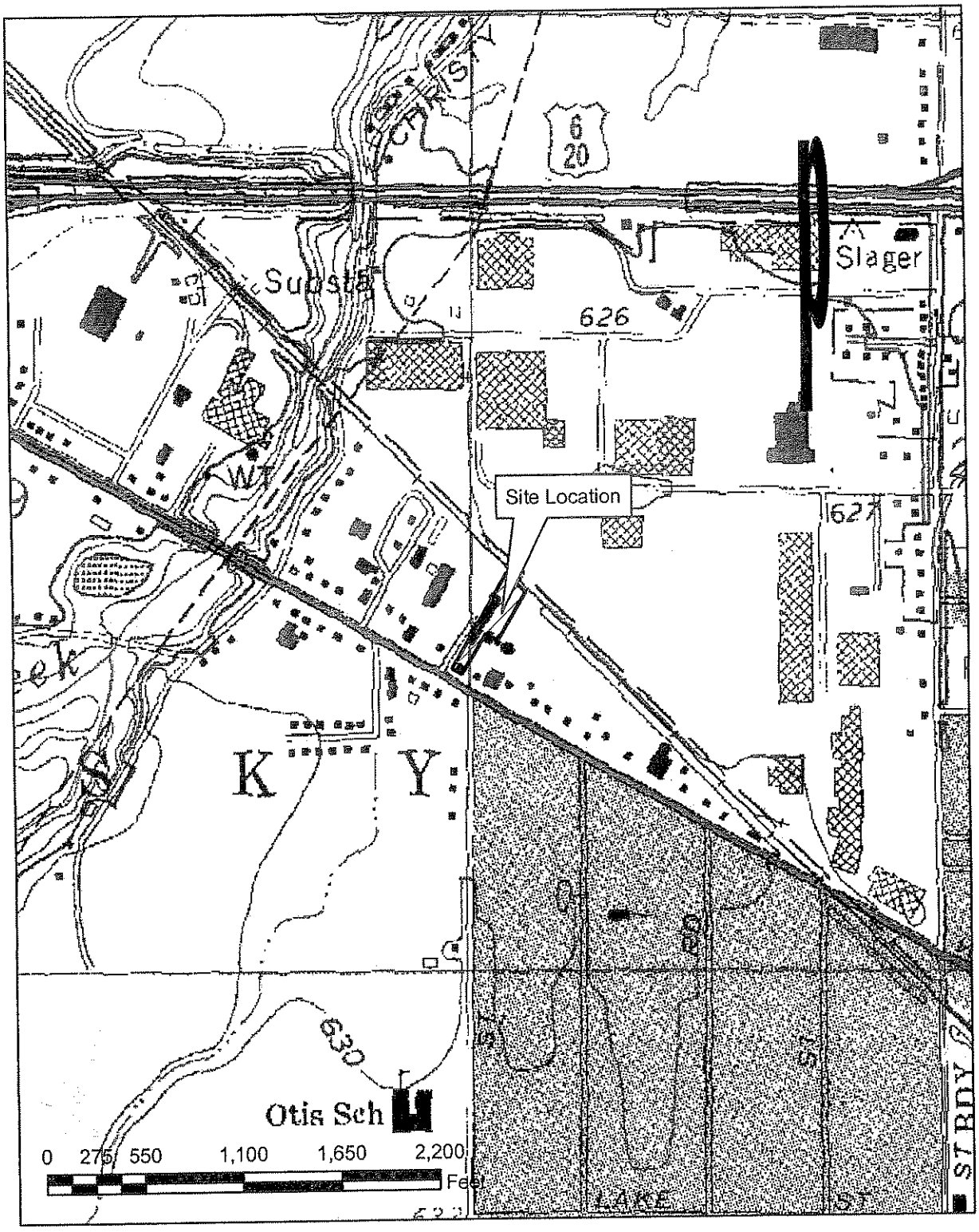
| | |
|---|---|
| Aquifer - | An underground geological formation capable of holding and yielding water. |
| ARARs - | Applicable or relevant and appropriate requirements. Those rules including state and federal laws which strictly apply to remedial activities at the site, or those rules whose requirements would help achieve the remedial goals for the site. |
| Baseline Risk Assessment - | An evaluation of the risks to humans and the environment posed by a site. |
| BETX - | Benzene, ethylbenzene, toluene and xylenes |
| Carcinogen - | A chemical that causes cancer. |
| CERCLA - | Comprehensive Environmental Response, Compensation and Liability Act. A federal law that regulates cleanup of hazardous substances sites under the U.S. EPA Superfund Program. |
| Decision Document - | A statement issued by the Ohio EPA giving the Director's selected remedy for a site and the reasons for its selection. |
| Ecological Receptor - | Animals or plant life exposed to chemicals released from a site. |
| Environmental Covenant- | A servitude arising under an environmental response project that imposes activity and use limitations and that meets the requirements established in section 5301.82 of the Ohio Revised Code. |
| Exposure Pathway - | Route by which a chemical is transported from the site to a human or ecological receptor. |
| Feasibility Study - | A study conducted to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected. |
| Hazardous Substance - | A chemical that may cause harm to humans or the environment. |

| | |
|---|---|
| Hazardous Waste - | A waste product, listed or defined by the RCRA, which may cause harm to humans or the environment. |
| Human Receptor - | A person exposed to chemicals released from a site. |
| MCL - | Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. The level is established by U.S. EPA. |
| NCP - | National Oil and Hazardous Substances Pollution Contingency Plan, codified at 40 C.F.R. Part 300 (1990), as amended. A framework for remediation of hazardous substances sites specified in CERCLA. |
| O&M - | Operation and Maintenance. Long-term measures taken at a site, after the initial remedial actions, to assure that a remedy remains protective of human health and the environment. |
| Preferred Plan - | The plan that evaluates the preferred remedial alternatives presented in the FS and identifies the preferred remedial alternative selected by Ohio EPA to remediate the site in a manner that best satisfies the evaluation criteria. |
| RCRA - | Resource Conservation and Recovery Act of 1976, codified at 42 U.S.C. 6901 et seq., as amended. A federal law that regulates the handling of hazardous wastes. |
| Remedial Action Objectives (RAOs) - | Specific goals of the remedy for reducing risks posed by the site. |
| Remedial Investigation - | Those activities undertaken by Respondent to determine the nature and extent of the contamination at the Site caused by disposal, discharge, or release of waste materials. |
| Responsiveness Summary- | A summary of all comments received during the public comment period concerning the Preferred Plan and Ohio EPA's response to all issues raised in those comments. |
| Water Quality Criteria - | Chemical and thermal standards that define whether a body of surface water is unacceptably contaminated. These standards are intended to ensure that a body of water is safe for fishing, swimming and as a drinking water source. |

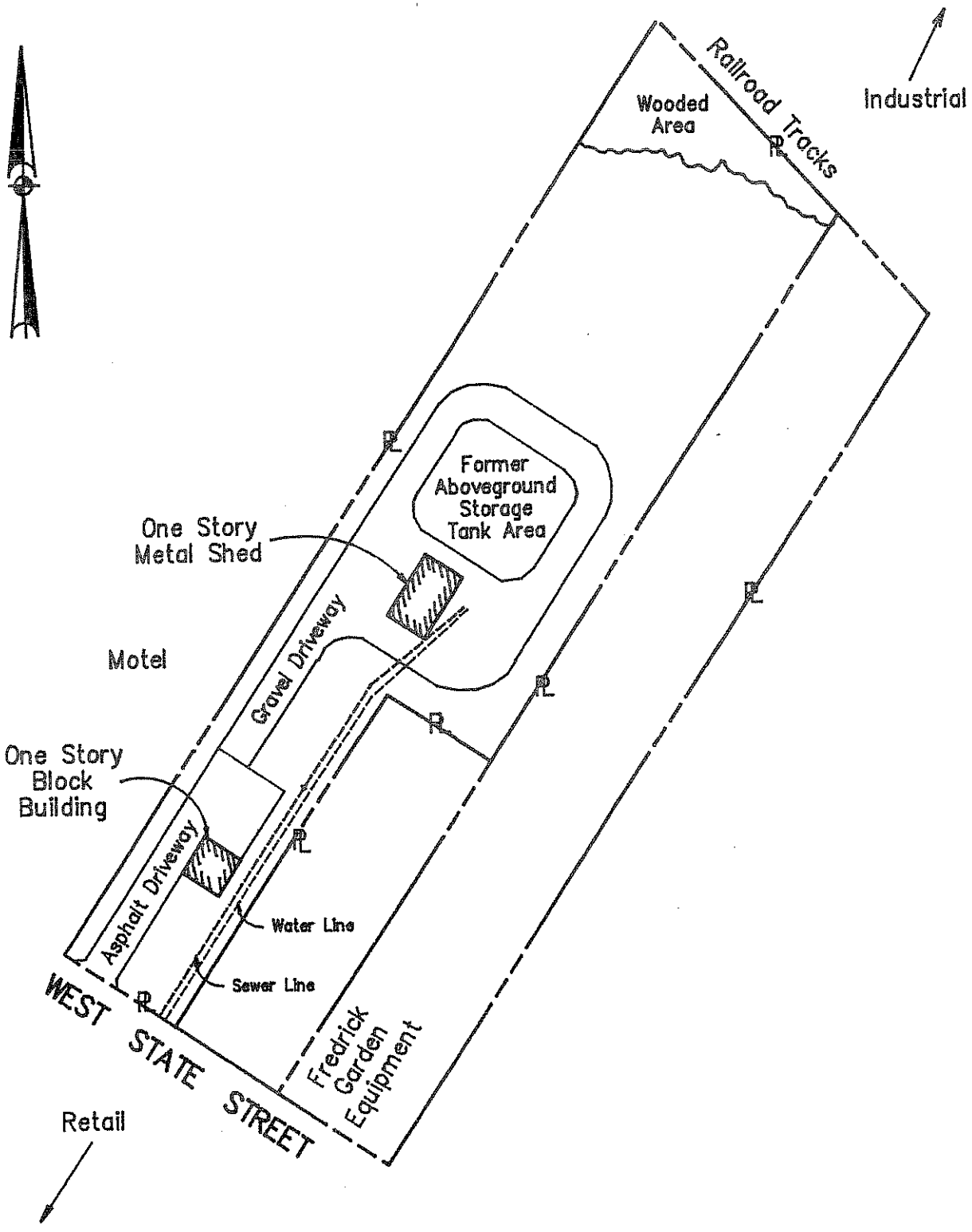
| | |
|---|---|
| PCE - | Tetrachloroethene or Perchloroethylene. A common industrial solvent and cleaner, often used for dry cleaning. |
| SVOCs - | Semivolatile organic compounds, also known as "SVOCs," are substances that contain carbon and various proportions of other elements found in VOCs. The main difference is that these compounds evaporate less readily. |
| TAL - | Target Analyte List. The TAL was originally derived from the U.S. EPA Priority Pollutant List under CERCLA. A fact sheet on the total metals, dissolved metals and cyanide can be obtained from the U.S. EPA Contract Laboratory Program. |
| VOCs - | Volatile organic compounds, also known as "VOCs," are substances containing carbon and different proportions of other elements such as hydrogen, oxygen, fluorine, chlorine, bromine, sulfur, or nitrogen. VOCs are most commonly used as solvents such as paint thinners, lacquer thinner, degreasers, and dry cleaning fluids. |

# Figures

# Site Location Map




# Marathon Bulk Plant




SITE PLAN
RI/FS WORK PLAN
FORMER MARATHON BULK PLANT NO. 279
2416 WEST STATE STREET
FREMONT, OHIO

| | |
|---|---|
| PROJECT NO. | 22-07-94-47644 |
| SCALE | 1 in. ~ 100 ft. |
| FIGURE NO. | 2 |
| DATE | 01/24/95 |
| APPROVED BY | |

ATEC