FINAL AMENDMENT TO THE 1993 RECORD OF DECISION (ROD) FOR OPERABLE UNIT 2

PEAK OIL SITE/BAY DRUM SITE
TAMPA, HILLSBOROUGH COUNTY, FLORIDA

PREPARED BY:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

January 2005
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<table>
<thead>
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<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ARAR</td>
<td>Applicable or Relevant and Appropriate Regulations</td>
</tr>
<tr>
<td>ATV</td>
<td>Alternate Toxicity Value</td>
</tr>
<tr>
<td>BDL</td>
<td>Below the laboratory Detection Limit</td>
</tr>
<tr>
<td>BHHRA</td>
<td>Baseline Human Health Risk Assessment</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</td>
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<tr>
<td>COC</td>
<td>Chemical of Concern</td>
</tr>
<tr>
<td>COEJ</td>
<td>Community Organized for Environmental Justice</td>
</tr>
<tr>
<td>COPC</td>
<td>Chemicals of Potential Concern</td>
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<tr>
<td>cys</td>
<td>cubic yards (also see yd³)</td>
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<td>EPA</td>
<td>United States Environmental Protection Agency</td>
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<td>EPA Region 4 Office of Technical Services</td>
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<td>Explanation of Significant Differences</td>
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<td>Integrated Risk Information System</td>
</tr>
<tr>
<td>JEA</td>
<td>Jacksonville Electric Corporation</td>
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<tr>
<td>LOAEL</td>
<td>Lowest Observed Adverse Effects Level</td>
</tr>
<tr>
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<td>Maximum Contaminant Level</td>
</tr>
<tr>
<td>MEP</td>
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<tr>
<td>mg/kg</td>
<td>milligrams per kilogram or parts per million (ppm)</td>
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<tr>
<td>NCEA</td>
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</tr>
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<td>NOAEL</td>
<td>No Observed Adverse Effects Level</td>
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Amendment to 1993 Record of Decision
Peak Oil/Bay Drum Site

RI/FS  Remedial Investigation/Feasibility Study
ROD   Record of Decision
RPM   Remedial Project Manager
SARA  Superfund Amendments and Reauthorization Act of 1986
SAS   Superfund Alternative Site
SDWA  Safe Drinking Water Act
SESD  EPA Region 4 Science and Ecosystem Support Division
SI    Site Inspection
SQL   Sample Quantification Limit
SVOCs Semi-Volatile Organic Compounds
TCDD  tetrachlorodibenzodioxin
TCLP  Toxicity Characteristic Leaching Procedure
TEQ   Toxicity Equivalence Quotient
TRPH  Total Recoverable Petroleum Hydrocarbons
\( \mu g/kg \)  micrograms per kilogram
\( \mu g/L \)  micrograms per Liter
US    United States
US FWS United States Fish and Wildlife Service
VOCs  Volatile Organic Compounds
yd\(^3\)  cubic yards
<    less than
>    greater than
PART I: THE DECLARATION

1.1 Site Name and Location

This Record of Decision (ROD) is for the Peak Oil/Bay Drum Superfund Site, which is located in Tampa, Florida. The Peak Oil/Bay Drum Superfund Site ("the Site") is located in north central Hillsborough County within the southeast quarter of Section 7, Township 29 South, Range 20 East (Figure 1). The Site is located on State Road 574 (State Road 574), approximately 0.25 miles west of Faulkenburg Road. There are four Operable Units (OUs) identified at the Peak Oil/Bay Drum Site:

- OU-1 (Peak Oil Source Control)
- OU-2 (Area-Wide Groundwater)
- OU-3 (Bay Drum Source Control)
- OU-4 (Wetlands)

This Amended Record of Decision (ROD) concerns the remedy for OU-2 (Area-Wide Groundwater).

The U.S. Environmental Protection Agency (EPA) Site Identification Number is FLD 004 091 807.

1.2 Statement of Basis and Purpose

This decision document represents an amendment to the 1993 ROD for Operable Unit 2 of the Peak Oil/Bay Drum Superfund Site (the "Site"). This amendment changes the remedy selected in the earlier ROD for both the Surficial Aquifer and the Floridan Aquifer. The Amended remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for the Site.

This ROD Amendment changes the remedy selected in the 1993 ROD and updates the cleanup standards for arsenic and vanadium. The cleanup standards for arsenic and vanadium have been lowered. No other aspect of the 1993 ROD is impacted or changed by this amendment. For example, all of the 1993 ROD’s objectives, cleanup standards (other than the updates for arsenic and vanadium), application (or no application) of secondary drinking water standards, etc. remain in force and are unaffected by this amendment.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the field investigative and remedy re-analysis leading up to this ROD Amendment. In accordance with 40 CFR §300.435, as the support agency, FDEP has provided input during this process.
1.3 Assessment of Site

The response action selected in this ROD is necessary to effectively protect the public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

1.4 Description of Amendment

EPA is proposing the following amendments to the major components of the 1993 ROD:

Surficial Aquifer and Floridan Aquifer

- Elimination of groundwater extraction via extraction wells.
- Elimination of air stripping for removal of volatile organic compounds (VOCs).
- Elimination of carbon polishing for removal of semi-volatiles and other organic materials.
- Elimination of discharge of treated water to a Publicly Owned Treatment Works (POTW).

The above eliminations are to be replaced by the following major components:

Surficial Aquifer

- Installation of an acceptable number of new monitoring wells to monitor downgradient of the oil emulsion, or organic substrate, injection areas.
- Performance of baseline groundwater sampling for parameters needed to track the success or failure of natural attenuation.
- Injection of organic substrate through the depth of the Surficial Aquifer using a slotted injection tool and direct push technology.
- Monitoring of chemical and natural attenuation parameters to document organic substrate distribution, reduction of contaminant concentration and mass, and annual monitoring for the same chemicals and parameters to evaluate progress toward achieving the cleanup levels. Monitoring will occur quarterly for the first 6 months after injection and every 6 months after that during the first 2-year period. After 2 years, the frequency of monitoring will be evaluated and modified as needed.
- Additional injection of organic substrate, if determined to be needed.
- Installation of Air Sparging System in the area of MW B-7.
- Monitoring of the effectiveness of the Air Sparging System through time.
- Monitoring of metal concentrations to evaluate/document reductions over time.
- Ongoing evaluation of monitoring wells to determine the effect of turbidity on observed metals.
- Maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drums Site, continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC, continuation of Hillsborough County Ordinance 90-35, annual notification to local government entities and interested parties).
Floridan Aquifer

- Long term monitoring of select Floridan Aquifer monitoring wells for chemical parameters to routinely evaluate whether attenuation processes are eliminating contaminant to levels below the OU-2 groundwater cleanup levels.
- Maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC. which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system; annual notification to local government entities and interested parties).
- An option for a contingency remedy (e.g., injection of an organic substrate like vegetable oil), if needed. The need for the contingency will be evaluated on an annual basis.

1.5 Statutory Determinations (CERCLA §121)

The Amended Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances).

Because the implemented remedies for OU-1 (Peak Oil Source Control) and OU-3 (Bay Drum Source Control) resulted in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years from construction completion. The objective of these five year reviews will be to confirm that the remedy is, or will be, protective of human health and the environment. If found to be unprotective, then corrective actions to bring the remedy to a protectiveness level will be taken. The first 5 year review is set for completion by September 22, 2005.

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision (Part 2). Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations (pages 15-17)
- Baseline risk represented by the chemicals of concern (pages 14, 15)
- Cleanup levels established for chemicals of concern and the basis for these levels (pages 52-54)
How source materials constituting principal threats are addressed (43)
✓ Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the Baseline Risk Assessment and ROD (pages 27, 55)
✓ Potential land and groundwater use that will be available at the site as a result of the Selected Remedy (pages 27, 55)
✓ Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (page 40, 41)
✓ Key factor(s) that led to selecting the remedy (i.e. describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (page 42)

1.7 Authorizing Signatures

Winston A. Smith, Director
Waste Management Division

1-7-2005 Date
PART 2: INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

2.1 Site Name and Location

This Record of Decision (ROD) Amendment is for the Peak Oil/Bay Drum Site, which is located in Tampa, Florida, north central Hillsborough County, within the southeast quarter of Section 7, Township 29 South, Range 20 East (see Figure 1). The U.S. Environmental Protection Agency (EPA) Site Identification Number for Peak Oil/Bay Drum is FLD 004 091 807. The Site is located on State Road 574 (State Road 574), approximately 0.25 miles west of Faulkenburg Road. The Site is approximately 10 acres in size.

The Site is flanked on the east by the Master Halco facility. Industrial Galvanizers of America is located to the north. Master Halco and Industrial Galvanizers of America are located on land that makes up the Reeves Southeastern Galvanizing Superfund Site. Just south of the Site are Peoples Gas Company's natural gas distribution center and a soil and construction debris pile referred to as the Shingle Pile, which was moved by EPA to its present location from the Bay Drum Site during an EPA removal action in 1989. The Consolidated Bag Company is located southwest of the Shingle Pile. Owned by Hillsborough County, the area south of the Bay Drum Facility is undeveloped and includes a portion of the Central Wetland. South of the Central Wetland is an area which was historically used as a sprayfield for the Hillsborough County Wastewater Treatment Plant. A prison is now present south of the Central Wetland.

The Peak Oil/Bay Drum Site is actually a composite of two separate Sites. The Peak Oil property covers approximately 4 acres while the Bay Drum property covers approximately 6 acres. An abandoned CSX Railroad spur runs south between the Peak Oil and Bay Drum facilities. This spur once serviced the Tampa Bay Sunshine Skyway Bridge painting site.

There are four Operable Units (OUs) identified at the Peak Oil/Bay Drum Site:

- OU-1 (Peak Oil Source Control)
- OU-2 (Area-Wide Groundwater)
- OU-3 (Bay Drum Source Control)
- OU-4 (Wetlands)

This amendment is related to OU-2 (Area-Wide Groundwater) and its initial (or original) ROD which was signed August 9, 1993. Pursuant to CERCLA §117 and NCP §300.435(c)(2)(ii), an amendment is needed because the 1993 selected remedy for the Surficial Aquifer and the 1993 selected remedy for the Floridan Aquifer are in need of fundamental alteration. This alteration changes the basic features of the 1993 selected remedies with respect to scope, performance and cost.
Regional Site Location Map
Peak Oil/Bay Drum Site

Reference:
USGS "Brandon, FL" Quadrangle Map
Dated 1956, Photorevised 1987

Scale: 1" = approx. 2750'

Figure 1 - Topo Map
2.2 Administrative History and Administrative Record

In the early 1980s, EPA and FDEP conducted inspections at the Peak Oil and Bay Drum Sites. Various chemical constituents were found to be present in Site soils, including heavy metals, petroleum hydrocarbons, trace concentrations of polychlorinated biphenyls (PCBs) and solvent-type chemical compounds.

In 1984, the Peak Oil and Bay Drum Sites were jointly evaluated according to the Hazard Ranking System and proposed for listing on the National Priority List (NPL) with a score of 58.15. On June 10, 1986, the Peak Oil Site, combined with the adjacent Bay Drum Site, was placed on the NPL. EPA initiated a removal action utilizing a mobile incinerator to treat sludge found in Lagoon No. 2 in 1986. In 1989, members of the Peak Oil Generators Group entered into a Consent Order with EPA to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the Peak Oil Site. The final RI Report was published in July 1992, and the FS Report was completed in September 1992.

As mentioned, there are four OUs identified at the Peak Oil/Bay Drum Site and this amendment is related to OU-2 (Area-Wide Groundwater) and its initial (or original) ROD, which was signed on August 9, 1993. According to the National Contingency Plan (NCP - §300.825(a)(2)), the ROD Amendment will become part of the Administrative Record. The final Administrative Record can be viewed at the EPA offices at the following address:

Sam Nunn Federal Center  
61 Forsyth Street  
Atlanta, Georgia 30303

The Administrative Record can also be viewed at the Local Repository in Brandon, Florida:

Brandon Regional Library  
619 Vonderburg Drive  
Brandon, Florida

The lead agency for this Site is the EPA with the Florida Department of Environmental Protection (FDEP) providing technical support (CERCLA §117 and NCP §300.435(c)(2)(ii)).

2.3 Summary of Circumstances Leading to ROD Amendment

The 1993 ROD selected remedial actions for two aquifers affected by contaminants from the Peak Oil/Bay Drum Site. Each aquifer will be discussed separately here and throughout this document.

Surficial Aquifer: The contaminant plume originates on the Peak and Bay properties. A narrow portion of the plume does extends across Broadway Road and onto the western side/border of Industrial Galvanizers of American facility (see Figure 2).
Figure 2 - Plume Map of Surficial Aquifer
A Remedial Design (RD) Work Plan for OU-1, OU-2 and OU-3, prepared by Parsons Engineering Science, was submitted to EPA as final in September 1998. Relative to the OU-2 remedy, the work plan identified several additional data requirements that were needed to complete the design of the groundwater treatment system. The RD Work Plan also noted that the remedial design for OU-2 could not be completed until the remedies for OU-1 and OU-3 were completed. For example, it would be necessary to know the final location of the stabilized soils, sediments, ash pile and other features of the OU-1 and OU-3 remedies in order to complete the OU-2 design. The remedies for OU-1 and OU-3 were completed in 2001.

A Surficial Aquifer pump test was one of the key tasks to be completed pursuant to the OU-2 RD Work Plan. The pump test was to provide specific data on the hydrogeologic properties of the Surficial Aquifer and to evaluate potential impacts to the Site-area wetlands. Components and procedures of the pump test were detailed in the Pre-Design Investigation Sampling and Analysis Plan (Parsons, 1998b).

The Surficial Aquifer pump test was conducted in January/February 1999. Results of the pump test were provided in the Pre-design Investigation Report (PDI Report) submitted to EPA on March 19, 1999. Principal conclusions were that flow rates achieved during both pump tests in the Surficial Aquifer were less than one gallon per minute (gpm) and that a groundwater extraction rate of less than 1 gpm would result in an excessive number of extraction wells. Specifically, the extraction well yields are likely to be in the range of 0.3 to 0.5 gpm per well. Therefore, in order to provide the yield anticipated when this alternative was selected by the 1993 ROD for OU-2, as many as 100 extraction points would have to be installed. In addition, groundwater sampling in the Surficial Aquifer showed the presence of reductive dechlorination for trichloroethene (TCE) and trichloroethane (TCA). A pattern of daughter product predominance has been observed at many of the monitoring points indicating biologically driven reductive degradation of chlorinated compounds (i.e., chlorinated compounds are being naturally degraded). Furthermore, the fuel hydrocarbons present at the Site (i.e., benzene, toluene, ethylbenzene and xylenes) may be acting as an organic substrate to stimulate reductive dechlorination.

Floridan Aquifer: The contaminants in the Floridan Aquifer are mostly centered around two old onsite production wells (F-2 and F-3).

The 1993 RI noted that the chemical concentrations detected in the two production wells (i.e., Production Wells F-2 and F-3) were similar to concentrations found in the Surficial Aquifer and much higher than concentrations detected in other adjacent Floridan Aquifer wells. The RI concluded that the chemical distribution in the Floridan Aquifer is characteristic of point source contamination (i.e., borehole leakage from old production wells F-2 and F-3). The two production wells were decommissioned in 1994. Sampling of the Floridan Aquifer wells since 1994 indicates that decommissioning of F-2 and F-3 has virtually eliminated the source of contaminant migration into the Floridan Aquifer. Furthermore, pH measurements collected in 2001 indicate that the pH levels in the Floridan, previously near 4 in 1995, have returned to the anticipated pH range for the Floridan Aquifer (i.e., 6.5 to 7.5).
In summary, Floridan Aquifer monitoring conducted since the OU-2 ROD indicates an overall decrease in organic compound concentrations, calling into question the wisdom of pursuing a pump and treat system as envisioned by the 1993 ROD for OU-2. Based on the downward trend over time, contaminant concentrations in the Floridan Aquifer support the premise for natural attenuation.
PART 3: SITE HISTORY, CONTAMINATION AND 1993 SELECTED REMEDY

3.1 History of Peak Oil Site

The Peak Oil Facility was constructed and began operation as a waste oil re-refinery in August 1954 under the ownership of Mr. John Schroter. Ownership of the company was transferred in 1975 to Mr. Robert Morris. Mr. Morris and his sons continued the operation of the business as a waste oil re-refinery. After 1979, operations reportedly were limited to the resale of used oils as fuel and flotation oil and repackaging of virgin material.

Facility operations involved the use of a waste re-refining process to purify waste oils and lubrications fluids. Waste oils accepted at the facility for re-refining consisted primarily of used auto and truck crankcase oil, with some hydraulic oil, transformer oil and other waste oils.

An acid/clay purification and filtration process was used to re-refine the oil. This process generated a low pH sludge and oil-saturated clay, which were stored over the life of the facility in three separate impoundment areas (Lagoons No. 1, No. 2, and No. 3). These three impoundments were located on the southern half of the Peak property. Two impoundments, Lagoons Nos. 2 and 3, were connected by an oil/water separator.

In 1979 or 1980, the company discontinued the re-refining process and shifted to filtering and blending the waste oil for resale as burner fuel or flotation oil. Several company employees have reported that spills and leaks continued to occur from on-site storage tanks, tanker trucks, oil/water separators, and other onsite equipment after the company shifted its operations from re-refining to filtering and blending. The former employees also reported that some wastes continued to be stored in the on-site lagoons after the shift to filtering and blending operations.

Lagoon No 1 and Lagoon No. 3 were backfilled. However, the exact dates of the backfilling are unknown. Lagoon No. 2 is the only impoundment on the Site that was not backfilled at that time. This lagoon originally contained up to 12 feet of sludge. Overflow from Lagoon No. 2 was apparently directed to the oil/water separator to remove free oil, and the aqueous phase was discharged into Lagoon No. 3, to the east. In 1986, EPA initiated a removal action utilizing a mobile incinerator to treat approximately 4,000 cubic yards of acidic polychlorinated biphenyl (PCB) sludge found in Lagoon No.-2. Approximately 6,000 cubic yards of ash generated during the incineration process was placed on and covered with a protective plastic cover at the Site. In short, all of these lagoons have been closed and no longer exist.

Hillsborough County is listed as the current owner of the Peak Oil property.

Figure 3 shows the location of the Peak Oil Facility in relation to the Bay Drum Facility and the Reeves Superfund Site.
Figure 3 - Site Map

Site Study Area
Peak Oil/Bay Drum Site
3.2 History of Bay Drum Site

Prior to development of the Bay Drum property in 1962, the property was an open field with some small trees. A one-acre wetland on the east side of the Site drained to the Central Wetland, about 300 feet to the southwest.

The Bay Drum Facility was historically operated as a drum reconditioning facility. Like Peak Oil, Bay Drum is no longer operating. During operation, drum reconditioning activities occurred within the building on the eastern portion of the Site. Although nearly the entire property has been used for drum storage, only approximately two acres in the northeast corner of the Site were considered an active drum reclaiming area.

A berm was constructed between 1962 and 1965 that crossed the southern one-third of the one-acre wetland. This effectively dried out the southern portion of this wetland. The southern portion of this wetland was reported to be hydraulically connected to the Peak Oil Site by means of a culvert beneath the CSX Railroad spur, allowing water to drain from the Peak Oil Site to the northern portion of the wetland. The northeast and south portions of the Bay Drum Site were purchased by Mr. Bennie Genuardi, the owner of the Bay Drum facility, in 1967 and 1968, respectively.

The volume of drums reconditioned at the Site increased from 1974 to 1978 under the ownership of Tamp Steel Drums. Drums were located along the western edge of the wetland in 1975. In a 1977 aerial photograph, the wetland had been backfilled. Presumably, soil from a new pond on the southeast corner of the Bay Drum Site had been used to backfill the wetland. Drainage from the Peak Oil Site was reportedly diverted by ditch to the Central Wetland. In 1978, the western portion of the previously filled wetland was developed into a washwater holding pond which is known to have received waste from drum reconditioning activities.


For approximately two and one-half years beginning in 1984, the Bay Drum Site was operated as Resource Recovery Association, Inc. During this time, waste roofing shingles were deposited on most of the Site to depths ranging from three to more than nineteen feet. In 1989, the EPA removed approximately 70,000 cubic yards of shingles in order to effectively evaluate the extent of soil contamination at the Site. The pile currently lies on Hillsborough County. EPA conducted another removal action at the Site in 1990 and removed contaminated soils, drums of hazardous waste, and bags of pesticides from the Site.

Mark S. King is listed as the current land owner for the Bay Drum property.
3.3 Summary of Previous Peak Oil/Bay Drum Investigations (RI/FS and Risk Assessments)

What ultimately became the Peak Oil/Bay Drum Site has been investigated numerous times over the years. The following paragraphs summarize the investigation leading to the 1993 ROD for OU-2.

In 1989, the Peak and Bay Groups entered into an Administrative Order by Consent with USEPA to conduct an Area-Wide RI/FS for groundwater. An Area-Wide RI characterized groundwater, surface water and sediment, evaluated fate and transportation of constituents of concern (COCs), assessed their potential impacts and compile data for the evaluation of remedial alternatives. The Area-Wide RI was conducted in two phases of investigation. Phase 1 was conducted between October 1989 and January 1990 and characterized the extent and nature of impacts. Phase 2 was conducted between July 1991 and September 1991 to provide supplemental data and information for the evaluation of remedial action alternatives.

Analytical results for groundwater showed impact to the two aquifers beneath the Site. The shallow Surficial Aquifer indicated the presence of several volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), inorganic compounds and few pesticides. The deeper Floridan Aquifer indicated the presence of VOCs, SVOCs and inorganics. Constituents in the Floridan Aquifer were primarily located in close proximity to on-site production wells (F-2 and F-3). Previously, these wells had allowed the migration of constituents from the overlying Surficial Aquifer into the Floridan Aquifer.

For the Peak Oil/Bay Drum Operable Unit 2 (OU-2; Area-Wide Groundwater), some 3,200 potentially responsible parties (PRPs) have been identified. A series of three deminimis actions have occurred over the years. The last deminimis settlement ended in early 2003.

As part of the RI/FS, a baseline risk assessment was conducted as part of the RI/FS to determine the current and future effects of contaminants on human health and the environment.

Current Risks for OU-2: The area-wide risk groundwater assessment did not address current exposure because the onsite groundwater was not currently being used as a source of drinking water. It should also be noted that a well survey was conducted in 1992, and in September of 2002, as required in the 1993 ROD, another targeted well survey was performed to re-verify well locations/uses near the Site. The 2002 survey focused on the area immediately surrounding the Site (i.e., a radius of approximately 1,500 foot). Because the direction of groundwater flow direction is determined to be to the north/northwest, an even larger area to the north, northwest and west of the Site was also surveyed. A total to 22 water supply wells were identified. None of the identified wells are used for drinking water purposes. Approximately 800 feet separates the nearest water supply well from the plume, and this well is to the northeast of the Site. Again, groundwater flow is determined to be north/northwest of the Site; therefore, the well closest to the Site is not in the path of the plume. More importantly, the closest water
supply well to the north/northwest of the Site is approximately 2.5 miles beyond the plume's leading edge.

**Future Risks:** The risks associated with the possible future exposures for workers or residents exceeds the risk range used by EPA for both the Surficial Aquifer and the Floridan Aquifer. The Floridan Aquifer is the current source of municipal water supplies in the area. For this reason, actual or threatened releases of hazardous substances from the groundwater, if not addressed, will continue to contaminate the groundwater and may present an imminent and substantial endangerment to the public health, welfare or the environment. As noted earlier, none of the 22 water supply wells identified near the Site are used for drinking water purposes.

3.4. **Summary of Remedial History Operable Units 1, 3 and 4**

As mentioned earlier, four OUs have been identified at the Peak Oil/Bay Drum Site. To place the remedy for OU-2 (to be discussed in Part 3.5) into perspective, the following is a brief summary of the remedial actions taken at the remaining three OUs.

3.4.1 **OU-1 (Peak Oil Source Control)**

The main contaminants of concerns at OU-1 are metals (e.g., lead), Bis (2-ethylhexyl)-phthalate and polychlorinated biphenols (PCBs). To address these contaminants, in June of 1993, a ROD for OU-1 (Peak Oil Source Control) was issued by EPA. The Peak Oil Group entered into a Consent Decree in May 1997 to perform work under the OU-1 ROD. Major elements of the OU-1 remedy were completed in 2001. The major components of the OU-1 remedy are as follows:

- Excavation and stabilization/solidification of impacted soils and the ash pile.
- Construction of a slurry wall around the impacted area and keyed into the underlying Hawthorn Formation.
- On-site disposal of the solidified/stabilized soils and ash in a single monolith.
- Installation of a low permeability cap over the treated material.
- Institutional controls to be placed on the property.

In addition to these components of the OU-1 remedy, the ROD also included a soil flushing/bioremediation component for organics. This remedial component was eliminated by EPA. The reasons for the elimination can be found in the Explanation of Significant Differences (ESD), dated June 26, 2000. Other elements addressed by the ESD included the revision of solidification performance standards and a modification of the cap design. The cap design change was from a multi-media cover system to a geosynthetic clay liner (GCL) cover system. Again, the OU-1 source control remedy was substantially completed in 2001. The institutional control (i.e., a Restrictive Covenant) was finalized in early 2004.

As of 2004, the Peak Oil property currently has one warehouse-type building standing on its northwestern corner. In addition, the property contains the capped and stabilized soil from Peak Oil. A slurry wall surrounds the capped and stabilized soil.
3.4.2 **OU-3 (Bay Drum Source Control)**

The main contaminants of concern at OU-3 are lead and chlordane. To address these contaminants, on March 31, 1993, a Record of Decision for OU-3 was issued by EPA. The Bay Group entered into a Consent Decree with EPA in February 1998 to perform work under the OU-3 ROD. The major components of the OU-3 remedy are as follows:

- Excavation and stabilization/solidification of impacted soils/sediments.
- On-site disposal of the solidified/stabilized soils in a single monolith.
- Installation of a low permeability cap over the treated material.
- Disposal of the on-site shingle pile (i.e., the shingles left on the Bay Drums property after the 1989 EPA Shingle Removal -completed in 1997).
- Placement of one foot of topsoil over the remainder of the uncapped Site.
- Placement of Institutional Controls on the property.

Major elements of the OU-3 remedy were completed in 2001. The Bay Drum Site is currently an open field. There are no buildings present on the Site. The Institutional Control (i.e., a Restrictive Covenant) was finalized on August 2, 2004.

3.4.3 **OU-4 (Wetlands)**

Three wetlands adjacent to the Site are located southwest, southeast and northwest. The main contaminants of concern at OU-4 are the contaminants transported by storm water runoff to the wetland (e.g., lead, chlordane, etc.). To address these contaminants, on June 28, 1994, a Record of Decision (ROD) for OU-4 was issued by EPA. The selected remedy for OU-4 does not involve active remediation measures, but does require periodic ecological assessments of specified time intervals. The conceptual model is that implementation of remedies for OU-1, OU-2 and OU-3 will either eliminate or significantly reduce the migration of contaminants into the wetland areas.

3.5 **Summary of Selected Remedy for OU-2, as originally described in ROD**

The main contaminants of concern for OU-2 are chlorinated solvents (e.g., dichloroethane, dichloroethylene, ethylbenzene, tetrachloroethylene, vinyl chloride) and acetone, benzene, toluene, ethylbenzene, xylenes. Metals are also listed as COCs in the 1993 ROD, but post-ROD sampling has not shown a distinct metals plume. References in the ROD Amendment to groundwater plumes should be understood to refer to organic compounds (i.e., fuel hydrocarbons or chlorinated solvents) and not a metals plume. These contaminants are found in both the Surficial Aquifer (i.e., from approximately 9 feet below land surface (b.s.) to approximately 37 feet b.s.) and the Floridan Aquifer (i.e., beginning at a depth below land surface of from approximately 30 feet to 80 feet). To address these contaminants in both aquifers, EPA issued the proposed plan for remedial action for the site. After receiving public comment on the proposed remedy, EPA signed a ROD for OU-2 on August 9, 1993. The 1993 ROD provides for the following:

- Groundwater extraction via extraction wells.
- Implementation of the Peak Oil source control remedy outlined in the Peak Oil/Bay Drum Record of Decision - Operable Unit 1.
- Air stripping for removal of volatile organic compounds (VOCs).
- Carbon polishing for removal of semi-volatiles and other organic materials.
- Discharge to a Publicly Owned Treatment Works (POTW). Groundwater will be treated to meet Federal and State drinking water standards and/or pollutant limits set by the local publically owned treatment works prior to discharge. The treated water will be conveyed via discharge piping to connect to a manhole for ultimate discharge to the POTW. A permit from the POTW will have to be obtained in order to discharge the treated groundwater into its system.
- Groundwater monitoring.

As a contingency, if necessary, chemical precipitation for the treatment of metals and discharge by either spray irrigation, recharge, or surface water as outlined in Alternative 3C of the Feasibility Study was added to the remedy. For instance, if the remedy failed to meet the pretreatment requirement of the local POTW for metals, the chemical precipitation component would be added to the remedy. Also, in the event that a POTW permit could not be obtained, EPA would select an alternative discharge method. If this had occurred, the treatment system would have been required to meet the appropriate discharge standards for the selected method.
PART 4: BASIS FOR AMENDED ROD

4.1 Scope of ROD Amendment

This ROD Amendment changes the remedy selected in the 1993 ROD and updates the cleanup standards for arsenic and vanadium. No other aspect of the 1993 ROD is impacted or changed by this amendment. For example, all of the 1993 ROD's objectives, cleanup standards (other than the updates for arsenic and vanadium), application (or no application) of secondary drinking water standards, etc. remain in force and are unaffected by this amendment.

4.1.1 Summary of Basis for Amending the ROD (Surficial Aquifer)

The contaminant plume originates on the Peak and Bay properties. A narrow portion of the plume extends across Faulkenburg Road and onto the western side/border of Industrial Galvanizing Plant (see Figure 2).

A Remedial Design (RD) Work Plan for OU-1, OU-2 and OU-3, prepared by Parsons Engineering Science, was submitted to EPA as final in September 1998. Relative to the OU-2 remedy, the work plan identified several additional data requirements that were needed to complete the design of the groundwater treatment system. The RD Work Plan also noted that the remedial design for OU-2 could not be completed until the remedies for OU-1 and OU-3 were completed. In order to complete the OU-2 design, it would be necessary to know the final location of the stabilized soils, sediments, ash pile and other features of the OU-1 and OU-3 remedies. The remedies for OU-1 and OU-3 have been completed.

A Surficial Aquifer pump test was one of the key tasks to be completed pursuant to the OU-2 RD Work Plan. The pump test was to provide specific data on the hydrogeologic properties of the Surficial Aquifer and to evaluate potential impacts to the Site-area wetlands. Components and procedures of the pump test were detailed in the Pre-Design Investigation Sampling and Analysis Plan (Parsons, 1998b).

The Surficial Aquifer pump test was conducted in January/February 1999. Results of the pump test were provided in the Pre-design Investigation Report (PDI Report) submitted to EPA on March 19, 1999. Principal conclusions were that flow rates achieved during both pump tests in the Surficial Aquifer were less than one gallon per minute (gpm) and that a groundwater extraction rate of less than 1 gpm would result in an excessive number of extraction wells. Specifically, the extraction well yields are likely to be in the range of 0.3 to 0.5 gpm per well. Therefore, in order to provide the yield anticipated when this alternative was selected by the 1993 ROD for OU-2, as many as 100 extraction points would have to be installed. In addition, groundwater sampling in the Surficial Aquifer shows the presence of reductive dechlorination for trichloroethene (TCE) and trichloroethane (TCA). A pattern of daughter product predominance has been observed at many of the monitoring points indicating biologically driven reductive degradation of chlorinated compounds (i.e., chlorinated compounds are being naturally degraded). Furthermore, the fuel hydrocarbons present at the Site (i.e., benzene, toluene, ethylbenzene and xylenes) may be acting as an organic substrate to stimulate reductive
dechlorination.

Regarding metals, interpretation of post-ROD monitoring suggests that most of the metals concern is probably attributable to turbidity and the sampling methodology previously used. The post-ROD monitoring to date does not suggest that metals constitute a distinct groundwater plume at the Site.

4.1.2 Summary of Basis for Amending the ROD (Floridan Aquifer)

The contaminants in the Floridan Aquifer are mostly centered around two old onsite production wells (F-2 and F-3).

The 1993 Remedial Investigation noted that the chemical concentrations detected in the two production wells (i.e., Production Wells F-2 and F-3) were similar to concentrations found in the Surficial Aquifer and much higher than concentrations detected in other adjacent Floridan Aquifer wells. The Remedial Investigation concluded that the chemical distribution in the Floridan Aquifer is characteristic of point source contamination (i.e., borehole leakage from old Production Wells F-2 and F-3). The two production wells were decommissioned in 1994. Sampling of the Floridan Aquifer wells shows the decommissioning of F-2 and F-3 has virtually eliminated the source of contaminant migration into the Floridan Aquifer. Furthermore, pH measurements collected in 2001 indicate that the pH levels in the Floridan, previously near 4 in 1995, have returned to the anticipated pH range for the Floridan Aquifer (i.e., 6.5 to 7.5).

In summary, Floridan Aquifer monitoring conducted since the OU-2 ROD indicates an overall decrease in organic compound concentrations, calling into question the wisdom of pursuing a pump and treat system as envisioned by the 1993 ROD for OU-2. Based on the downward trend over time, contaminant concentrations in the Floridan Aquifer support the premise for natural attenuation.
PART 5: DESCRIPTION OF NEW ALTERNATIVES

5.1 Summary of Original Remedy for OU-2 (Area-Wide Groundwater)

The main contaminants of concern for OU-2 are chlorinated solvents (e.g., dichloroethane, dichloroethylene, ethylbenzene, tetrachloroethylene, vinyl chloride) and acetone, benzene, toluene, ethylbenzene, xylenes. These contaminants are found in both the Surficial Aquifer (i.e., from approximately 9 feet below land surface (bls) to approximately 37 feet bls) and the Floridan Aquifer (i.e., beginning at a depth below land surface of from approximately 30 feet to 80 feet). To address these contaminants in both aquifers, EPA issued the proposed plan for remedial action for the site. After receiving public comment on the proposed remedy, EPA signed a Record of Decision (ROD) for the OU-2 on August 9, 1993. The 1993 ROD provided for the following:

- Groundwater extraction via extraction wells to address metals and organics.
- Implementation of the Peak Oil source control remedy outlined in the Peak Oil/Bay Drum Record of Decision - Operable Unit 1.
- Air stripping for removal of volatile organic compounds (VOCs).
- Carbon polishing for removal of semi-volatiles and other organic materials.
- Discharge to a Publicly Owned Treatment Works (POTW). Groundwater will be treated to meet Federal and State drinking water standards and/or pollutant limits set by the local publically owned treatment works prior to discharge. The treated water will be conveyed via discharge piping to connect to a manhole for ultimate discharge to the POTW. A permit from the POTW will have to be obtained in order to discharge the treated groundwater into its system.
- Groundwater monitoring.

As a contingency, if necessary, chemical precipitation for the treatment of metals and discharge by either spray irrigation, recharge, or surface water as outlined in Alternative 3C of the Feasibility Study was added to the remedy. For instance, if the remedy failed to meet the pretreatment requirement of the local POTW for metals, the chemical precipitation component would be added to the remedy. Also, in the event that a POTW permit could not be obtained, EPA would select an alternative discharge method. If this had occurred, the treatment system would have been required to meet the appropriate discharge standards for the selected method.

5.2 Summary of Alternatives Screening for Amended ROD

In order to evaluate the possible cleanup alternatives for OU-2, a Focused Feasibility Study (FFS) was begun in 2003. The FFS evaluated the following possible remedial alternatives (see Table 1). The alternatives in *italics* were retained for further evaluation against the nine evaluation criteria explained later in Part 6 of the Amended ROD (see Table 2). The Iron Permeable Reactive Barrier alternative was screened out as an alternative for further consideration based on bench-scale results which indicated that levels of total organic carbon at the Sites would have a negative impact on degradation rates. Although the pilot test results for the Chemical Oxidation alternative were promising, the conclusion was that it would be more efficient to capitalize on the already reducing environment to induce dechlorination.
5.2.1 Monitored Natural Attenuation

Because several of the alternatives listed in Table 1 include monitored natural attenuation or enhanced in-situ bioremediation (i.e., enhanced natural attenuation), a brief summary of the Agency's view of natural attenuation is needed prior to discussion of each alternative.

Monitored natural attenuation, as defined in the OSWER Directive, refers to the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods. The 'natural attenuation processes' that are at work in such a remediation approach include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or ground water.\(^1\)

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\(^1\) Natural attenuation processes can also convert some contaminants to more toxic forms.
EPA does not view MNA to be a “no action” remedy, but rather considers it to be a means of addressing contamination under a limited set of site circumstances where its use meets the applicable statutory and regulatory requirements. Also, MNA should be evaluated and compared to other viable remediation methods (including innovative technologies) during the study phases leading to the selection of a remedy and should not be considered a “presumptive” or “default” remediation alternative. The decision to implement MNA should include a comprehensive site characterization, risk assessment where appropriate, and measures to treat or otherwise control sources. In addition, the progress of natural attenuation towards a site’s remediation objectives should be carefully monitored and compared with expectations to ensure that it will meet site remediation objectives within a time frame that is reasonable compared to time frames associated with other methods. Where MNA’s ability to meet these expectations is uncertain and based predominantly on predictive analyses, decision-makers should incorporate contingency measures into the remedy.

If monitored natural attenuation comprises all or part of the remedy, the following points need to be addressed (see Part 6).

- A brief explanation of why natural processes are expected to achieve remedial objectives in a time frame that is reasonable in comparison to other alternatives.
- If a relatively long time frame is required for natural processes to attain remediation goals, explain why this remediation time period is appropriate for conditions at the site (e.g., no anticipated need for site ground water during this period).
- A description of the performance monitoring that will be part of the remedy and will be used to determine if natural attenuation is proceeding as anticipated.
- If applicable, a description of the contingency measures that will be implemented should the monitoring show that natural attenuation is unable to achieve the cleanup goals. Conditions that would trigger the contingency should also be specified (e.g., continued plume migration or contaminant levels are well above levels predicted for a specified time)
- Describe the institutional controls that will be implemented to prevent use of contaminated ground water until cleanup levels are achieved.

5.2.2 Description of Remedial Alternatives for OU-2 (Surficial Aquifer)

With the completion of the pump test for the Surficial Aquifer and the monitoring of the Surficial Aquifer since signing of the 1993 ROD for OU-2, understanding of the hydrogeology and contaminant history has significantly improved. Based on this new

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2 A remedial alternative using natural attenuation as the cleanup method is not the same as the “no action alternative.” When cleanup is required, natural attenuation may be able to attain cleanup levels in a timeframe that is “reasonable” when compared to other comparable alternatives. In general, the “no action” alternative is appropriate only when cleanup is not required.
information, EPA looked at the following alternatives for the Surficial Aquifer:

5.2.3 Surficial Aquifer Alternative 1: No Action

The no action alternative was retained for evaluation as a baseline comparison with the other remedies. This alternative involves no active remediation. However, 5 year reviews would be implemented to ensure that contaminants have not migrated beyond the compliance boundary in concentrations exceeding their cleanup levels. As such, in conjunction with each 5 year review, a round of groundwater sampling would be needed and costs would be incurred.

This alternative would also require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC. which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system).

5.2.4 Surficial Aquifer Alternative 2: Monitored Natural Attenuation

Like the no action alternative, monitored natural attenuation for the Surficial Aquifer involves no active remediation. This remedy would rely on existing natural degradation processes to degrade the plume. Any reduction in groundwater contaminant concentrations would be due to natural dispersion, attenuation, and degradation processes. Monitored natural attenuation would include the following:

- Collecting groundwater samples from locations on, or adjacent to, the Site property

Two types of monitoring locations would be established: monitoring wells in the plume and in the zone of natural attenuation to determine if the behavior of the plume is changing, and performance evaluation wells to confirm that contaminant concentrations meet regulatory acceptance levels. Groundwater monitoring would be implemented for a 30 year period. At the conclusion of each 5 year review, groundwater quality would be evaluated and the monitoring program would be revisited.

This alternative would also require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC. which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system).

5.2.5 Surficial Aquifer Alternative 3: Enhanced In-Situ Bioremediation

Enhanced In-Situ Bioremediation is an enhancement of the naturally occurring biodegradation of contaminants. With Enhanced In-Situ Bioremediation, an organic substrate (such as vegetable oil) would be injected into the subsurface in the areas of high
contamination, or to provide a "permeable reactive barrier" of substrate in line with the groundwater flow from a contaminated area. The organic substrate would provide a source of organic carbon to induce reducing conditions and to stimulate growth of indigenous microorganisms that will enhance rates of anaerobic reductive dechlorination of the groundwater contaminants. Effective injection of organic substrate can be accomplished with an oil emulsion using direct-push technology. The emulsion allows for easier distribution of the oil within the subsurface. The separate phase nature of the organic substrate allows for slow dissolution into groundwater, thus making it a slow release carbon source. Additionally, chlorinated compounds in the groundwater should partition in the organic substrate, which acts as a "sponge" to quickly remove these compounds from the groundwater until steady-state conditions are reached. The compounds are then slowly released as the organic substrate degrades into an active bioremediation zone.

Implementation of this alternative would require the following:

- Installation of an acceptable number of new monitoring wells to monitor groundwater downgradient of the oil emulsion, or organic substrate, injection areas.
- Performance of baseline groundwater sampling for parameters needed to track the success or failure of natural attenuation.
- Injection of organic substrate through the depth of the Surficial Aquifer using a slotted injection tool and direct push technology.
- Monitoring of chemical and natural attenuation parameters to document organic substrate distribution, reduction of contaminant concentration and mass, and annual monitoring for the same chemicals and parameters to evaluate progress toward achieving the cleanup levels. Monitoring will occur quarterly for the first 6 months after injection and every 6 months after that during the first 2 year period. After 2 years, the frequency of monitoring will be evaluated and modified as needed.
- Additional injection of organic substrate, if determined to be needed.
- Maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drums Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC, which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system) until cleanup is reached.

The groundwater monitoring component of this remedy would also require monitoring of metal concentrations to evaluate/document reductions over time and ongoing evaluation of monitoring wells to determine the effect of turbidity on observed metals.

5.2.6 Surficial Aquifer Alternative 4: Enhanced In-Situ Bioremediation with Source Area Treatment and MNA

This alternative consists of three interrelated components: Enhanced In-Situ Bioremediation, Air Sparging and Monitored Natural Attenuation (MNA).
The Enhanced In-Situ Bioremediation component is equivalent to that explained in Surficial Aquifer Alternative 3, including maintenance of Institutional Controls.

The Source Area Treatment portion of this alternative is to be utilized within the plume area at and around monitoring well (MW) B-7, an area containing high benzene, toluene, ethylbenzene and xylene (and chlorinated) compounds in groundwater. Air Sparging involves injecting a gas (usually air/oxygen) under pressure into the saturated zone to volatilize groundwater contaminants and to possibly promote biodegradation in saturated and unsaturated soils by increasing subsurface oxygen concentrations. An evaluation of the source area treatment will be made to determine if state and federal air emission standards are exceeded. If applicable standards are found to be exceeded, then corrective action will be taken.

The MNA component is equivalent to that explained in Surficial Aquifer Alternative 2. Both Enhanced In-Situ Bioremediation and Source Area Treatment are actions taken to supplement natural attenuation; hence, the inclusion of MNA in the title of this alternative. It is envisioned that at some future point in time, the actions to supplement natural attenuation will no longer be needed and this alternative will become a stand alone MNA remedy.

The groundwater monitoring component of this remedy would also require monitoring of metal concentrations to evaluate/document reductions over time and ongoing evaluation of monitoring wells to determine the effect of turbidity on observed metals.

5.2.7 Surficial Aquifer Alternative 5: Groundwater Extraction and Treatment (original 1993 ROD Remedy for OU-2)

Alternative 5 was the alternative originally proposed and selected remedy in the 1993 ROD for OU-2. This alternative includes the following:

- Groundwater extraction via extraction wells.
- Implementation of the Peak Oil source control remedy outlined in the Peak Oil/Bay Drum Record of Decision - Operable Unit 1.
- Air stripping for removal of volatile organic compounds (VOCs).
- Carbon polishing for removal of semi-volatiles and other organic materials.
- Discharge to a Publicly Owned Treatment Works (POTW).
- Metals precipitation, if needed.
- Groundwater monitoring.

This alternative would also require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system).
5.2.8 **Floridan Aquifer Alternative 1: No Action**

The no action alternative was retained for evaluation as a baseline comparison with the other remedies. This alternative involves no active remediation. However, 5 year reviews would be implemented to ensure that contaminants have not migrated beyond the compliance boundary in concentrations exceeding their cleanup levels. As such, in conjunction with each 5 year review, a round of groundwater sampling would be needed and costs would be incurred.

This alternative would also require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system).

5.2.9 **Floridan Aquifer Alternative 2: Monitored Natural Attenuation**

Like the no action alternative, the Monitored Natural Attenuation alternative for the Floridan Aquifer would involve no active remediation. This remedy would rely on existing natural degradation processes to degrade the plume. Any reduction in groundwater contaminant concentrations would be due to natural dispersion, attenuation, and degradation processes. Monitored Natural Attenuation would include:

- Collecting groundwater samples from locations on and adjacent to the Site property.

Sampling would be performed to evaluate the contaminant concentrations to confirm that contaminant concentrations meet regulatory cleanup levels. Groundwater monitoring would be implemented for at least a 30 year period. At the conclusion of each 5 year review, groundwater quality would be evaluated and the monitoring program would be revisited.

This alternative would also require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system).

5.2.10 **Floridan Aquifer Alternative 3: Groundwater Extraction and Treatment (original 1993 ROD Remedy for OU-2)**

Alternative 4 was the alternative originally proposed and selected remedy in the 1993 ROD for OU-2. This alternative includes the following:

- Groundwater extraction via extraction wells.
- Implementation of the Peak Oil source control remedy outlined in the Peak
Oil/Bay Drum Record of Decision - Operable Unit 1.

- Air stripping for removal of volatile organic compounds (VOCs).
- Carbon polishing for removal of semi-volatiles and other organic materials.
- Discharge to a Publicly Owned Treatment Works (POTW).
- Metals precipitation, if needed.
- Groundwater monitoring.

This alternative would also require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system).

5.3 Amended ROD's Impact on the Remedial Action Objective (RAO) and Expected Outcomes

Remedial Action Objectives (RAOs) for the Peak Oil/Bay Drum Site were developed from a review of the results of the site sampling data, site-specific risk and fate and transport evaluations, and review of ARARs. Operations conducted at the Site resulted in contamination of groundwater. The following is the RAO identified in the 1993 OU-2 ROD for the Peak Oil/Bay Drum Site:

- Restore groundwater to meet Federal and State drinking water standards.

This ROD Amendment does not change the RAO. Therefore, the expected outcome of the ROD Amendment is exactly the same as the expected outcome of the 1993 ROD (i.e., restoration of groundwater to drinking water standards).

The land use for cleanup of OU-2 is predicated on the soil remedy for OU-1 and OU-3. The Site is covered by two restrictive covenants, one for the Peak property and one for the Bay property. The following is a summary of the restrictions on land use as they currently exist on the Peak Oil/Bay Drum Site.

- The construction of any on-site water supply wells and/or irrigation wells on the Property is prohibited.
- Construction activities of any type on or through the remedial cap system or within 50 feet of the cap are prohibited.
- Any activities on the cap that might damage, alter in any fashion (such as planting ornamental landscaping), adversely affect, or otherwise be detrimental to the cap system are prohibited.
- Any subsurface activities which might puncture, breech or weaken (either chemically or physically) the slurry wall system are prohibited.
- Any activities which would damage or destroy the groundwater monitoring wells located on the Property, from time to time, including without limitation, onsite wells.
- Any activities which would damage, destroy or adversely impede the operation of any future groundwater extraction or treatment system.
- Any activities which would damage or destroy the fence and associated warning signs around the perimeter of the Site.
PART 6: EVALUATION OF ALTERNATIVES

6.1 Comparative Analysis of Alternatives

In this Part, each alternative is evaluated using the nine evaluation criteria required in Section 300.430(f)(5)(i) of the NCP. Specifically, the five alternatives for the Surficial Aquifer and the three alternatives for the Floridan Aquifer are compared in relation to the evaluation criteria described in Table 2 to determine which alternative best eliminates or reduces risks posed by contaminated groundwater.

<table>
<thead>
<tr>
<th>TABLE 2: CRITERIA FOR EVALUATING REMEDIAL ALTERNATIVES</th>
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</thead>
<tbody>
<tr>
<td>In selecting the preferred cleanup alternative, EPA uses the following criteria to evaluate each alternative developed in the Feasibility Study (FS).</td>
</tr>
<tr>
<td><strong>Threshold Criteria:</strong> The first two criteria are essential and if not met, an alternative is not considered further.</td>
</tr>
<tr>
<td>1. Overall Protection of Human Health and the Environment -- Degree to which alternative eliminates, reduces, or controls health and environmental threats.</td>
</tr>
<tr>
<td>2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) -- Assesses compliance with Federal/State requirements.</td>
</tr>
<tr>
<td><strong>Balancing Criteria:</strong> The next five are balancing criteria used to further evaluate all options that meet the first two criteria.</td>
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<tr>
<td>3. Long-Term Effectiveness -- How the remedy maintains protection once cleanup goals have been met.</td>
</tr>
<tr>
<td>4. Reduction of Toxicity, Mobility, or Volume Through Treatment -- Expected performance of the treatment technologies to lessen harmful nature, movement, or amount of contaminants.</td>
</tr>
<tr>
<td>5. Implementability -- Technical feasibility and administrative ease of a remedy.</td>
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<tr>
<td>6. Short-Term Effectiveness -- Length of time for remedy to achieve protection and impact of implementing the remedy.</td>
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<tr>
<td>7. Cost -- Weighing of benefits of a remedy against the cost of implementation.</td>
</tr>
<tr>
<td><strong>Modifying Criteria:</strong> The final two criteria are used to modify EPA's proposed plan after the public comment period has ended and comments from the community and the State have been received.</td>
</tr>
<tr>
<td>8. State Acceptance -- Consideration of State's opinion of EPA's proposed plan. EPA seeks state concurrence.</td>
</tr>
<tr>
<td>9. Community Acceptance -- Consideration of public comments on proposed plan.</td>
</tr>
</tbody>
</table>
The following sections of this ROD Amendment profile the relative performance of each alternative against the seven criteria and conclude with an opinion on which alternative compares most favorable against the criterium under consideration. The two modifying criteria are addressed in Parts 9 and 10 of the ROD Amendment.

Tables 5 and 6, located at the end of Part 6, summarize the relative performance of the Surficial Aquifer alternatives and the Floridan Aquifer alternatives summarized narratively in the following sections.

6.2 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

6.2.1 Overall Protection of Human Health and the Environment (Surficial Aquifer)

All of the Surficial Aquifer alternatives would require institutional controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site; continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC. which prohibits/restricts new potable water wells; continuation of Hillsborough County Ordinance 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system) to ensure protection prior to reaching the cleanup goals.

Threats to human health and the environment would not directly be eliminated, reduced or controlled by Surficial Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation). However, since no one is currently drinking the contaminated groundwater and natural attenuation seems to be occurring, Surficial Aquifer Alternatives 1 and 2, should, through natural degradation and given enough time, eventually reach the cleanup goals for the Site.

Surficial Aquifer Alternative 3 (Enhanced In-Situ Bioremediation) is expected to be protective of human health and the environment through prevention of further migration of contaminants by targeted placement of injection points for the organic substrate. The injection points would be placed perpendicular to groundwater flow, thereby intercepting daughter products of the dechlorination process (such as vinyl chloride) that may be more mobile than the original contaminant. Additionally, chlorinated compounds in the groundwater should partition into the organic substrate, which would act as a "sponge" to quickly remove these compounds from the groundwater until steady-state conditions are reached. The chlorinated compounds would then be slowly released as the organic substrate degrades into an active bioremediation zone. By enhancing the currently active biodegradation processes in the Surficial Aquifer, Alternative 3 should provide a much reduced time frame in meeting long term protection goals for the Site relative to Surficial Aquifer Alternatives 1 or 2.

Surficial Aquifer Alternative 4 (Enhanced in-situ Bioremediation with Source Treatment
All of the remedial alternatives are protective of Human Health and the Environment (i.e., Threshold Criteria 1 is met).

6.2.2 Overall Protection of Human Health and the Environment (Floridan Aquifer)

All of the Floridan Aquifer alternatives would require institutional controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site, continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC, which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system) to ensure protection prior to reaching the cleanup goals.

Threats to human health and the environment would not directly be eliminated, reduced or controlled by Surficial Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation). However, since no one is currently drinking the contaminated groundwater and natural attenuation seems to be occurring, Floridan Aquifer Alternatives 1 and 2 should, through natural degradation and given enough time, eventually reach the cleanup goals for the Site.

Floridan Aquifer Alternative 3 (Groundwater Extraction and Treatment) was the original remedy selected in the OU-2 ROD in 1993. This alternative would be protective of human health and the environment; however, extracted groundwater may not need to be treated since the contaminant levels have decreased to levels that may be acceptable for direct discharge to the POTW.

All of the remedial alternatives are protective of Human Health and the Environment (i.e., Threshold Criteria 2 is met).

6.3 Compliance with ARARs

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations, which are collectively referred to
Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking waiver. The chemical and location specific ARARs for the Site were established in the OU-2 ROD and thus apply to this ROD Amendment. Please see Part 7.3 and Tables 7, 8 and 9 for a more in-depth listing of the Site's ARARs.

6.3.1 Compliance With ARARs (Surficial Aquifer)

The previously identified chemical and location specific ARARs were established in the 1993 ROD (see Table 7). Action specific ARARs have been identified (see Table 9).

Regarding Alternatives 1 (No Action) and 2 (Monitored Natural Attenuation), natural degradation should eventually result in attainment of the chemical specific ARARs.

The action specific ARARs for Surficial Aquifer Alternatives 1, 2, 3 and 4 basically consist of State of Florida well requirements (e.g., well installation requirements for monitoring wells, well permitting, etc.) These requirements would be followed for Alternatives 1, 2, 3 and 4. Alternative 4 (Enhanced In-Situ Bioremediation with Source Control and MNA) would also include the following action specific ARAR: Air Pollution Control and Ambient Air Quality Standards. Monitoring will be performed to ensure that air standards are met.

Surficial Aquifer Alternative 5 was the original remedy selected in the 1993 ROD. Thus, the previously identified Federal and State ARARs identified in the 1993 ROD still apply.

None of the identified ARARs are expected to hinder implementation of any of the alternatives to the point where the alternative cannot be pursued.
6.3.2 Compliance With ARARs (Floridan Aquifer)

The previously identified chemical and location specific ARARs were established in the 1993 ROD (see Table 8). Action specific ARARs have been identified (see Table 9).

Regarding Alternatives 1 (No Action) and 2 (Monitored Natural Attenuation), natural degradation should eventually result in attainment of the chemical specific ARARs.

The action specific ARARs for Floridan Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) have been identified. The identified ARARs include well permitting requirements. These action specific ARARs would be followed for Alternatives 1 and 2.

Floridan Aquifer Alternative 3 (Groundwater Extraction and Treatment) was the original remedy selected in the 1993 ROD (e.g., State of Florida well requirements (e.g., well installation requirements for monitoring wells, well permitting, etc.). Thus, the previously identified Federal and State ARARs identified in the 1993 ROD still apply.

None of the identified ARARs are expected to hinder implementation of any of the alternatives to the point where the alternative cannot be pursued.

6.4 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

The following discussion on Long-Term Effectiveness and Permanence is predicated on the following assumption: All major sources of groundwater contamination have been removed or stabilized by the actions taken at OUs 1 and 3. In other words, the solidification/stabilization, capping and slurry wall at OU-1 and the soil covering at OU-3 have eliminated major continuing sources of contamination entering the groundwater system. Groundwater contamination observed at the points of compliance (POC) for OU-1 and OU-3 could come from at least two possible sources:

- existing contamination unrelated to an immediate release from OU-1 or OU-3 (i.e., past releases),
- a release from OU-1 or OU-3 (i.e., current releases).

Until the remedy for OU-2 has been successfully implemented, determining between these two possible sources will be difficult. After initiation of the groundwater remedy for OU-2, groundwater monitoring at OUs 1, 2 and 3 should, over time, be able to determine if OUs 1 and 3 are successful in keeping contaminants out of the groundwater as well as determining the success of the OU-2 remedy.
6.4.1 Long-Term Effectiveness and Permanence (Surficial Aquifer)

The long term effectiveness of Surficial Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) depends on the active natural attenuation processes ongoing in the aquifer. The resulting degradation of the contaminants in the aquifer should eventually result in permanent reduction of the contaminants. After successful implementation, this alternative should leave little residual risk. However, these alternatives have no identified options if the degradation does not proceed in a timely manner.

Surficial Aquifer Alternative 3 (Enhanced In-Situ Bioremediation) enhances the natural attenuation processes ongoing in the aquifer. The groundwater monitoring and evaluation program would provide data useful in targeting further biodegradation enhancements, where appropriate. With Surficial Aquifer Alternative 3, permanent reduction of contaminants is expected to occur faster than the reduction expected for Surficial Aquifer Alternatives 1 and 2. After successful implementation, Surficial Aquifer Alternative 3 should leave little residual risk.

Surficial Aquifer Alternative 4 (Enhanced In-Situ Bioremediation with Source Area Treatment and MNA) has all the advantages of Surficial Aquifer Alternatives 2 and 3 but further enhances cleanup with the addition of air sparging to the volatile contaminants near monitoring well B-7. After successful implementation, this alternative should leave little residual risk. If monitoring identifies areas of lingering contamination, further injections of the organic substrate can be made to target the remaining contaminants.

Surficial Aquifer Alternative 5 (Groundwater Extraction and Treatment) is dependent on the effectiveness of the extraction well placement in capturing the plume and/or “hot spot” areas of contamination. Treatment of the contaminated extracted water will provide permanent destruction of contaminants. However, even with successful and long term pumping, it is expected that residual contaminants would remain adsorbed in the subsurface and natural attenuation processes would be necessary to further reduce the subsurface contaminants.

Although all of the alternatives should result in permanent reduction and little residual risk, it is believed Surficial Aquifer 4 (Enhanced In-Situ Bioremediation with Source Treatment and MNA) provides the best long term effectiveness and permanence.

6.4.2 Long-Term Effectiveness and Permanence (Floridan Aquifer)

The long term effectiveness of Floridan Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) depends on the active natural attenuation processes ongoing in the aquifer. The resulting degradation of the contaminants in the aquifer should eventually result in permanent reduction of the contaminants. The monitoring and evaluation program for these two alternatives would provide data to evaluate residual risk that may remain and would provide data from which to estimate the time frame to reach cleanup. Further, Alternative 2 (Monitored Natural Attenuation) includes a contingency for injection of organic substrate if monitoring shows the contaminant concentrations to linger longer than expected. These two alternatives should be able to maintain protection.
once the cleanup levels have been reached.

Floridan Aquifer Alternative 3 (Groundwater Extraction and Treatment) is dependent on the effectiveness of the extraction well placement in capturing the plume and/or "hot spot" areas of contamination. Treatment of the contaminated extracted water will provide permanent destruction of contaminants. Little residual risk would be expected after conclusion of the pump and treat alternative.

It is believed that all of the Floridan Aquifer alternatives are about equal in providing long term effectiveness and permanence; however, alternatives 1 and 2 are probably more advantageous given that they are just as effective and permanent as alternative 3 but without the massive construction activities associated with Floridan Aquifer Alternative 3.

6.5 Reduction of Toxicity, Mobility or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

6.5.1 Reduction of Toxicity, Mobility or Volume Through Treatment (Surficial Aquifer)

All of the remedial alternatives ultimately result in reduction of toxicity, mobility and volume. However, the rate of reduction is different and the mechanism to meet the reduction differs.

Surficial Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) do not actively reduce toxicity, mobility or volume through treatment. However, a permanent benefit of reducing toxicity, mobility or volume would be realized through the currently active natural attenuation processes.

Surficial Aquifer Alternative 3 (Enhanced In-Situ Bioremediation) actively pursues accomplishes permanent reduction of toxicity, mobility and volume by biodegradation, enhanced by the placement of organic substrate into the subsurface. The injection points would be placed in barrier configurations perpendicular to groundwater flow, thereby intercepting daughter products of the dechlorination process that may be more mobile than the original contaminant. The aqueous phase chlorinated compounds would partition in the organic substrate to remove these contaminants from the groundwater until steady-state conditions are reached. The contaminants would then be slowly released as the organic substrate degrades into any active bioremediation zone.

Surficial Aquifer Alternative 4 (Enhanced In-Situ Bioremediation with source area treatment and MNA) accomplishes permanent reduction of toxicity, mobility and volume by the biodegradation process as described for Surficial Aquifer Alternative 3. In addition, treatment of contaminants near monitoring well B-7 would occur as a result of the installation of an Air Sparging System. Air sparging would inject a gas, probably air/oxygen, under pressure into the aquifer to force gas to move through contaminated aquifer material and groundwater. Treatment of the extracted gas would be pursued, as needed.
Surficial Aquifer Alternative 5 (Groundwater Extraction and Treatment) uses extraction of impacted groundwater to meet permanent reduction for toxicity, mobility and volume of contaminants. Use of oil/water separators (as needed), air stripping, carbon polishing and metals precipitation (as needed) would be used to treat the extracted groundwater thereby reducing contaminant concentrations to levels protective for discharge to the locally owned POTW.

Although all of the alternatives would use different “treatment” processes to reduce the toxicity, mobility or volume of the contaminants, it is believed Surficial Aquifer Alternative 4 (Enhanced In-Situ Bioremediation with source area treatment and MNA) provides the best reduction of toxicity, mobility and volume of contaminants.

6.5.2 Reduction of Toxicity, Mobility or Volume Through Treatment (Floridan Aquifer)

All of the remedial alternatives ultimately result in reduction of toxicity, mobility and volume. However, the rate of reduction is different and the mechanism to meet the reduction differs.

Floridan Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) do not actively reduce toxicity, mobility or volume through treatment. However, a permanent benefit of reducing toxicity, mobility or volume is realized through the currently active natural attenuation processes.

Floridan Aquifer Alternative 5 (Groundwater Extraction and Treatment) uses extraction of impacted groundwater to meet the reduction criteria. Use of oil/water separators (as needed), air stripping, carbon polishing and metals precipitation (as needed) would be used to treat the extracted groundwater thereby reducing contaminant concentrations to levels protective for discharge to the locally owned POTW.

It is believed that all of the Floridan Aquifer Alternatives are equally matched in meeting this balancing criterium.

6.6 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

6.6.1 Short-Term Effectiveness (Surficial Aquifer)

Given the fact that no one is currently drinking groundwater in this area, none of the Surficial Aquifer Alternatives pose a risk to the community during implementation. To maintain protection during cleanup, all of the Surficial Aquifer Alternatives would require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site, continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC. which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited
exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system) until cleanup is complete. In addition, Hillsborough County Ordinance 90-35 indicates that with certain limited exceptions (such as financial hardship), anyone constructing new or modifying existing residential, commercial or industrial buildings within 500 feet of a County main waterline must use the public water supply system. In short, Institutional Controls are already in place and operating within the Site boundary.

Surficial Aquifer Alternative 1 (no action) and 2 (Monitored Natural Attenuation) depend on ongoing natural processes. Given that no large constructions (other than possibly the construction of some additional monitoring wells for Alternative 2) are needed for these two alternatives, the short term risks to workers or community members are minimal. Compared to the other alternatives, the length of time for these alternatives to be up and running is very short; basically, the time needed to work up a monitoring plan and maybe install a few additional monitoring wells. However, the length of time to “operate” this remedy will be relatively long, but this is offset by the very low profile and impact associated with a remedy consisting of only a monitoring scheme.

Surficial Aquifer Alternative 3 (Enhanced In-Situ Bioremediation) will require some field work. Therefore, there is moderate short term risk to workers during operation of the direct push point rig for injection of the organic substrate and any additional monitoring well construction. There is no short-term risk to the community since most of the injection zones are in controlled areas and not accessible to the public. At least one injection zone may be close to an existing public road. Depending on how close the injection points are to the road, traffic control may be necessary during injection. Compared to the other alternatives, the length of field time for this alternative be up and running is moderate; basically, the time needed for injection(s) of the organic substrate.

Surficial Aquifer Alternative 4 (Enhanced In-Situ Bioremediation with Source Control and MNA) includes all the disadvantages outlined for Surficial Aquifer Alternative 3 and the risks to workers from installation and start-up of the Air Sparging System. This alternative is deemed to have moderate to high short term worker risk. Because the Air Sparging System is in controlled areas not accessible to the public, there would be little community risk. Compared to the other alternatives, the length of field time for this alternative be up and running is moderate to high; basically, the time needed for injection(s) of the organic substrate and installation of the air sparging system.

Surficial Aquifer Alternative 5 (Groundwater Extraction and Treatment) includes massive equipment installation and, in comparison to the other alternatives, much higher risk to workers. Compared to the other alternatives, the length of field time for this alternative be up and running is high; basically, the time needed for installation fo extraction wells and construction of the treatment system. The expectation is that operating time for this alternative would be the longest and most complicated, thereby increasing the risk to workers.

It is believed that Surficial Aquifer Alternatives 4 (Enhanced In-Situ Bioremediation with source area treatment and MNA) would provide the most cleanup advantage relative to short-term effectiveness.
6.6.2 Short-Term Effectiveness (Floridan Aquifer)

Given the fact that no one is drinking the water in this area, none of the alternatives pose a short term risk to the community. To maintain protection during cleanup, all of the Floridan Aquifer Alternatives would require maintenance of Institutional Controls (i.e., prohibition on installation of drinking water wells on the Peak Oil/Bay Drum Site, continuation of the Delineation Zone designation pursuant to Chapter 62-524 FAC, which prohibits/restricts new potable water wells; continuation of Hillsborough County 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system) until cleanup is completed. In addition, Hillsborough County Ordinance 90-35 indicates that with certain limited exceptions (such as financial hardship), anyone constructing new or modifying existing residential, commercial or industrial buildings within 500 feet of a County main waterline must use the public water supply system. The Institutional Controls are already in place and operating within the contaminant plume.

The Floridan Aquifer Alternative 1 (no action) depends on ongoing natural processes. Given that no large constructions are needed for this remedy, just groundwater monitoring, the short term risks to workers is minimal. Compared to the other alternatives, the length of field time for this alternative be up and running is short. This alternative would have no adverse impacts on the community from operating issues given that the only field action at the site would be groundwater monitoring every 5 years. Worker impacts would be limited to actions associated with sampling contaminated monitoring wells every 5 years.

Floridan Aquifer Alternative 2 (Monitored Natural Attenuation) uses natural processes already active in the areas of contamination. Implementation of MNA does not pose short-term risk to the community and only small risk to Site workers as no further remedial field work would occur at the Site other than possibly installation of a few new monitoring wells and ongoing groundwater monitoring. Compared to the other Floridan Aquifer Alternatives, the length of field time for this alternative be up and running is moderate; basically, the time needed to generate and approve a monitoring plan. Alternative 2 would have moderate adverse impact on workers for two reasons:

- the monitoring scheme for alternative 2 would be include more sampling events over time than Alternative 1,
- alternative 2 does not include all of the risks inherent in a larger industrial-like operation of an extraction and treatment system as envisioned in alternative 3.

Floridan Aquifer Alternative 3 (groundwater extraction and treatment) includes monitoring well installation, piping to the treatment plant, construction of the groundwater treatment system. In comparison to the other alternatives, this alternative has a much higher risk to workers. However, there should be little risk to the community because the extraction and treatment system would on fenced property and hence not easily accessible to the public. Compared to the other alternatives, the length of field time for this alternative be up and running is long, and the operating time could be quite long.
It is believed that Floridan Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) would provide the most cleanup advantage relative to short-term effectiveness advantages.

6.7 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

6.7.1 Implementability (Surficial Aquifer)

The actions associated with the no action and monitored natural attenuation alternatives (i.e., monitoring of groundwater wells) are considered both technically and administratively (including regulatorily) feasible and could be implemented without difficulties.

Surficial Aquifer Alternative 3 (Enhanced In-Situ Bioremediation) is also considered to be both technically and administratively feasible. Some regulatory approval would be needed for injecting the organic substrate and a water supply for substrate addition must be identified, but these are not considered insurmountable issues. Post-injection monitoring should be easily implemented.

Surficial Aquifer Alternative 4 (Enhanced In-Situ Bioremediation with source area treatment and MNA) is considered both technically and administratively feasible. Some approval will be needed for injecting the organic substrate and a water supply for substrate addition would have to be identified, but these are no insurmountable issues. Air sparging could also be readily implemented and would consist of injection points using a specific gas mixture at locations near monitoring well B-7. Post-injection monitoring of the organic substrate and air sparging should be easily implemented.

The groundwater extraction and treatment alternative would use standard technologies, albeit on a large scale (i.e., extraction of 50 gallons per minute (gpm) - estimated 100 extraction wells). Operational issues would have to be considered carefully (e.g., placement of wells, prevention of silting and/or biological fouling of well screens and pumps, etc.). In addition, access under the railroad for discharge to the POTW would be needed.

It is believed that Surficial Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) would be the easiest to implement.

6.7.2 Implementability (Floridan Aquifer)

The groundwater monitoring associated with Floridan Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) are considered both technically and administratively feasible and could be implemented without difficulties.
Floridan Aquifer Alternative 3 (groundwater extraction and treatment) would use standard technologies. Operational issues would have to be considered carefully (e.g., placement of wells, prevention of silting and/or biological fouling of well screens and pumps, etc.). In addition, access under the railroad for discharge to the POTW would be needed.

It is believed that Floridan Aquifer Alternatives 1 (no action) and 2 (Monitored Natural Attenuation) would be the easiest to implement.

6.8 Cost

Tables 8 and 9 present a comparison of the main segments of alternatives considered. The final costs of the project and the resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, the implementation schedule, the firm selected for final engineering design, and other variables. Therefore, final project costs will vary from the cost estimates. Because of these factors, project feasibility and funding needs must be reviewed carefully before specific financial decisions are made or project budgets are established to help ensure proper project evaluation and adequate funding. The specific details of remedial actions and cost estimates would be refined during final design.

Remedial action projects typically involve construction costs that are expended at the beginning of a project (e.g., capital costs) and costs in subsequent years that are required to implement and maintain the remedy after the initial construction period (e.g., annual operation and maintenance, monitoring costs, 5 year reviews, etc.). Present value/worth analysis is a method to evaluate expenditures which occur over different time periods. This standard methodology allows for cost comparisons of different remedial alternative on the basis of a single cost figure for each alternative. Therefore, the most meaningful comparison that can be made is found in the highlighted column titled Total Present Work Cost.

<table>
<thead>
<tr>
<th>Remedial Alternative</th>
<th>Monitoring Cost</th>
<th>5 Year Review Cost</th>
<th>Capital Cost</th>
<th>Total Present Worth Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No Action</td>
<td>$12,425 (per event)</td>
<td>$11,595</td>
<td>0</td>
<td>$101,980</td>
</tr>
<tr>
<td>2. Monitored Natural Attenuation</td>
<td>$62,525 (years 1-5)</td>
<td>$34,780</td>
<td>0</td>
<td>$693,026</td>
</tr>
<tr>
<td></td>
<td>$23,780 (years 6-30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Enhanced In-Situ Bioremediation</td>
<td>$20,425 (years 1-5)</td>
<td>$30,000</td>
<td>$648,700 (both direct and indirect)</td>
<td>$1,200,787</td>
</tr>
</tbody>
</table>
### TABLE 3: SURFACE AQUIFER COSTS OF REMEDIAL ALTERNATIVES

<table>
<thead>
<tr>
<th>Remedial Alternative</th>
<th>Monitoring Cost</th>
<th>5 Year Review Cost</th>
<th>Capital Cost</th>
<th>Total Present Worth Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Enhanced In-Situ Bioremediation with Source Area Treatment and MNA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$20,425 (years 1-5)</td>
<td>$45,000</td>
<td>$685,700 (both direct and indirect)</td>
<td>$1,377,829</td>
</tr>
<tr>
<td></td>
<td>$25,190 (years 6-30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$25,000 (O&amp;M for Air Sparging; years 1-3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Groundwater Extraction and Treatment</td>
<td>$32,100 (annual)</td>
<td>$23,185</td>
<td>$553,100 (both direct and indirect)</td>
<td>$5,674,820</td>
</tr>
<tr>
<td></td>
<td>$26,750 (O&amp;M for P&amp;T System; yearly)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 4: FLORIDIAN AQUIFER COSTS OF REMEDIAL ALTERNATIVES

<table>
<thead>
<tr>
<th>Remedial Alternative</th>
<th>Monitoring Cost</th>
<th>5 Year Review Cost</th>
<th>Capital Cost</th>
<th>Total Present Worth Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No Action</td>
<td>$15,025 (per event)</td>
<td>$11,595</td>
<td>0</td>
<td>$113,019</td>
</tr>
<tr>
<td>2. Monitored Natural Attenuation</td>
<td>$54,875 (years 1-5)</td>
<td>$34,780</td>
<td>0</td>
<td>$631,425</td>
</tr>
<tr>
<td></td>
<td>$21,440 (years 6-10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Groundwater Extraction and Treatment</td>
<td>$32,100 (annual)</td>
<td>$23,185</td>
<td>$351,200</td>
<td>$5,214,204</td>
</tr>
<tr>
<td></td>
<td>$148,000 (O&amp;M; yearly)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 5: SURFICIAL AQUIFER COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

<table>
<thead>
<tr>
<th>Criterion</th>
<th>No Action (1)</th>
<th>Monitored Natural Attenuation (2)</th>
<th>Enhanced In-Situ Bioremediation (3)</th>
<th>Enhanced In-Situ Bioremediation with Source Treatment and MNA (4)</th>
<th>Groundwater Extraction and Treatment (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall Protectiveness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2. Compliance with ARARS</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>3. Long-Term Effectiveness and Permanence</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>4. Reduction of Toxicity, Mobility, or Volume</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>5. Short-Term Effectiveness</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>6. Implementability</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7. Present Worth Cost</td>
<td>$101,980</td>
<td>$693,026</td>
<td>$1,200,787</td>
<td>$1,377,829</td>
<td>$5,674,820</td>
</tr>
</tbody>
</table>

### TABLE 6: FLORIDIAN AQUIFER COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

<table>
<thead>
<tr>
<th>NCP Criterion</th>
<th>No Action (1)</th>
<th>Monitored Natural Attenuation (2)</th>
<th>Groundwater Extraction and Treatment (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall Protectiveness</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2. Compliance with ARARS</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3. Long-Term Effectiveness and Permanence</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4. Reduction of Toxicity, Mobility, or Volume</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5. Short-Term Effectiveness</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

---

3 The comparison is a relative evaluation from 1 to 5 (i.e., a 1 is least advantageous for the criterion; a 5 is most advantageous for the criterion).

4 The comparison is a relative evaluation from 1 to 3 (i.e., a 1 is least advantageous for the criterion; a 3 is most advantageous for the criterion).
6. Implementability

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Implementability</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7. Cost</td>
<td>$113,019</td>
<td>$631,425</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$5,214,204</td>
</tr>
</tbody>
</table>

6.9 State Acceptance

See Part 9 of the ROD Amendment.

6.10 Community Acceptance

See Part 10 of the ROD Amendment.

6.11 Principal Threat Wastes

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP §300.430(a)(1)(iii)(A)). Identifying principal threat waste combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. The contaminated groundwater in the Surficial and Floridan Aquifers is not considered to be “principal threat wastes” because groundwater is not a source of contamination, but, rather, groundwater is the environmental medium contaminated by other sources.

6.11.1 Principal Threat Wastes (Surficial Aquifer)

With regard to “principle threat wastes,” the remedy for OU-2 (groundwater) must be understood in relation to the corrective actions taken at the source(s) of the groundwater contamination, namely, the stabilization/solidification, capping and slurry wall installation for OU-1 (Peak Oil Source) and the stabilization/solidification and soil covering at OU-3 (Bay Drum Source). The actions at OUs 1 and 3 were source control actions to address "principle threat wastes" through treatment and engineering controls.

All of the Surficial Aquifer Alternatives should dovetail with the remedial actions taken at OUs 1 and 3 and satisfactorily meet EPA’s goal to restore groundwater to drinking water standards.

6.11.2 Principal Threat Wastes (Floridan Aquifer)

With regard to “principle threat wastes,” the remedy for the Floridan Aquifer must be understood in relation to the following:

completed actions -

- closure of the pathway(s) of contaminant migration from the Surficial Aquifer to the Floridan (i.e., closing of the old production wells).
- stabilization/solidification, capping and installation of a slurry wall at OU-1.
- stabilization/solidification and installation of a soil cover at OU3.
and the following to-be-completed actions -

- remediation of groundwater contaminants in the Surficial Aquifer.

With the source of groundwater contamination removed or controlled along with the actions planned for the Surficial Aquifer, all of the Floridan Aquifer Alternatives should complete the Agency’s approach to the “principle threat wastes” at the Peak Oil/Bay Drum Site.

6.12 Proposed Remedy (Surficial Aquifer)

In the August 2004 Proposed Plan, EPA championed Surficial Aquifer Alternative 4 (enhanced in-situ bioremediation and source area treatment and MNA) is the most practical and efficient alternative and has the best chance of eliminating or significantly reducing risks at the site.

6.13 Proposed Remedy (Floridan Aquifer)

In the August 2004 Proposed Plan, EPA championed Floridan Aquifer Alternative 2 (MNA) as the most practical alternative and will lead to the elimination or significant reduction of risks at the Site.
PART 7: SELECTED REMEDY

7.1 Selected Remedy (Surficial Aquifer)

Although the Surficial Aquifer could be used as a future source of drinking water, it is not currently being used for this purpose either on-site or near-by off-site. The RAO for the ground-water portion of this remedial action is to restore contaminated ground water in the Surficial Aquifer to restore groundwater to its beneficial use. Cleanup levels for the Surficial Aquifer can be found in Part 7.3 (and Table 7).

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public and state comments, the selected remedy for the Surficial Aquifer is Surficial Aquifer Alternative 4 (Enhanced In-Situ Bioremediation and Source Area Treatment and MNA). This alternative was the remedy proposed in the August 2004 Proposed Plan. This alternative is the most practical and efficient alternative and has the best chance of eliminating or significantly reducing risks at the site and achieving the RAO and associated cleanup levels.

Implementation of Surficial Aquifer Alternative 4 (Enhanced In-Situ Bioremediation and Source Area Treatment and MNA) will include the following major components:

A. Submission of an acceptable Remedial Design (RD) to cover injection of an organic substrate in targeted portions of the Surficial Aquifer. The injection technology should be similar to or analogous to a slotted injection tool and direct push technology.

B. Submission of a acceptable RD for installation of an Air Sparging System in the vicinity of monitoring well B-7 to address plume areas with total VOCs containing 100 ppb.

C. Submission of an acceptable Operation and Monitoring Plan (O&M), including a Groundwater Monitoring Plan. The objective of the O&M Plan is to cover all actions necessary for the remedial action in the Surficial Aquifer to be maintained until cleanup levels are reached. The Groundwater Monitoring Plan must identify all actions necessary to create a satisfactory monitoring plan to track the success or failure of meeting the cleanup levels (e.g., identify the monitoring wells for chemical analysis, identify all parameters to be monitored, identify the sampling techniques, etc.). The plan must meet the following general objectives:

- identify points of compliance (POC) for OU-2,
- evaluate/document whether the enhanced attenuation process is eliminating organic contaminants to levels below the OU-2 groundwater

5 Application of the cleanup standards extends to the entire extent of the groundwater plume. In federal terms, the point of compliance for meeting cleanup standards is "throughout the plume." In state terms, if the groundwater plume extends beyond the property boundary, then the department is authorized to temporarily move the point of compliance to the edge of the plume (i.e., a temporary point of compliance, Section 376.30701(2)(b) Florida Statute).
cleanup levels.
- evaluate/document whether the Air Sparging System is eliminating organic contaminants to levels below the OU-2 groundwater cleanup levels.
- evaluate/document whether the Air Sparging System is causing any air violations.
- evaluate/document the impact of turbidity on metals concentrations and to evaluate/document whether attenuation processes are reducing soluble metal contaminants to levels below the OU-2 groundwater cleanup levels.\(^6\)
- evaluate/document an adverse impact on the remedy to the groundwater plume associated with the Reeves Superfund Site (e.g., monitor for zinc, nickel).
- evaluate for the presence of total recoverable petroleum hydrocarbons (TRPH).\(^7\)

Both Enhanced In-Situ Bioremediation and Source Area Treatment are actions taken to supplement natural attenuation; hence, the inclusion of MNA in the title of this alternative. It is envisioned that at some future point in time, the actions to supplement natural attenuation will no longer be needed and this alternative will become a stand-alone MNA remedy. Once Enhanced In-Situ Bioremediation and Source Area Treatment is complete, the Groundwater Monitoring Plan will have to be updated to shift to MNA remedy monitoring. Before shifting to MNA remedy monitoring, the natural attenuation default concentrations (NADC) in Chapter 62-777 FAC (specifically, Table 5 of Chapter 62-777 FAC) must be met.

To meet the above objectives for the Groundwater Monitoring Plan, the major groups of constituents to be monitored shall include the following:

- COCs identified in the RODs for OU1, OU-2 and OU-3 with cleanup levels.
- Underlying constituents related to constituents of concern to assure that cleanup of COCs is protective (e.g., pyrene, benzo(a)pyrene, TRPH or equivalent (e.g., C8 - C40), etc.). For example, monitoring to date has included some non COCs as indicators of remediation (e.g., cis-1,2-dichloroethene, trichloroethene, benzo(a)pyrene, etc.).
- Bioremediation/natural attenuation indicators (e.g., dissolved oxygen, pH, etc.) needed to monitor changes to the natural system induced by injection of the organic substrate. The objective is to monitor parameters which can provide an indication of the extent, rate, etc. of bioremediation/natural

\(^6\) Groundwater monitoring to date does not indicate the presence of distinctive plumes of metals (e.g., lead, arsenic, vanadium, etc.) at the site. The expectation is that future metal concentrations exceeding their respective cleanup levels will also be sporadic over time and geography and that such metals will be addressed by natural attenuation.

\(^7\) If monitoring and data interpretation finds TRPH attributable to the Peak/Bay Site, then TRPH would be incorporated as a groundwater cleanup goal for the Site.
attenuation.

- Select constituents which could adversely impact the Reeves groundwater plume. The objective is to monitor groundwater to quickly detect any induced groundwater changes which could adversely impact the Reeves groundwater plume given local groundwater flow regimes. At a minimum, the constituents to be analyzed shall include zinc and nickel.

The O&M Plan must also address maintenance and compliance with the following Institutional Controls until final cleanup is reached:

- The restrictions found in the Declaration of Restrictive Covenants placed on the Peak Oil Site in March 2004.
- The restriction found in the Declaration of Restrictive Covenants placed on the Bay Drum Site in May 2004.
- The restriction associated with the Delineation Zone designation filed pursuant to Chapter 62-524 FAC. (See Figure 4 for a presentation of the Delineation Zone).
- The restrictions associated with Hillsborough County Ordinance 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system.

To further ensure that these controls are followed, annual notification to local government entities, including the water management district regarding site activities and associated institutional controls, is to occur. This annual notification will assure appropriate coordination during area activities such as dewatering during construction or well installation proposals. Owners of property affected by the plume are to also be notified annually.

D. Groundwater monitoring (and associated reporting) for the organic substrate injections shall occur on the following schedule:

- Quarterly sampling for the first 6 months following any injection of organic substrate.
- Semi-Annually for years 1 through 2.
- Annually for years 2 through 10.

The need for monitoring beyond year 10 will be determined in the 5 year review report performed in year 10.

E. Groundwater monitoring (and associated reporting) of the Air Sparging System shall be identified in the Groundwater Monitoring Plan once the system is installed and operating. Air monitoring shall also be identified in the Groundwater Monitoring Plan or similar document submitted after system construction. To demonstrate compliance with federal and state air emission requirements, the air monitoring will be pursuant to applicable ARARs (e.g., Chapter 204, FAC, Chapter 210, FAC, etc.).
After year 3, the need for continuation of the air sparging system (and associated monitoring) will be re-evaluated. The two possible outcomes of the re-evaluation are as follows:

- Cessation of the Air Sparging System (and associated monitoring)
- Continuation of the Air Sparging System or some modification of the system (and associated monitoring).

F. Possible re-injection(s) of organic substrate. If groundwater monitoring indicates that contaminant levels are not declining at a acceptable rate or that contaminant migration is occurring beyond previously identified plume boundaries, then a second, third, etc. injection of organic substrate or system modification will be pursued. One or more of the following observations could trigger a re-injection:

- Increase in levels of parent contaminants, indicating that other sources may be present or recently re-mobilized.
- Concentration levels of parent contaminants and/or daughter products begin to differ significantly from predictions based on historical sampling results.
- Contaminant plume for parent contaminants and daughter products increase significantly in areal or vertical extent and/or volume from that predicted by historical sampling results.
- Concentrations of parent contaminants and/or daughter products level off at concentrations above the cleanup level.

G. Submission of a Close Out Report covering the active remedial actions (i.e., Enhanced In-Situ Bioremediation and Air Sparging).
Delineation Zone
Peak Oil/Bay Drums Site

Chapter 62-524, F.A.C.
Bay Drum/Peak Oil/Reeves

Delineated November 1994
Delineation Zone ID 29993407

Delineated for: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Silver, Sodium, TCE, PCE, Vinyl Chloride, Benzene, 1,1,1-Trichloroethane, 1,1-dichloroethene

Map Prepared October 28, 2003
Ground Water Regulatory Section
Florida Department of Environmental Protection

This map is to be used for location purposes only.

Figure 4 - Delineation Zone Map
7.2 Selected Remedy (Floridan Aquifer)

The Floridan Aquifer could be used as a future source of drinking water, but is not being used currently for this purpose either on-site or near-by off-site. The RAO is to restore contaminated ground water in Floridan Aquifer to restore groundwater to its beneficial use. Cleanup levels for the Floridan Aquifer can be found in Part 7.3 (also see Table 8).

The Selected Remedy for the Floridan Aquifer is Alternative 2 (Monitored Natural Attenuation). This alternative was the remedy proposed in the August 2004 Proposed Plan.

Implementation of this alternative will include the following major components:

A. Submission of an acceptable O&M Plan, including a Groundwater Monitoring Plan. The objective of the O&M Plan is to cover all actions necessary for the remedial action in the Floridan Aquifer to be maintained until cleanup levels are reached. The main objectives of the Groundwater Monitoring Plan are:

- to identify points of compliance (POC)\(^8\) for OU-2,
- to gather data for evaluating whether or not the plume is expanding relative to the POC for OU-2, and
- to routinely evaluate whether natural attenuation processes are eliminating contaminants to levels below the OU-2 groundwater cleanup levels.

The plan must identify all actions necessary to create a satisfactory monitoring plan (e.g., identify the Floridan Aquifer monitoring wells for chemical analysis, identify the parameters to be monitored, identify the sampling techniques, etc.).

The O&M Plan must also address maintenance and compliance with the following Institutional Controls until final cleanup is reached:

- The restrictions found in the Declaration of Restrictive Covenants placed on the Peak Oil Site in March 2004.
- The restriction found in the Declaration of Restrictive Covenants placed on the Bay Drum Site in May 2004.
- The restriction associated with the Delineation Zone designation filed pursuant to Chapter 62-524 FAC. (See Figure 4 for a presentation of the Delineation Zone).
- The restrictions associated with Hillsborough County Ordinance 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system.

\(^8\) Application of the cleanup standards extends to the entire extent of the groundwater plume. In federal terms, the point of compliance for meeting cleanup standards is “throughout the plume.” In state terms, if the groundwater plume extends beyond the property boundary, then the department is authorized to temporarily move the point of compliance to the edge of the plume (i.e., a temporary point of compliance, Section 376.30701(2)(b) Florida Statute).
To further ensure that these controls are followed, annual notification to local government entities, including the water management district regarding site activities and associated institutional controls, is to occur. This annual notification will assure appropriate coordination during area activities such as dewatering during construction or well installation proposals. Owners of property affected by the plume are to also be notified annually.

B. Groundwater monitoring (and associated reporting) shall occur on the following schedule:

- Annually during years 1 through 5.
- Biannually during years 6 through 30 if review of the sampling results in the first 5 year review report concur with the move to biannual monitoring and reporting.

The need for monitoring beyond year 30 will be determined in the recent 5 year review report performed in year 30.

C. If groundwater monitoring indicates that contaminant levels are not declining at an acceptable rate, then the remedy decision will be re-evaluated and the following contingency may be pursued: enhanced in-situ biodegradation (i.e., injection of an organic substrate). The need for the contingency will be evaluated on an annual basis. One or more of the following observations could trigger application of the contingency:

- Increase in levels of parent contaminants, indicating that other sources may be present.
- Concentration levels of parent contaminants and/or daughter products begin to differ significantly from predictions based on historical sampling results.
- Contaminant plume for parent contaminants and daughter products increase significantly in areal or vertical extent and/or volume from that predicted by historical sampling results.

7.3 Final Cleanup Levels

The Final Cleanup Levels for groundwater are equivalent to the Final Cleanup Levels for groundwater found in the 1993 ROD, except for arsenic and vanadium which have been lowered to satisfy new standards (see ROD Amendment Section 10.2). The chemical specific cleanup levels are shown in Tables 7 and 8:

---

As with other metals whose cleanup standards have not been lowered, groundwater monitoring to date does not indicate the presence of plumes of arsenic and vanadium at the site. The expectation is that metal concentrations exceeding their respective cleanup levels will also be sporadic over time and geography and that such metals will be addressed by natural attenuation.
<table>
<thead>
<tr>
<th>Volatiles</th>
<th>Volatile</th>
<th>Volatile</th>
<th>Volatile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>3,000</td>
<td>Rfd</td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>1</td>
<td>MCL (FL)</td>
<td>MCL (FL)</td>
</tr>
<tr>
<td>1,1 Dichloroethane</td>
<td>2,400</td>
<td>Rfd</td>
<td></td>
</tr>
<tr>
<td>1,2 Dichloroethane</td>
<td>3</td>
<td>MCL (FL)</td>
<td></td>
</tr>
<tr>
<td>1,1 Dichloroethylene</td>
<td>7</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>1,2 Dichloroethylene (total)</td>
<td>70</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>700</td>
<td>MCLG</td>
<td></td>
</tr>
<tr>
<td>Methylene Chloride</td>
<td>5</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>Tetrachlorethylene</td>
<td>3</td>
<td>MCL (FL)</td>
<td></td>
</tr>
<tr>
<td>Tolune</td>
<td>1,000</td>
<td>MCLG</td>
<td></td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>1</td>
<td>MCL (FL)</td>
<td></td>
</tr>
<tr>
<td>Xylenes (total)</td>
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<td>MCLG</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bis(2-chloroethyl)ether</td>
<td>7</td>
<td>CSF</td>
<td></td>
</tr>
<tr>
<td>Bis(2-ethylhexly)phthalate</td>
<td>6</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>2-Methylphenol</td>
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<td>Rfd</td>
<td></td>
</tr>
<tr>
<td>Naphthalene</td>
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<td>FAC. 17-770</td>
<td></td>
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<td>Inorganics</td>
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</tr>
<tr>
<td>Antimony</td>
<td>6</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td>10</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>Beryllium</td>
<td>4</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>Chromium</td>
<td>100</td>
<td>MCL (FL)</td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>15</td>
<td>AL</td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>160,000</td>
<td>MCL (FL)</td>
<td></td>
</tr>
<tr>
<td>Vanadium</td>
<td>49</td>
<td>Rfd</td>
<td></td>
</tr>
<tr>
<td>Volatiles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Acetone</td>
<td>3,000</td>
<td>Rfd</td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>1</td>
<td>MCL (FL)</td>
<td></td>
</tr>
<tr>
<td>1,1 Dichloroethane</td>
<td>2,400</td>
<td>Rfd</td>
<td></td>
</tr>
<tr>
<td>1,2 Dichloroethane</td>
<td>3</td>
<td>MCL (FL)</td>
<td></td>
</tr>
<tr>
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<td>7</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td>1,2 Dichloroethylene (total)</td>
<td>70</td>
<td>MCL</td>
<td></td>
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<tr>
<td>Ethylbenzene</td>
<td>30</td>
<td>SMCL (FL)</td>
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</tr>
<tr>
<td>Methylene Chloride</td>
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<td>MCL</td>
<td></td>
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<tr>
<td>Tetrachlorethylene</td>
<td>3</td>
<td>MCL (FL)</td>
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<td>Vinyl Chloride</td>
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<tr>
<td>Xylenes (total)</td>
<td>20</td>
<td>SMCL (FL)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
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<th>Semi-Volatiles</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Bis(2-chloroethyl)ether</td>
<td>7</td>
<td>CSF</td>
</tr>
<tr>
<td>Bis(2-ethylhexyl)phthalate</td>
<td>6</td>
<td>MCL</td>
</tr>
<tr>
<td>2-Methylphenol</td>
<td>2,000</td>
<td>Rfd</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>100</td>
<td>FAC. 1-770</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Inorganics</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>200</td>
<td>SMCL (FL)</td>
</tr>
<tr>
<td>Antimony</td>
<td>6</td>
<td>MCL</td>
</tr>
<tr>
<td>Arsenic</td>
<td>10</td>
<td>MCL</td>
</tr>
<tr>
<td>Beryllium</td>
<td>4</td>
<td>MCL</td>
</tr>
</tbody>
</table>

10 Cleanup Level Basis Definitions

Rfd  =  Cleanup level is based on protection of health from the non-cancer reference dose and future residential exposure.
MCL (FL)  =  Cleanup level is a Florida primary drinking water MCL.
MCL  =  Cleanup level is a Federal primary drinking water MCL.
SMCL (FL)  =  Cleanup level is a Florida secondary drinking water MCL.
CSF  =  Cleanup level is a health-based number derived from the cancer slope factor and the future residential assumptions from the Baseline RA (Represents a $10^{-4}$ risk level).
FAC 17-770  =  Cleanup level is a petroleum-contaminated site cleanup criteria as listed in the Florida Administrative Code, Chapter 17-770.
AL  =  Cleanup level is the federal action level for lead.
As mentioned, all of the 1993 ROD’s remedial action objectives, cleanup standards, application (or no application) of secondary drinking water standards, etc. remain in force and (except for the lowering of the cleanup standard for arsenic and vanadium - see ROD Amendment Section 10.2) are unaffected by this amendment. Regarding secondary drinking water standards, the 1993 ROD recommended not applying secondary drinking water standards in the Surficial Aquifer under the following conditions:

Condition 1 A thorough door-to-door private well survey shall be performed as a task in the OU-2 Remedial Design.

Condition 2 Monitoring of replacement Floridan Aquifer wells must indicate that plugging and abandonment of the on-site Floridan production wells (F-2 and F-3) is effective in preventing continued vertical migration of contaminants into the Floridan Aquifer where secondary standards must be met.

Condition 1 has been met. The 1993 ROD’s call for a door-to-door private well survey was conducted in 1992. Further, in September of 2002, as required by the 1993 ROD, a targeted well survey was performed to re-verify well locations/uses near the Site. The 2002 survey focused on the area immediately surrounding the Site (i.e., a radius of approximately 1,500 foot). Because the direction of groundwater flow direction is determined to be to the north/northwest, an even larger area to the north, northwest and west of the Site was also surveyed. A total to 22 water supply wells were identified. None of the identified wells are used for drinking water purposes. Approximately 800 feet separates the nearest water supply well from the plume, and this well is to the northeast of the Site. Again, groundwater flow is determined to be north/northwest of the Site; therefore, the well closest to the Site is not in the path of the plume. More importantly, the closest water supply well to the north/northwest of the Site is approximately 2.5 miles beyond the plume’s leading edge.

Condition 2 appears to have been met. Sampling since the 1993 ROD of the Floridan Aquifer wells shows that decommissioning of F-2 and F-3 has virtually eliminated the source of contaminant migration into the Floridan Aquifer. Furthermore, pH measurements collected in 2001 indicate that the pH levels in the Floridan, previously near 4 in 1995, have returned to the anticipated pH range for the Floridan Aquifer (i.e., 6.5 to 7.5). Further monitoring of the Floridan Aquifer will occur during remedy
implementation to ensure that contamination does decrease to cleanup levels.

7.4 Expected Outcomes of the Selected Remedy

The expected outcome of the 1993 ROD was restoration of the Surficial and Floridan Aquifers to federal and state drinking water standards and appropriate risk based levels (i.e., restoration of the groundwater to beneficial use). This ROD Amendment does not change the RAO from 1993; rather, the ROD Amendment changes how the RAO from 1993 will be achieved.

7.5 Available Land Use after Cleanup

The groundwater cleanup levels chosen in the 1993 ROD and retained in this ROD Amendment were based on residential, unrestricted use scenarios. After the groundwater is cleaned up to the levels found in Tables 7 and 8, the groundwater resource will be available for unrestricted use within the bounds of local ordinances.

7.6 Anticipated Environmental and Ecological Benefits

Restoration of the contaminated groundwater will eliminate or minimize any future discharges of contaminated groundwater into surface water bodies impacted by the groundwater flow paths.
PART 8: STATUTORY DETERMINATIONS (NCP §300.430(f)(5)(ii) and (iii))

8.1 Protection of Human Health and the Environment (NCP §300.430(f)(5)(ii)(A))

The selected remedy will adequately protect human health and the environment through elimination and/or reduction of contamination through remediation (both active and passive) and controlling exposures through Institutional Controls.

Elimination and/or Reduction

Enhanced Bioremediation with Source Control and MNA for the Surficial Aquifer will be used to eliminate and/or reduce contamination in the groundwater. Elimination and/or reduction of contamination in the Floridan Aquifer will occur through MNA.

Controlling Exposures

While the groundwater remedy is operating, Institutional Controls will function to keep exposures from occurring. Specifically, pursuant to Chapter 62-524 FAC., the area containing the Peak Oil/Bay Drum groundwater plume is an area of known groundwater contamination. A map dated 1994 and referenced by Chapter 62-524 FAC. shows a delineation zone of contamination (see Figure 4). This delineation zone serves as an institutional control in place for both the onsite and offsite portion of the plume. Restrictive Covenants on both the Peak Oil property and the Bay Drum property will also eliminate installation of any on-property drinking water wells in both the Surficial and Floridan Aquifers. Further, Hillsborough County Ordinance 90-35, which, with certain limited exceptions, requires anyone constructing new or modifying existing buildings within 500 feet of a County main water line to use the public water supply system.

8.2 Compliance with Applicable or Relevant and Appropriate Requirements (NCP §300.430(f)(5)(ii)(B))

This section presents the federal and state requirements that are ARARs for the site and the remedy.

Chemical Specific ARARs and 1993 ROD ARARs

The primary chemical ARARS for the Surficial and Floridan Aquifers are the remediation goals from the 1993 ROD and reproduced in Tables 7 and 8. The other Federal and State ARARs identified in the 1993 ROD are as follows:

1) Safe Drinking Water Act (40 CFR 141)
2) Endangered Species Act ((50 CFR 402)
3) Clean Air Act (40 CFR 50 (National Ambient Air Quality Standards)
4) Clean Water Act (40 CFR 122-125; 307, 402(a)(1), 403)
5) Florida Drinking Water Standards (FAC 62-550)
6) Florida Ambient Air Quality Standards (FAC 62-272; formerly FAC 17-2.1 and 17-2.3)
7) Florida Water Quality Standards (FAC 62-3, formerly FAC 17-3)
8) Warning Signs at Contaminated Sites (FAC 62-730; formerly FAC 17-736)
9) Groundwater Classes, Standards and Exemptions (FAC 62-520)
10) Florida Surface Water Quality Standards (FAC 62-302)
11) Florida Secondary Drinking Water Standards (FAC 62-550). As noted in the OU-2 ROD, these standards would apply only if the Surficial Aquifer is being used as a potable drinking water source or if there is vertical migration of contamination into the underlying Floridan Aquifer.¹¹

**Action Specific ARARs**

Action specific ARARs for alternatives selected in this ROD Amendment are listed in Table 9. The selected remedy will comply with all of the action ARARs listed in Table 9 that are listed as either “Applicable” (A) or “Relevant and Appropriate” (RA) under the “Category” column.

**Location Specific ARARs**

There are no location specific ARARs identified for the remedy selected in this ROD Amendment.

**“To-Be-Considered”**

Standards found in 20 CFR 1910 from the Occupational, Health and Safety Administration (OSHA) are carried as to-be-considered values pursuant to 40 CFR 300.400(g)(3).¹²

Standards referenced in the ROD Amendment relating to the natural attenuation default concentrations (NADCs) (i.e., Chapter 62-777 FAC, Table 5) are also carried at TBCs.

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¹¹ EPA’s current position is that secondary drinking water standards are ARARs only if they are associated with human health or environmental protection. EPA and Florida secondary standards are not associated with human health or environmental protection; hence, they would not be considered ARARs in a new ROD drafted in 2004. However, this ROD Amendment is not designed to update the ARAR list to match current EPA interpretation of the secondary drinking water standards.

¹² By definition, ARARs are promulgated, or legally enforceable federal and state requirements. EPA has also developed another category known as “to be considered” (TBCs), that includes nonpromulgated criteria, advisories, guidance, and proposed standards issued by federal or state governments. TBCs are not potential ARARs because they are neither promulgated nor enforceable. It may be necessary to consult TBCs to interpret ARARs, or to determine preliminary remediation goals when ARARs do not exist for particular contaminants. Identification and compliance with TBCs is not mandatory in the same way that it is for ARARs.
<table>
<thead>
<tr>
<th>Aquifer</th>
<th>Category</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surficial Aquifer</td>
<td>Wellhead Protection, FAC 62-521</td>
<td>RA</td>
<td>Provides restrictions on underground injection to protect portable water wells</td>
</tr>
<tr>
<td></td>
<td>Permits, FAC 62-4</td>
<td>RA</td>
<td>Provides procedures for obtaining a permit from FDEP.</td>
</tr>
<tr>
<td></td>
<td>Underground Injection Control, 62-528 FAC</td>
<td>RA</td>
<td>Provides criteria, standards, and well permitting for Class V Injection wells (FAC 62-528.600.645)</td>
</tr>
<tr>
<td></td>
<td>Groundwater Permitting and Monitoring Requirements, FAC 62-522</td>
<td>RA</td>
<td>General provisions for groundwater permitting and monitoring</td>
</tr>
<tr>
<td></td>
<td>Water Well Permitting and Construction Requirements, FAC 62-532</td>
<td>RA</td>
<td>Requirements for construction of any water well or repair (obtain permit)</td>
</tr>
<tr>
<td></td>
<td>Air Emission Standards, FAC 62-210.200(130)</td>
<td>RA</td>
<td>Demonstrates that system meet criteria for Hazardous Air Pollutant (HAPs) at stationary sources</td>
</tr>
<tr>
<td></td>
<td>Air Pollution Control, general Provisions, FAC 62-204, FAC 62-160, FAC 62-213.430(6)</td>
<td>RA</td>
<td>Provides air sampling protocol, analytical methods, and emission criteria</td>
</tr>
</tbody>
</table>

Relevant for alternative using injection although would be exempt if action plan is approved by FDEP

Relevant for installation of new wells

Relevant for operation of air sparging system

Relevant for operation of air sparging system
8.3 **ARAR Waivers (NCP §300.430(f)(5)(ii)(C))**

This section of the ROD Amendment explains any federal or state laws that the remedy will not meet, the waiver invoked, and the justification for invoking the waiver.

No ARAR waivers are utilized in this ROD Amendment.

8.4 **Cost Effectiveness (NCP §300.430(f)(5)(ii)(D))**

This section explains how the Selected Remedy meets the statutory requirement that all Superfund remedies be cost-effective.

A cost-effective remedy in the Superfund program is one whose "costs are proportional to its overall effectiveness". (NCP §300.430(f)(1)(ii)(D)). The "overall effectiveness" is determined by evaluating the following three of the five balancing criteria used in the detailed analysis of alternatives:
1) Long-term effectiveness and permanence
2) Reduction in toxicity, mobility and volume (TMV) through treatment
3) Short-term effectiveness.

"Overall effectiveness is then compared to cost" to determine whether a remedy is cost-effective (NCP §300.430(f)(1)(ii)(D)).

For determination of cost effectiveness, a cost effectiveness matrix was utilized (Table 10). In the matrix, the alternatives are listed in order of increasing costs. For each alternative, information is presented on long term effectiveness and permanence, reduction of toxicity, mobility and volume through treatment, and short term effectiveness. The information in those three categories is compared to the prior alternative listed and evaluated as to whether it is more effective (+), less effective (-) or of equal effectiveness (=).

The selected remedy for the Surficial Aquifer and the selected remedy for the Floridan Aquifer are considered cost effective because they offer a permanent solution that reduces human health and ecological risks to acceptable levels at less expense than some of the other permanent, risk reducing alternatives evaluated.
<table>
<thead>
<tr>
<th>No Action</th>
<th>Monitored Natural Attenuation</th>
<th>Enhanced Bioremediation</th>
<th>Enhanced Bioremediation and Source Treatment and MNA</th>
<th>Groundwater Extraction and Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>$101,980</td>
<td>$693,026</td>
<td>$1,200,787</td>
<td>$1,377,829</td>
<td>$5,674,820</td>
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<tr>
<td>Reduction of TMV through自然 attenuation</td>
<td>Reduction of TMV through自然 attenuation</td>
<td>+ Reductions at Acceptable Levels</td>
<td>+ Reduction of TMV through enhanced natural attenuation and air sparging</td>
<td>= Reduction of TMV</td>
</tr>
<tr>
<td>minimal reduction in Long Term Risk</td>
<td>minimal reduction in Long Term Risk</td>
<td>+ Reductions at Acceptable Levels</td>
<td>+ Reduction of TMV through enhanced natural attenuation</td>
<td>= Reductions at Acceptable Levels</td>
</tr>
<tr>
<td>$113,019</td>
<td>$631,425</td>
<td>$5,214,204</td>
<td>$5,418,204</td>
<td>$5,214,204</td>
</tr>
<tr>
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<td>Controllable risk to community and environment</td>
<td>Controllable risk to community and environment</td>
<td>Controllable risk to community and environment</td>
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</table>

**Florian Aquifer**

<table>
<thead>
<tr>
<th>No Action</th>
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<th>Groundwater Extraction and Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>$113,019</td>
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<tr>
<td>Controllable Risk to Community and environment</td>
<td>Controllable risk to community and environment</td>
<td>Controllable risk to community</td>
</tr>
</tbody>
</table>

**Notes:**

1. The selected remedies are in italics.
2. TMV = Toxicity, Mobility and Volume

**Key:**

- + More effective than previous alternative
- - Less effective than previous alternative
- = No change in effectiveness over previous alternative
8.5 **Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable (MEP) (NCP §300.430(f)(5)(ii)(E))**

The amended remedy for the Surficial Aquifer provides for permanent reduction of toxicity, mobility and volume of the constituents of concern through treatment by natural processes (both natural and enhanced) and treatment of organics volatilized during the air sparging. The amended remedy for the Floridan Aquifer provides for permanent reduction of toxicity, mobility and volume of constituents of concern through treatment by natural processes. If needed, the Floridan Aquifer remedy includes the option for enhanced natural attenuation.

The amended remedy for the Surficial and Floridan Aquifers include ongoing monitoring of groundwater to ensure that degradation is occurring and cleanup levels can be or are being met.

8.6 **Preference for Treatment as a Principal Element (NCP §300.430(f)(5)(ii)(F))**

The amended remedy for both the Surficial and Floridan Aquifers includes treatment as a principal element. However, for the Surficial Aquifer, this treatment consists of treatment by natural processes (both natural and enhanced) and treatment of organics volatilized during the air sparging. The amended remedy for the Floridan Aquifer provides for treatment through treatment by natural processes. If needed, the Floridan Aquifer remedy includes the option for enhanced natural attenuation.

8.7 **Indication of the Remediation Goals (NCP §300.430(f)(5)(iii)(A))**

Table 7 lists the cleanup levels to be met by the remedy. As explained in Part 7.1 (Surficial Aquifer) and Part 7.2 (Floridan Aquifer), ongoing groundwater monitoring plans will be implemented to track the success or failure of the selected remedy.

8.8 **Documentation of Significant Changes from Preferred Alternative of Proposed Plan (NCP §300.430(f)(5)(iii)(B))**

The Proposed Plan for the Peak Oil/Bay Drum Site was released for public comment on September 23, 2004. The public comment period was from September 22, 2004, through October 22, 2004. The Proposed Plan identified Alternative 4 (Enhanced In-Situ Bioremediation with Source Area Treatment and MNA) as the remedy for the Surficial Aquifer and Alternative 2 (Monitored Natural Attenuation) as the remedy for the Floridan Aquifer. Written comments were received by EPA during the public comment period. No request for a public meeting was received during the public comment period.

Based on comments received, it was determined that two significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate. See Part 10 of this ROD Amendment for a response to the comments received. The following is a summary of changes:

- The cleanup level for arsenic contained in the 1993 OU-2 ROD (i.e., 50 ppb) was
changed to 10 ppb (see ROD Amendment Section 7.3).

- The cleanup level for vanadium contained in the 1993 OU-2 ROD (i.e., 240 ppb) was changed to 49 ppb (see ROD Amendment Section 7.3).

8.9 **Five-Year Requirements (NCP §300.430(f)(5)(iii)(C))**

Because the already implemented remedies for OU-1 and OU-3 resulted in hazardous substances, pollutants, or contaminants remaining on-site above levels that do not allow for unlimited use and unrestricted exposure, a statutory 5 year review will be completed by September 22, 2005, to ensure that the remedy is, or will be, protective of human health and the environment. The 5 year review will include an evaluation of the protectiveness of the groundwater remedy.
PART 9: SUPPORT AGENCY COMMENTS

9.1 State Opinion on the Remedy (NCP §300.435(c)(2))

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the field investigative and remedy re-analysis leading up to this ROD Amendment. In accordance with 40 CFR §300.435, as the support agency, FDEP has provided input during this process.

On October 22, 2004, FDEP provided five comments on the Proposed Plan. A response to their comments are included in the Responsiveness Summary (see Section 10.2).
PART 10: PUBLIC PARTICIPATION (NCP §300.435(c)(2)(ii))

10.1 Public Notice (NCP §300.435(c)(2)(ii)(A)), Public Comment (NCP §300.435(c)(2)(ii)(B) and (C)), Public Meeting (NCP §300.435(c)(2)(ii)(D) and (E))

The notice of the availability of the Administrative Record and an announcement of the Proposed Plan public meeting was published in the Tampa Tribune on September 23, 2004. The public comment period ran from September 22, 2004, through October 22, 2004. The Proposed Plan Fact Sheets were mailed to the community during the week of September 20, 2004. The Administrative Record file was made available to the public on September 20, 2004. The Administrative Record was placed in the information repository maintained at the EPA Region 4 Superfund Record Center and at the Brandon Regional Library.

An opportunity to request a public meeting was announced in both the public notice and in the Proposed Plan mailed to the community. No request for a public meeting was received. A reporter from the Tampa Tribune did conduct an interview with the EPA Remedial Project Manager (RPM). The newspaper article on the ROD Amendment is included in the Appendix A. The newspaper article did stimulate submission on one written public comment.

10.2 Responsiveness Summary ((NCP §300.435(c)(2)(ii)(F))

Verbal comments were not received from the public during the public comment period. Written comments were received from the State of Florida, a consultant for a local industry and one local citizen. The comments are reproduced below followed by the Agency’s response.

1. **FDEP:** The proposed plan references Chapter 62-524, FAC . (delineated areas) as the mechanism to prevent new well construction in the area of the plume. It should be noted that in addition to that rule, there is a Hillsborough County Ordinance 90-35 (see original ROD) that also prohibits the installation of wells if a public water main is located within 500' of the proposed well location. These 2 restrictions along with the recently completed well survey provide the assurance and documentation confirming the absence of potable private well use in the affected area as stipulated in the original ROD.

**Agency Response:** FDEP is correct that the Hillsborough County Ordinance is in the 1993 ROD. EPA has added references to Hillsborough County Ordinance 90-35 to the ROD Amendment (e.g., Sections 7.1 and 7.2 of the ROD Amendment).

**FDEP:** The following actions may also be prudent in the interim prior to reaching groundwater cleanup target levels: a) annual notification to local government entities, including the water management district regarding site activities and associated institutional controls, to assure appropriate coordination during area activities such as dewatering during construction or well installation proposals, and b) a groundwater use advisory program.
Agency Response: The objective of the ROD Amendment is to complete a targeted change to the remedy selected in 1993 without adding to or removing any additional remedy requirements not needed based on the remedy revision. The interim actions offered by FDEP in this comment were not put in place by the 1993 ROD. However, EPA does believe that the annual notification to local government entities would help in implementing the institutional controls while cleanup occurs, and annual notification has been added to the ROD Amendment (e.g., Sections 7.1 and 7.2 of the ROD Amendment and Table 9).

2. FDEP: As previously noted in DEP's July 19th proposed plan comments and prior preliminary design review comments, we anticipate that the monitoring network to track the effect of injection of the vegetable oil barrier on plume migration and remedial performance will be more extensive than the 4 monitoring wells indicated in the draft proposed plan. The final plan appropriately indicates that the specific number and location of these monitoring wells will be addressed in the design of the remedy.

Agency Response: Two new monitoring wells were proposed in the January 2004 Design of the Treatment of Onsite and Offsite Groundwater. Based on FDEP comments from May 2004, the Design of the Treatment of Onsite and Offsite Groundwater was modified to propose four monitoring wells (see August 2004 Design). Further, due the need for placing some of the injection zones near Broadway Avenue, installing monitoring wells may be difficult in certain locations. As an alternative, it was agreed that geoprobe or other direct push technologies will be used during monitoring events to satisfy monitoring requirements. Nothing in the ROD precludes installation of future monitoring wells if deemed appropriate based on monitoring results or design concerns.

Section 7.1 of the ROD calls for submission of a Remedial Design and O&M Plans, including a Groundwater Monitoring Plan. This comment is more appropriately dealt with during Remedial Design and O&M discussions, as such, no ROD Amendment changes have been made in response to this comment.

3. FDEP: With regard to groundwater target cleanup levels, the final proposed plan indicates that cleanup up criteria remain the same as those identified in the original 1993 area-wide groundwater ROD. State ARARs were provided to EPA in FDEP's May 2004 Feasibility Study review correspondence and included groundwater cleanup target levels (GCTL) and drinking water standards. The State arsenic groundwater MCL is 10 ppb as of January 1, 2005. In addition, a review of the 1993 ROD cleanup criteria indicates that the RfD derived criterion of 240 ppb for vanadium is significantly higher that the current vanadium GCTL in 62-777, FAC., (49 ppb). Considering that it has been 10 years since the original ROD and the groundwater remedy has not been implemented, we recommend that these lower groundwater cleanup goals be reflected in the amended ROD.

Agency Response: FDEP's comments deals with two constituents: arsenic and vanadium. Comparison of past monitoring data to either 50 ppb (1993 ROD
cleanup level) or 10 ppb (the new upcoming MCL) has not indicated a distinct arsenic problem in the Surficial Aquifer or Floridan Aquifer. Similarly, use of the lower FDEP value for vanadium (i.e., 49 ppb) also fails to detect a consistent or broad vanadium plume in the Surficial Aquifer or Floridan Aquifer.

The objective of the ROD Amendment was to complete a targeted change to the remedy selected in 1993 without adding to or removing any additional remedy requirements not needed based on the remedy revision. However, based on the issue raised by FDEP with regard to arsenic and in consultation with EPA Headquarters, the new arsenic MCL (i.e., 10 ppb) is promulgated and so should be utilized as an ARAR. Regarding vanadium, the value referenced by the state (i.e., 49 ppb) is a minimum criteria standard in 62-777; hence, the vanadium cleanup level in the ROD should be updated.

The ROD has been modified to update the arsenic cleanup level to 10 ppb and the vanadium cleanup level to 49 ppb.

4. FDEP: As noted in prior correspondence, we remain unconvinced that the TRPH contamination along the common Peak Oil/Reeves SEW property boundary is not related to prior waste oil recycling activities at the Peak Oil site. Oily wastes were documented during contaminated soil delineation and solidification/stabilization treatability testing during design of the Peak Oil site soil remedy. No groundwater TRPH analysis was performed during the RI. We recommend that at least 1 round of groundwater monitoring include TRPH analyses to determine if groundwater concentrations exceed the 62-777 FAC, GCTL of 5,000 ug/l and if this criterion should be included as a groundwater COC for the site.

Agency Response: The State recommends groundwater monitoring for TRPH. This comment is similar to FDEP Comment 2 contained in the August 25, 2003, EPA review letter on the Groundwater Monitoring Plans for OU-1 and OU-3. EPA’s position on the August 2003 comment was “...once Phase I of the groundwater monitoring is complete and full monitoring under the Area-Wide Groundwater Remedy swings into place, EPA will examine more closely whether some of the wells need to be analyzed, maybe on a rotating basis, for a more complete suite of constituents for added protection that nothing is escaping from the unit. For now, the three (3) contaminants listed in the Groundwater Monitoring Plan for analysis are acceptable for Phase I.” Accordingly, the Groundwater Monitoring Plans for OU-1 and OU-3 specifically state that “Long-term groundwater monitoring at the Site will be conducted relative to the Area-Wide Groundwater Remedy under OU-2 ROD.”

Now that the Area-Wide Groundwater Remedy has been selected by this ROD Amendment, a Groundwater Monitoring Plan which takes into account all

13 FDEP Comment 2: “The proposed groundwater analytes for performance monitoring should be expanded to include all of the site related groundwater Contaminants of Concern identified in the OU-II ROD, not the few that drove the soil solidification. This includes the chlorinated and aromatic organic volatiles, PAHs, and TRPH.”
monitoring needs for constituents of concern at OU-1, OU-3 and OU-2 is required (see ROD Amendment Section 7.1).

FDEP’s comment calls for adding TRPH to the Groundwater Monitoring Plan and, based on the results, possibly adding TRPH as a COC. The three main classes of hydrocarbons are aliphatics (e.g., methane), alicyclics (e.g., cyclopropane), and aromatics (e.g., benzene). The aromatics are typically the result of the refining process and are produced during the distillation operations. Aromatics are typically the target of sampling for environmental contamination, distillation efficiency, etc.

Although TRPH is not listed as a COC in the RODs for OU-1 and OU-2, many of the constituents that comprise TRPH are COCs to be sampled/analyzed for OU-2 (e.g., BTEX, naphthalene). Therefore, EPA concludes that COCs already identified in the RODs for OU-1, OU-2 and OU-3 are acceptable surrogates for the State’s concerns over TRPH in groundwater. However, to assure that all underlying COCs are addressed, ROD Amendment Section 7.1 has been updated to explain that the Groundwater Monitoring Plan shall include the following:

- Underlying constituents related to constituents of concern to assure that cleanup of COCs is protective (e.g., pyrene, benzo(a)pyrene, TRPH or equivalent (e.g., C8 - C40), etc.). For example, monitoring to date has included some non COCs as indicators of remediation (e.g., cis-12-diochloroethene, trichloroethene, benzo(a)pyrene, etc.).

The exact list of underlying constituents will be established in the Groundwater Monitoring Plan (see ROD Amendment Section 7.1).

5. FDEP: We are pleased to see that EPA has included a contingent enhanced bioremediation alternative in the proposed Monitored Natural Attenuation (MNA) remedy for the Floridan Aquifer contamination in the final proposed plan, to be determined at the 5-year review. We recommend that annual monitoring to support evaluation of the effectiveness of the MNA remedy begin as soon as the ROD amendment is signed by EPA. (The last round of Floridan monitoring well(s) samples were collected in 2002.) This will assure that there is adequate monitoring data to determine if contaminant concentrations are declining at an acceptable rate during the next 5-year review.

Agency Response: ROD Amendment Section 7.1 includes a call for a Groundwater Monitoring Plan. EPA agrees that monitoring in the Floridan Aquifer should begin as soon as possible and will work toward that objective.

No changes were made to the ROD Amendment in response to this comment.

6. Industrial Galvanizers of America: Environmental Consulting & Technology, Inc. is working on behalf of Industrial Galvanizers of America at their facility downgradient of the Peak Oil and Bay Drum sites. We are concerned that inducing strongly reducing conditions could mobilize metals and enhance their
migration down gradient. Please provide specific citations for the documents that contain the information that we need to review.

Agency Response: In response to this comment, EPA confirmed with the local repository that the Administrative Record is present and available for review. A specific contact with the repository was provided to Environmental Consulting & Technology, Inc. Regarding the concern that the proposed remedial action will induce strong reducing conditions, EPA notes that the natural groundwater is already reducing (i.e., sulfate reducing, maybe even methanogenesis). The enhanced in-situ bioremediation will stimulate naturally occurring processes already ongoing. In anticipation of a concern over the impact the remedy might have on the Reeves groundwater plume, some remedy design changes have already been made. For example:

- Pre-design discussions resulted in the injection zone closest to the Reeves groundwater plume being pulled further south (and shortened) to put even more distance between the farthest downgradient injection zone and the Reeves groundwater plume.
- To eliminate any possible impact on the Reeves groundwater plume, pre-design discussions resulted in the decision to inject less organic substrate at the injection site on the north side of Broadway Avenue.

Given the way the injection is to occur, the organic substrate should remain more as a flow-through barrier as opposed to flowing with the groundwater. More importantly, from a flow system analysis, the groundwater flow direction downgradient of the three injection zones has the groundwater flowing (slowly) to the northwest of the center of the zinc plume at Reeves (i.e., groundwater flowing through the injection zones should flow to the west of the Reeves plume).

Groundwater monitoring by the Reeves Superfund Site is also ongoing, and groundwater monitoring is required for this remedy (see Section 7.1 of the ROD Amendment). To assure that enhanced in-situ bioremediation does not adversely affect the groundwater plume associated with the Reeves Superfund Site, ROD Amendment Section 7.1 has been updated to clearly note that the Groundwater Monitoring Plan shall include the following:

- Select constituents which could adversely impact the Reeves groundwater plume. The objective is to monitor groundwater to quickly detect any induced groundwater changes which could adversely impact the Reeves groundwater plume given local groundwater flow regimes. At a minimum, the constituents to be analyzed shall include zinc and nickel.

Groundwater monitoring from both the Reeves and the Peak/Bay sampling programs will allow for determining what, if any, impact the enhanced in-situ bioremediation has with regards to metal concentrations in the Reeves plume.

7. Paul A. O'Byrne: While we must embrace new technologies as they become available - we must be prudent to assure they are proven in a controlled
environment before they are used out in the environment. Therefore, I oppose the injection of oil into the ground - but approve the injection of air, on a limited scale as not to change the natural pressure existing underground.

**Agency Response:** EPA notes that in order for naturally occurring microorganisms (i.e., microbes) to cleanup harmful contaminants in groundwater, the right temperature, nutrients (fertilizers), and amount of oxygen must be present in groundwater. These conditions allow the microbes to grow, multiply and ultimately destroy or degrade contaminants. When conditions are not right, microbes grow too slowly or die and cleanup happens slowly or not at all. With the right temperature and amount of oxygen and nutrients, microbes can do their work to bioremediate harmful contaminants.

One way they improve conditions for the microbes is to pump air, nutrients, or other organic substances (e.g., molasses, vegetable oil) into the ground. In this case, EPA has chosen to enhance the microbes’ environment by adding an organic substrate (e.g., vegetable oil) and air. Enhanced in-situ bioremediation is very safe because it is merely an approach which provides those ingredients needed to allow naturally occurring microbes to thrive. Air sparging involves the injection of air below the water table to strip dissolved volatile organic compounds and oxygenate the groundwater to facilitate aerobic biodegradation of organic compounds.

Regarding the comment’s acceptance of injection of air only if the natural pressure of the “existing underground” is not changed, EPA notes that pressures greater than the natural conditions must be temporarily exceeded in order to inject air into the groundwater. These pressure changes will be limited in time and geography. Air sparging has been used for many years at many sites around the country and the world. Sparging is a relatively old technology which has distinct advantages for the contaminants of concern at this Site.

No changes were made to the ROD Amendment in response to this comment.

**10.3 Availability of Amended ROD (NCP §300.435(c)(2)(ii)(G) and (H))**

The availability of the ROD Amendment will be public noticed in the Tampa Tribune within thirty (30) calendar days from signature of the ROD Amendment. The supporting information for the ROD Amendment is already in the Administrative Record which also resides at the local repository. The ROD Amendment will be included in the Administrative Record and at the local repository within thirty (30) calendar days of signature of the ROD Amendment.

**10.4 Issuance of Fact Sheet Prior to Initiation of Remedial Action (NCP §300.435(c)(3))**

After completion of the final engineering design, EPA will issue a fact sheet and provide the public with the opportunity for a public briefing prior to initiation of the remedial action.
PART 11: REFERENCES

The references listed below are the documents used in writing this ROD.

1. EPA, 2004. Proposed Plan Fact Sheet, Peak Oil/Bay Drum Superfund Site September 2004, Peak Oil/Bay Drum Superfund Site, Tampa, Hillsborough County, Florida


6. Peak Oil/Bay Drum, 1992a. Area-Wide Hydrologic Remedial Investigation and Baseline Risk Assessment prepared by Cononie Environmental Services Corporation (1992a), Peak Oil/Bay Drum Superfund Site, Brandon, Hillsborough County, Florida

7. Peak Oil/Bay Drum, 1998. Remedial Design Work Plan-Sampling and Analysis Plan (September 1998), Peak Oil/Bay Drum Superfund Site, Brandon, Hillsborough County, Florida


10. Peak Oil/Bay Drum, 2004. Focused Feasibility Study prepared by de maximis, inc (June 2004), Peak Oil/Bay Drum Superfund Site, Brandon, Hillsborough County, Florida

APPENDIX A: Reproduction of Newspaper Article on the ROD Amendment

Tampa Tribune Published: Oct 11, 2004

EPA Seeks Comments On Changes To Cleanup Plan

By Yvette C. Hammett

ORIENT PARK - The federal Environmental Protection Agency wants to revise a cleanup plan for the Peak Oil/Bay Drums Superfund site that could save millions of dollars and still have the job finished in about a decade.

EPA officials are taking public comment until Oct. 22 on a proposal to add vegetable oil to the surficial aquifer to assist the natural breakdown of contaminants in the water.

That would be an alternative to the current plan to pull the contaminated plume from the ground, clean the water, then release it.

The new proposal also calls for pumping air into the deep Floridan aquifer. Remedial Project Manager Wesley Hardegree said certain contaminants prefer air and will attach to it, making them easier to extract.

The Superfund site is just west of Falkenburg Road near the CSX Railroad and south of the Sabal Palm Industrial Park.

Contaminants found in the groundwater include dangerous chlorinated solvents, acetone, lead and toluene.

Written comments on the proposed changes to the cleanup plan should be directed to L'Tonya Spencer, Community Involvement Coordinator, U.S.E.P.A., Region 4, 61 Forsythe St. S.W., Atlanta GA 30303-3014.