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Remedial Action Decision Document For IRP Sites 2, 21, 41, 42 and 43 Rickenbacker Air National Guard Base Columbus, Ohio

Project No. 762970
October 13, 1999

FINAL
Remedial Action Decision Document
For IRP Sites 2, 21, 41, 42, and 43
Rickenbacker Air National Guard Base
Columbus, Ohio

Prepared for
Air Force Base Conversion Agency
Rickenbacker Air National Guard Base
and
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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
AFBCA	Air Force Base Conversion Agency
AFCEE	Air Force Center for Environmental Excellence
BRA	baseline human health risk assessment
BRAC	Base Realignment and Closure Program
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CERCLA	Comprehensive Environmental Responsibility, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CRP	Community Relations Plan
DCE	Dichloroethene
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EBS	Environmental Baseline Survey
FS	Feasibility study
HI	Hazard Index
IRP	Installation Restoration Program
K	hydraulic conductivity
MCLs	maximum contaminant levels
MSL	Mean Sea Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
OHANG	Ohio Air National Guard
OEPA	Ohio Environmental Protection Agency
O&M	Operations and maintenance
PA	Preliminary Assessment
PRG	Preliminary Remediation Goal
RAB	Restoration Advisory Board
RANGB	Rickenbacker Air National Guard Base
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPA	Rickenbacker Port Authority
SARA	Superfund Amendments and Reauthorization Act
SDWA	Federal Safe Drinking Water Act
SI	Site Investigation
TBC	To Be Considered
TCE	trichloroethene
USAF	United States Air Force

USEPA	United States Environmental Protection Agency
UWBZ	Upper Water Bearing Zone
VC	vinyl chloride
VOCs	Volatile Organic Compounds

I DECLARATION FOR THE REMEDIAL ACTION DECISION DOCUMENT

SITE NAME AND LOCATION

This Remedial Action Decision Document (RADD) addresses the findings of a remedial investigation conducted for five Installation Restoration Program (IRP) sites located at the Rickenbacker Air National Guard Base (RANGE), near Columbus, Ohio. The five IRP sites are:

- IRP Site 2 – Bulk Fuel Storage Tank Farm
- IRP Site 21 – Leaking Drum and Oil Change Area at Water Treatment Plant
- IRP Site 41 – Oil/Water Separator at Building 848
- IRP Site 42 – Jet Engine Test Stand (Building 896)
- IRP Site 43 – Test Cell Hush House (Building 926)

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for each of the aforementioned IRP sites at RANGB. The IRP is an element of the Defense Environmental Restoration Program (DERP) and is compliant with the guidelines and standards set forth in the Comprehensive Environmental Responsibility, Compensation, and Liability Act (CERCLA). At RANGB, the IRP is funded and administered by the Base Realignment and Closure Program (BRAC) and the Air Force Base Conversion Agency (AFBCA). The Air Force Center for Environmental Excellence (AFCEE) is contracting and overseeing the IRP program at RANGB.

Restoration activities at RANGB are being conducted with the concurrence and oversight of the Ohio Environmental Protection Agency (OEPA) and the United States Environmental Protection Agency (USEPA). The remedies presented in this document were evaluated and selected in accordance with CERCLA, (1980), as amended by the Superfund Amendments and Reauthorization Act (SARA), (1986), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Information presented herein is based on the administrative record for RANGB, which was developed in accordance with CERCLA and are available for public review

at the Air Force Base Conversion Agency Office (AFBCA), 7161 2nd Street, Building 440, Columbus Ohio.

OEPA and the USEPA, Region 5, concur with the selected remedy for IRP Sites 2, 21, 41, 42, and 43.

ASSESSMENT OF IRP SITES 2, 21, 41, 42, 43

The United States Air Force (USAF) has determined that actual or threatened releases of hazardous substances from IRP Sites 2, 21, 41, 42, and 43, if not addressed, may pose a risk to human health and the environment. This determination was based on an assessment of cancer and non-cancer risks to current and future occupants of RANGB documented in the Phase II Remedial Investigation (RI) Report. Using the projected future land use of the site (industrial/commercial) the risk assessment evaluated soil exposures to an industrial use scenario represented by an industrial worker, a construction worker, and a trespasser. Groundwater was considered to be a complete pathway for residential use. The results of the risk assessment showed that the risks are acceptable for exposure to the soil for industrial use. However, the risk for groundwater exposure is not within the acceptable range for residential use. This risk will be addressed by implementing the remedies selected in this RADD which include provisions for ensuring the site use remains industrial (as assumed in the risk assessment) and the groundwater will be restored for residential use.

DESCRIPTION OF THE SELECTED REMEDY

This decision document presents the selected remedy for IRP Sites 2, 21, 41, 42, and 43. The selected remedy addresses the principal threats posed by suspected soil and groundwater contamination at the IRP sites. The selected remedy for each IRP site is:

Site 2 - Institutional Controls, Natural Attenuation, Groundwater Cutoff Trench with Reactive Wall
Site 21 - Institutional Controls, Hot Spot Removal, Natural Attenuation

Site 41 - Institutional Controls, Oil/Water Separator Removal, Free Product Removal, TCE Hot-Spot Removal, Natural Attenuation
Site 42 - Institutional Controls, Hot-Spot Removal, Natural Attenuation
Site 43 - Institutional Controls, Removal of the Oil/Water Separator, Natural Attenuation

A major component of the remedy for each site is that natural attenuation monitoring data will be collected and analyzed on a quarterly basis for the first two years. The data will be examined after two years to ascertain the rate of natural attenuation, the potential for ongoing plume migration, and an estimate of the time likely to be required to achieve remedial goals. The newly calculated time projection for achieving cleanup goals will be compared to the time estimates initially presented in the Feasibility Study (FS). A decision will be made at that time, on the basis of this time comparison and the plume migration rates, as to whether a more aggressive cleanup strategy is appropriate. A recommendation for the monitoring frequency and monitoring network for subsequent years will also be made at that time. This review will not replace the normal schedule of five-year RADD reviews mandated by CERCLA and the NCP.

The selected remedy for each site is protective of human health and the environment because it seeks to prevent exposure to human receptors by the use of Institutional Controls (in the form of a deed restriction) specifying the future reuse as industrial/commercial and prohibiting the use of groundwater during the time required for each contaminant of concern to reach the appropriate Maximum Contaminant Level (MCL) or a risk-based remedial goal in the absence of an MCL. Excavation and disposal of hot spots and removal of oil/water separators will serve to immediately remove a large fraction of the contamination currently present at the sites and assist in accelerating the rate of contaminant degradation by natural attenuation. The groundwater monitoring program will serve to evaluate, on an ongoing basis, the direction, velocity, and concentrations of the plume, thus allowing for quick implementation of alternate corrective action if the data do not bear out the assumptions used in this document to predict the plume distance and the time required for natural attenuation to remediate the contaminants of concern to below their respective MCLs or a risk-based remedial goal in the absence of an MCL. The selected remedy is also a long-term, permanent, solution because monitored natural attenuation

permanently reduces contaminants to below the MCLs or a risk-based remedial goal in the absence of an MCL. The USAF will retain the responsibility to implement, monitor, maintain, and enforce the selected remedy until all remedial cleanup levels have been met. Groundwater monitoring will continue until the cleanup levels are achieved. To document completeness of the remedial action, the USAF will propose a monitoring program of not less than four consecutive sampling events within a two-year period for which groundwater contaminants remain below cleanup levels.

Covenants will also be included in deeds to ensure that any response actions that are the responsibility of the USAF, found to be necessary after the date of delivery of the deed, will be conducted by the United States. Provisions will also be included in deeds to allow the United States and the State of Ohio access to the property in any case in which any such response action is found to be necessary, or where such access is necessary to carry out a response action on adjoining property. In addition, provisions will also be included in deeds stating that the property will be used for specific reuse activities (industrial/commercial) and the USAF will annually document ongoing conformation with this specified reuse. Ongoing reuse will also be evaluated during the five-year reviews mandated by CERCLA and NCP. If the property would cease to be used for such specified purposes it will revert to the U.S. Government. Prior to the time of transfer, the USAF will provide the USEPA and OEPA a legal property description of the property boundaries of the IRP sites.

STATUTORY DETERMINATIONS

The remedies selected by the USAF for IRP sites 2, 21, 41, 42, and 43 are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (ARARs) for this action, and are cost-effective. These remedies utilize permanent solutions and alternative treatment technologies to the extent practicable.

The progress of the selected alternative in remediating each IRP site will be evaluated at the end of two years. The data will be examined to ascertain the rate of natural attenuation and the

potential for ongoing plume migration. A decision will be made at that time as to whether a more aggressive cleanup strategy is appropriate. A recommendation for the monitoring frequency and monitoring network for subsequent years will also be made at that time. This review will not replace the normal schedule of five-year RADD reviews mandated by CERCLA and the NCP as described in the following paragraph. Groundwater monitoring will continue until such time that remedial action objectives have been met.

Five-year reviews are mandated by CERCLA and the NCP. CERCLA 121(c), as amended, states: "If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews." The NCP is codified in Chapter 40 of the Code of Federal Regulations (CFR). 40 CFR Part 300.430(f)(4)(ii) states: "If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action." The five-year reviews determine the continued effectiveness of the selected remedies at the site in protecting human health and the environment including recommendations to address any deficiencies identified through the review. The results of the review, including the protectiveness of the remedial actions and the recommendations, are presented in a five-year review report.

DECLARATION

This RADD represents the selection of a remedial action under the IRP Program sites 2, 21, 41, 42, and 43, that exceed remediation goals and has been prepared by the Department of the Air Force and approved by the OEPA and USEPA as documented in the signature page. The RADD is authorized for immediate implementation.

Concur and recommend for immediate implementation:

Department of the Air Force

By: Alan C. Friedstrom, PE Date: October 14, 1999

Alan C. Friedstrom, PE
BRAC Environmental Coordinator
Air Force Base Conversion Agency

Ohio Environmental Protection Agency

By: Diana L. Bynum Date: October 14, 1999

Diana L. Bynum
Site Coordinator
Division of Emergency and Remedial Response
Ohio Environmental Protection Agency, Central District Office

United States Environmental Protection Agency

By: Laura J Ripley Date: 14 October 1999

Laura Ripley
Remedial Project Manager
United States Environmental Protection Agency, Region 5

II DECISION SUMMARY

1.0 Site Name, Location and Description

The Rickenbacker Air National Guard Base (RANGB) is located in central Ohio, approximately 12 miles southeast of downtown Columbus near the Village of Lockbourne (Figure 1-1). The Army Air Corps originally built the base in 1942 and the base continued operating until 1980 when it was closed and transferred to the Ohio Air National Guard (OHANG). In 1982, the base began the process of disposing of properties, including the transfer of approximately 1,600 acres to the Rickenbacker Port Authority (RPA) in 1984 and 1985. The base officially realigned in 1994.

Concurrent with passage of the Resource Conservation and Recovery Act of 1976 (RCRA), and in anticipation of the Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA), the Department of Defense (DoD) developed the Installation Restoration Program (IRP) to identify, assess, and control potential environmental contamination that may have resulted from past operations and waste disposal practices. At RANGB, the IRP is funded and administered by the Base Realignment and Closure Program (BRAC) and the Air Force Base Conversion Agency (AFBCA). The IRP was initiated at RANGB with the Preliminary Assessment in 1986. Through various investigations conducted in the late 1980's and early 1990's several sites were investigated and closed under various regulatory programs. In 1996, 14 sites were investigated as part of the Phase II Remedial Investigation (RI)/Feasibility Study (FS) to further characterize these sites and assess the risk posed by these sites to human health and the environment. The result of this investigation showed the following five sites had a sufficiently high risk from potential commercial, industrial, and residential exposures to warrant an evaluation of potential technologies for remedial action:

- Site 2 – Bulk Fuel Storage Tank Farm
- Site 21 – Leaking Drum and Oil Change Area at Water Treatment Plant
- Site 41 – Oil/Water Separator at Building 848

- Site 42 – Jet Engine Test Stand (Building 896)
- Site 43 – Test Cell Hush House (Building 926)

The locations of these sites are shown in Figure 2-1.

2.0 Site Histories and Enforcement Activities

This section provides an overview of the response history of the RANGB and the regulatory framework under which the responses were completed. In addition, the history of each of the five IRP sites identified as requiring additional action is presented.

The IRP was initiated at RANGB in 1986. Six assessments/investigations and one removal action have been conducted since initiation of the IRP, followed by completion of a FS. The assessments, investigations, and removal action completed and the timeframe the work was conducted are as follows:

Preliminary Assessment (PA)	1986
Site Investigation (SI)	1988 – 1989
Remedial Investigation (RI)	1993 – 1994
Environmental Baseline Survey (EBS)	1993
Engineering Evaluation/Cost Analysis (EE/CA) for Sites 21 and 22 (and removal action)	1995
Phase II EBS	1996
Phase II RI	1996
Feasibility Study Data Acquisition	1998
Feasibility Study (FS)	1998
Proposed Plan	1999

The PA assessed 27 sites. Twenty-two of these sites were subsequently evaluated during the SI, the results of which showed that 7 of the original 22 sites could be eliminated from further consideration due to contaminant levels being below levels of concern. An EE/CA was conducted for Sites 21 and 22 that resulted in soil removal at these two sites. The EBS and Phase II EBS were subsequently conducted to document the physical condition of real property resulting from the storage, use and disposal of hazardous substances and petroleum products and establish a baseline for making decisions concerning real property transactions. Sites 41, 42, and 43 were added as a result of these investigations. Based on the results of the EBS and Phase II EBS, 14 sites were investigated during the Phase II RI: 11 of the sites originally identified during

the PA, one site identified during the EBS, and 2 additional sites identified during the Phase II EBS. Based on the results of the characterization activities conducted during the Phase II RI and the risk assessment presented in the Phase II RI report, 7 sites were identified for no further action (NFA) under a commercial/industrial use scenario, 5 sites were identified as requiring remedial action, and 2 sites were identified as requiring ecological risk assessment. The following 5 sites were determined to exhibit a sufficiently high risk from potential residential exposures to groundwater to warrant an evaluation of potential technologies for remedial action:

- Site 2 - Bulk Fuel Storage Tank Farm
- Site 21 - Leaking Drum and Oil Change Area at Water Treatment Plant
- Site 41 - Oil/Water Separator at Building 848
- Site 42 - Jet Engine Test Stand (Building 896)
- Site 43 - Test Cell Hush House (Building 926).

The FS presents remedial alternatives for these five sites. The following sections provide a summary of the history of each of the five IRP sites.

RANGB was announced as a candidate for closure on 12 April 1991. A three-person BRAC Cleanup Team (BCT), consisting of an Air Force environmental coordinator and project managers from the USEPA and OEPA, was established in January 1994 to investigate and make the decisions related to environmental cleanup actions. The BCT has met regularly since that time. The BCT has managed the completion of the Phase II EBS, the Phase I and II RIs, and the FS and is currently managing this RADD. CERCLA, as amended, provided the power to the President to perform remedial actions at sites with releases, or threatened releases. The President, by Executive Order 12580, vested this authority to the heads of Executive departments for sites that are not on the National Priorities List. By this Executive Order, the Air Force is the "lead agency" for environmental cleanup at RANGB.

2.1 Site 2 – Bulk Storage Tank Farm

The Bulk Storage Tank Farm is located in the northwestern-most portion of the base property east of "A" Avenue (Figure 2-1). The tank farm, consisting of six, one-million-gallon capacity,

aboveground fuel storage tanks, was built in 1951 and previously held jet fuel and aviation gasoline. Some tanks currently store jet fuel while others are empty. Building 821 is located west of the site. Site 2 was identified in the PA as an IRP site because of four releases of petroleum hydrocarbons at the facility resulting in a net loss of over 13,000 gallons of unrecovered jet fuel (HMTC, 1987).

A drainage ditch is located along the western edge of "A" Avenue. This ditch approximately marks the edge of the current RANGB property. The RPA owns the land west of the drainage ditch and currently leases the property for farming purposes.

This site has been historically operated to store fuel for transfer to aircraft via the fuel hydrant system at the base. Fuel was also loaded and unloaded using fill stands located within the fenced area west of the tanks. A rail spur, which is no longer used, runs from north to south near the fill stands.

Building 821 was formerly used as a fuel-testing laboratory and is currently used as offices. An abandoned leach field north of Building 821 was formerly used to dispose of liquids from the septic system in Building 821.

2.2 Site 21 – Leaking Drum and Oil Change Area at Water Treatment Plant

Site 21 was identified as two areas of oil-stained soil adjacent to and southeast of the former water treatment plant located on Quartermaster Street (Figure 2-1). The smaller area surrounded a drum of WD-30 lubricating oil. The larger area of soil staining was the location where crankcase oil was drained from vehicles parked in the area into an underground storage tank (UST). It is uncertain when the UST was installed or began accepting crankcase oil. However airmen stationed at the base and living in the barracks were changing oil from their personal vehicles and using the tank for oil disposal in 1982. This practice ceased shortly thereafter and the tank was removed in 1995. Building 411 at this site was demolished in the mid-1970's.

The petroleum-contaminated soil was excavated and removed from both locations in 1995. At that time, a 1,000-gallon underground storage tank was discovered and removed. Other than the former water treatment plant, only the foundations of the two buildings (412 and 409) remain at this site.

2.3 Site 41 – Oil/Water Separator at Building 848

The oil/water separator at Building 848 (Figure 2-1) collects water from Buildings 846, 848, and 849 and was designed to separate any floating oil from the water prior to the water entering the sanitary sewer system. Building 846 was constructed in 1970 and Building 849 was completed in 1959. Both buildings have been used as vehicle maintenance facilities since those times. Building 848 was completed in 1964 and used as an auto hobby shop up to 1980. From 1980 to 1993 it was used as the base pavements & grounds facility. From 1993 to 1998, it was used as a maintenance shop for the AFBCA caretaker Force. An oil/water separator to the east-northeast of Building 848 was completed in 1977. A waste oil underground storage tank located north of Building 848 was installed in 1964 and used to store waste oil. It was later used to store various liquids prior to disposal. The waste oil tank was removed in 1994.

Also in 1994, a stockpile of petroleum-contaminated soil from an excavation for laying underground cable was placed in this location. In May 1995, oil from the oil/water separator was accidentally released to a sanitary sewer manhole.

2.4 Site 42 – Jet Engine Test Stand (Building 896)

The Jet Engine Test Stand, also known as Building 896, is located adjacent to Taxiway A in the central portion of the Base near the southern end of the existing runways (Figure 2-1). The test stand is a concrete structure where jet engines were attached and run up to test performance. The test stand was built in 1961 and was most recently modified in 1986, when pavement around the test stand was replaced.

2.5 Site 43 – Test Cell Hush House (Building 926)

The test cell hush house is a former jet engine test stand located southeast of the hangar of the 121st fighter squadron in the southwest portion of RANGB (Figure 2-1). The test cell hush house was a noise-baffling structure where jet engines were tested. The house and oil/water separator were reportedly built in 1978, and only the house was removed in mid-1995 after the OHANG ended the A-7 tactical fighter flying mission. Up to four test stands were present at the site. One empty single-room building remains at the site (Building 926). Storm water drainage from the site passes through an oil/water separator prior to entering the base drainage system.

3.0 Community Participation

Throughout the history of remedial investigations at RANGB, the community has been kept informed of base closure activities. The first public involvement with the RANGB IRP program dates to May 20-21, 1991 when citizens groups and representative members of the local community were asked to come to the base and be interviewed concerning their opinions on environmental issues at the base. This interview session was the "kick off" of the IRP community relations plan for the base.

The United States Air Force (USAF) through informational meetings such as Restoration Advisory Board (RAB) meetings, fact sheets, press releases, and public meetings have kept the community appraised of base closure activities. Membership of the RAB is composed of USAF, United States Environmental Protection Agency (USEPA), Ohio Environmental Protection Agency (OEPA), local officials, and community representatives. The first RAB meeting was held on January 13th, 1994, in the Madison Township Trustees Building in Groveport, Ohio. At the inception of RAB meetings, the USAF made the RANGB Administrative Record available for public review. The Administrative Record includes all information considered or relied on in selecting the remedy, including all comments from the public and from the regulatory agencies. The Administrative Record is currently available for public review at the Air Force Base Conversion Agency (AFBCA) Office, (AFBCA), 7161 2nd Street, Building 440, Columbus, Ohio. The index for the Administrative Record is also available at the Groveport and Columbus South branches of the Columbus Metropolitan Library. The first public hearing concerning the draft Environmental Impact Statement (EIS) for the Re-use and Closure of the base was held on 3 May 1994 at the Hamilton Township School. The RPA presented the Rickenbacker Community Reuse Plan in December 1994. The EIS was finalized in February 1995 after addressing public comments. A public comment period was provided for the EE/CA for Sites 21 and 22 in 1995.

The RANGB Community Relations Plan (CRP) was released in July 1995 and filed with the Columbus Metropolitan Library, Hamilton Township Community Center, Madison Township Trustee Hall, and the Teays Valley High School. The CRP can be found in the Administrative Record.

The AFBCA issued a public notice about the RANGB Proposed Plan in the Columbus Dispatch on December 29, 1998, and made the Proposed Plan and an informational fact sheet available to the public at the Columbus Metropolitan Library and the AFBCA Office.

On January 5, 1999 the AFBCA held a public meeting to present the Proposed Plan. From January 5, 1999 through February 3, 1999, the USAF held a 30-day public comment period to accept public input on the selected remedy for each of the IRP sites presented in the Proposed Plan. A transcript of this meeting is included as Appendix A and a Responsiveness Summary is included as Appendix B.

On February 8, 1999 the Proposed Plan was issued in its final version. Based on public comments and support from USEPA Region 5 and OEPA, the public is generally in agreement regarding the selected remedies for IRP Sites 2, 21, 41, 42, and 43 as presented in the Proposed Plan.

4.0 Scope and Role of IRP Sites and Response Actions

The USAF has determined that five sites, Sites 2, 21, 41, 42,and 43, were found to have sufficiently high risk from potential commercial, industrial and residential exposures to warrant remedial action. These risks were found to be associated with exposure to groundwater that may impact a potential residential receptor. The risks associated with contamination associated with the soils at the site were found to be within the acceptable range for industrial/commercial reuse of the sites. The remedies selected for all the sites incorporate institutional controls, hot spot removal (except at Site 2) and natural attenuation of the residual contamination. For Site 2, measures are planned to prevent further migration of residual contamination off site through the use of a cutoff trench. Remedies for Sites 21, 41, 42, and 43 all incorporate removal of contaminated soil as a possible source for ongoing groundwater contamination.

The institutional controls would utilize deed restrictions to protect against human exposure to contaminated groundwater. Institutional controls will be applied basewide to prevent the installation of groundwater wells in the Upper Water Bearing Zone (UWBZ). Additionally, a restriction will be included that prohibits drilling into or through areas of contaminated groundwater at IRP sites until completion of the remediation. This restriction on the deed will remain in effect until remediation is complete, and, this measure will ensure that the new property owner has been alerted that the UWBZ is not available for consumption. Covenants will also be included in deeds to ensure that any response actions that are the responsibility of the Air Force, found to be necessary after the date of delivery of the deed, will be conducted by the United States. Provisions will also be included in deeds to allow the United States and the State of Ohio access to the property in any case in which any such response action is found to be necessary, or where such access is necessary to carry out a response action on adjoining property. In addition, provisions will also be included in deeds stating that the property will be used for specific reuse activities (industrial/commercial) and the USAF will annually document ongoing conformation with this specified reuse. Ongoing reuse will also be evaluated during the five-

year reviews mandated by CERCLA and NCP. If the property would cease to be used for such specified purposes it will revert to the U.S. Government.

A major component of the remedy for each site is that natural attenuation monitoring data will be collected and analyzed on a quarterly basis for the first two years. The data will be examined after two years to ascertain the rate of natural attenuation and the potential for ongoing plume migration. A decision will be made at that time as to whether a more aggressive cleanup strategy is appropriate. A recommendation for the monitoring frequency for subsequent years will also be made at that time. The groundwater monitoring program will serve to evaluate, on an ongoing basis, the direction, velocity, and concentrations of the plume, thus allowing for quick implementation of alternate corrective action if the data do not bear out the assumptions used in this document to predict the plume distance and the time required for natural attenuation to remediate the contaminants of concern to below their respective Maximum Contaminant Levels MCLs) or a risk-based remedial goal in the absence of an MCL. The migration control used for Site 2 will protect against additional contamination from migrating down gradient. The source removal actions at Sites 21, 41, 42, and 43 will protect against additional contamination reaching groundwater. The USAF will retain the responsibility to implement, monitor, maintain, and enforce the selected remedy until all remedial cleanup levels have been met. Groundwater monitoring will continue until the cleanup levels are achieved. To document completeness of the remedial action, the USAF will propose a monitoring program of not less than four consecutive sampling events within a two-year period for which groundwater contaminants remain below cleanup levels.

5.0 Site Characteristics

This section provides a summary of the subsurface conditions present at each of the IRP sites. Included are descriptions of the geology, hydrogeology, and residual contamination present in groundwater and soil. Detailed descriptions of the sites, including cross-sections and contamination information, are presented in the Phase II RI and FS.

5.1 Site 2

Site 2 is underlain primarily by silt of the UWBZ and sandy silt within the zone. Below the UWBZ occurs a thick, dense clay, described as a basal till (gray clay or gray till). Depth to the gray clay layer in the area depicted on the cross-sections ranges from approximately 13 to 18 feet. The dominant soil type above the basal till layer is dense clayey silt with traces of gravel. Cross-sections for Site 2 are presented in the FS.

A sand or sand and gravel layer, which ranges in thickness from approximately 0.3 to 6.5 feet, was encountered in the majority of borings. The mean thickness of the sand zone at Site 2 at 23 borings where it was encountered is approximately 2 feet. Where present, the depth to top of the sand layer ranged from approximately 5 to 10 feet below ground surface at an elevation of approximately 723 to 719 feet above Mean Sea Level (MSL). An apparent three-pronged channel of sand is present under the western portion of Site 2 in the vicinity of the fill stands and west of the site toward the drainage ditch. This sand channel reaches up to 6.5 feet in thickness and is highly variable in thickness. The Phase II RI found no evidence of hydraulic interaction between the drainage ditch and groundwater.

This sand channel is the primary water bearing zone within Site 2 and, therefore, groundwater flow is largely controlled by the sand layer. Results of slug tests indicate hydraulic conductivity (K) ranges from 2.1 feet per day to 0.0013 feet per day with a geometric mean of slug test derived K measurements from Site 2 wells of 0.054 feet per day. The higher conductivity data appear to be related to the presence of sand zones within the UWBZ.

Groundwater flow through Site 2 is generally from east to west. Hydraulic gradient was calculated by measuring the distance between monitoring wells along a representative flowpath (both east and west of the railroad tracks) and dividing the well head difference by the change in distance. The area east of the railroad tracks exhibited a gradient of approximately 0.0087. The area west of the railroad tracks exhibited a gradient of 0.094.

Site investigations showed a definable plume of dissolved benzene in groundwater west of the tank areas. The plume approximately follows the sand or sand and gravel layer described above for an approximate area of 0.85 acres and is shown in Figure 5-1. Other petroleum hydrocarbons and chlorinated volatile organic compounds (VOCs) were also detected but at concentrations which did not pose a threat to human health and the environment. Table 5-1 presents maximum concentrations of the chemicals of concern (COCs) for Site 2 along with the background concentrations and the MCL for each COC.

Soil contamination is primarily in the area between the dike on the west side of Tank 1 and just west of the railroad tracks. This leads to the conclusion that fuel spills near the rail line and hydrant line are to be suspected as the source of benzene and other petroleum-related compounds in the soil and groundwater. One hydrant line was closed in July 1996. The second hydrant line is slated for closure during the fall of 1999. Soil and groundwater samples from within the tank-dike areas also show that the tanks themselves do not appear to be a major contributor to soil and groundwater contamination at Site 2. The primary compound detected in groundwater at this site is benzene. Soil contamination at this site was found to be within the acceptable risk range for industrial/commercial use.

5.2 Site 21

Subsurface materials at Site 21 consist primarily of clayey-silt and sandy-silt. The gray till layer within the study area is encountered at depths between 19 and 20 feet bgs. Unconsolidated

deposits above the gray till layer are predominantly dense silts and clays. A sand layer was encountered at most borings at depths between 8 and 12 feet. The sand layer is approximately 2.5 feet thick in the northwest portion of the site and pinches to less than one foot thick. A deeper sand layer approximately one foot thick and pinching down was encountered at depths between 14 and 16 feet bgs in the southeast portion of the study area. Cross-sections for Site 21 are presented in the FS

Slug tests were conducted on the three existing wells at Site 21. The geometric mean of K data collected from the three monitoring wells is approximately 0.9 feet/day.

The groundwater flow direction at Site 21 appears to be highly variable. Groundwater level measurements taken in July 1996 indicated a westerly direction of groundwater flow. As measured in December 1997, the indicated groundwater flow direction is due south. The dominant flow direction is believed to be southerly, as the July 1996 monitoring event may have been influenced by precipitation events.

Results of investigation at this site showed the presence of vinyl chloride (VC) in one well (MW-3) located upgradient from the soil removal area. Further investigations revealed a localized area of chlorinated VOCs in one soil boring (SB207). The groundwater was found to contain trichloroethene (TCE), 1,2-Dichloroethene (1,2-DCE), VC, and the metal thallium above their respective MCLs and 1,2-dibromo-3-chloropropane above the risk-based Preliminary Remediation Goal (PRG). The groundwater plume representing VC concentrations above the MCL, which has an approximate area of 0.12 acres, is shown in Figure 5-2. Table 5-2 presents the COCs for Site 21 along with the background concentrations and the MCL for each COC. For 1,2-dibromo-3-chloropropane, the remedial goal will be risk-based. Soil contamination at this site was found to be within the acceptable risk range for industrial/commercial use.

5.3 Site 41

Soils at Site 41 consist primarily of clayey silt with sand lenses. Two sand layers are present, one at approximately 14 feet below the ground surface and one at one at approximately 18 feet below the ground surface. The two sands, separated by 1 to 2 feet of clayey silt, do not appear to intersect either the UST cavity or the cavity that contains the oil/water separator. The depth to the gray till ranges from approximately 18 to 27 feet at Site 41. Cross-sections for Site 41 are presented in the FS.

Groundwater occurs at a depth of approximately 4 feet at Site 41. The groundwater flow direction at Site 41 is to the southwest, consistent with the direction estimated during the Phase II RI from the Basewide groundwater map. The results of the slug test indicate a conductivity of approximately 0.0036 feet per day. This conductivity is likely to be more representative of silty clay materials and not the sand units that underlie portions of the site that contain contaminants.

Results of investigation at this site showed the presence of petroleum related compounds in the vicinity of the oil/water separator and free product hydrocarbons in the backfill surrounding the oil/water separator. Chlorinated VOCs were also detected in samples in the vicinity of the removed waste oil tank. The groundwater was found to contain benzene, ethyl benzene, toluene, TCE, 1,2-DCE, and VC above their respective MCLs and acetone above the PRG. One metal, thallium, was also above the MCL. The groundwater plume for benzene and TCE, which has a total approximate area of 0.38 acres, is shown in Figure 5-3 and 5-4 respectively. Table 5-3 presents the COCs for Site 41 along with the background concentrations and the MCL for each COC. For acetone, the remedial goal will be risk-based. Soil contamination at this site was found to be within the acceptable risk range for industrial/commercial use.

5.4 Site 42

Site 42 is underlain primarily by silt of the UWBZ and localized lenses of sand within the zone. Below the UWBZ a thick, dense clay, described as a basal till (gray clay or gray till) occurs. The gray till was encountered at depths from approximately 14 feet in the south at Site 42 to

approximately 24 feet below ground in the north of the site. An upper sand layer occurs at a depth of approximately 8 feet in all but the southern most boring. This upper sand layer reaches a maximum thickness of approximately 2 feet at Site 42. A second sand layer occurs at a depth of approximately 12 feet. The sand layer is generally thinner in the southern portion of the site, less than one foot thick, and thicker in the northern portion of the site reaching up to 8 feet thick. Cross-sections for Site 42 are presented in the FS.

Slug test data indicate K ranges from 1.02 feet per day to 0.02 feet per day with a geometric mean of 0.15 feet per day. The higher conductivity value is associated with the presence of the extensive sand zone within the UWBZ. Groundwater flow at Site 42 is south-southeast at a hydraulic gradient of 0.026.

Results of investigation at this site showed the presence of vinyl chloride at the site. Further investigations revealed the groundwater contains benzene, TCE, 1,2-DCE, VC, and arsenic above their respective MCLs. None of these compounds were detected in the soil samples collected from these borings. The groundwater plume, which has an approximate area of 0.75 acres, is shown in Figure 5-5. Table 5-4 presents the COCs for Site 42 along with the background concentrations and the MCL for each COC. Soil contamination at this site was found to be within the acceptable risk range for industrial/commercial use.

5.5 Site 43

Site 43 is underlain primarily by clay and silt of the UWBZ and intermittent lenses of sand within the zone. Below the UWBZ, a thick, dense clay, described as a basal till (gray clay or gray till) occurs. The depth to gray till typically ranges from between 9 and 12 feet, however, the depth to gray till is as deep as 15 feet. Unconsolidated deposits above the basal till consist primarily of dense clayey silt with traces of gravel and sand. Intermittent and discontinuous sand lenses were encountered throughout Site 43. One relatively substantial sand layer (2-3 feet thick)

was encountered at depths between 4 and 6 feet. This sand lens is bounded in all directions by borings where sand was not encountered. Cross-sections for Site 43 are presented in the FS.

Results of the slug test indicate a K of 0.024 feet per day, which is on the same order of magnitude of the geometric mean of all slug test data collected during the FS field effort (0.086 feet/day). Groundwater flow at Site 43 is south-southeast at a hydraulic gradient of 0.025.

Results of investigation at this site showed the presence of petroleum related compounds and chlorinated VOCs. The groundwater was found to contain benzene, TCE, 1,2-dichloroethane (1,2-DCA) above their respective MCLs. One metal, thallium, was also above its MCL. The groundwater plume, which has an approximate area of 0.08 acres, is shown in Figure 5-6. Table 5-5 presents the COCs for Site 43 along with the background concentrations and the MCL, for each COC. Soil contamination at this site was found to be within the acceptable risk range for industrial/commercial use.

6.0 Summary of Site Risks

A baseline human health risk assessment (BRA) was performed for each of the IRP sites, as part of the Phase II RI, using USEPA approved methods to determine the baseline risk associated with chemicals present at each of the sites. The Conceptual Site Model (CSM) showing possible exposure pathways is shown in Figure 6-1. Soil was evaluated for exposure to an industrial worker (in keeping with the projected future land use for this site), a construction worker, and by a potential trespasser. Groundwater was evaluated for potential residential exposures to both adults and children. The BRA estimates the probability and magnitude of potential adverse human health effects from exposure to soil and groundwater contaminants detected at the sites. The human health risk assessment followed a four step process:

- Contaminant Identification – identified those contaminants which, given the specifics of the site, were of significant concern;
- Exposure Assessment – identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure;
- Toxicity Assessment – considered the types and magnitude of adverse health effects associated with exposure to hazardous substances; and
- Risk Characterization – Integrated the three previous steps to summarize the potential and actual risks posed by hazardous substances at the site, including carcinogenic and non-carcinogenic risks.

An ecological characterization of the IRP sites at RANGB showed these sites to be composed entirely of buildings, roads, flightlines, and mowed lawns. Therefore, the USAF, with concurrence from USEPA and OEPA, determined that an ecological assessment of these sites was not necessary.

6.1 Site 2

This risk assessment found that the increased lifetime cancer risk associated with exposure to soil from industrial/commercial activity at Site 2 is within USEPA's target cancer risk range of $1x10^{-4}$ to $1x10^{-6}$ (or a chance of less than one additional person between ten thousand and a million

people getting cancer as a result of exposure to this soil). The noncancer exposure risks resulted in a Hazard Index (HI) of less than USEPA's target of 1.

The Federal Safe Drinking Water Act (SDWA) establishes MCLs for several contaminants in groundwater. As presented in Section 5, comparison of the maximum detected concentrations of all chemicals detected in the groundwater at Site 2 to their respective MCLs showed that benzene was the only compound in groundwater that exceeded drinking water standards. Thus, the MCL for benzene was identified as the Remedial Action Objective (RAO) for this site.

6.2 Site 21

This risk assessment found that the increased lifetime cancer risk associated with exposure to soil from industrial/commercial activity at Site 21 is within USEPA's target cancer risk range of $1x10^{-4}$ to $1x10^{-6}$ (or a chance of less than one additional person between ten thousand and a million people getting cancer as a result of exposure to this soil). The noncancer exposure risks resulted in a Hazard Index (HI) of less than USEPA's target of 1.

As presented in Section 5, comparison of the maximum detected concentrations of all chemicals detected in the groundwater at Site 21 to their respective MCLs showed that TCE, 1,2-DCE, VC and thallium were the only compounds in groundwater that exceeded drinking water standards. Thus, the MCL for these compounds were identified as the RAO for this site. In addition, 1,2-dibromo-3-chloropropane was detected at a concentration greater than the PRG, and, thus, this compound was included as a COC with the remedial goal to be based on risk.

6.3 Site 41

This risk assessment found that the increased lifetime cancer risk associated with exposure to soil from industrial/commercial activity at Site 41 is within USEPA's target cancer risk range of $1x10^{-4}$ to $1x10^{-6}$ (or a chance of less than one additional person between ten thousand and a

million people getting cancer as a result of exposure to this soil). The noncancer exposure risks resulted in a HI of less than USEPA's target of 1.

As presented in Section 5, comparison of the maximum detected concentrations of all chemicals detected in the groundwater at Site 41 to their respective MCLs showed that benzene, toluene, ethyl benzene, TCE, 1,2-DCE, VC, and thallium were the only compounds in groundwater that exceeded drinking water standards. Thus, the MCL for these compounds were identified as the RAO for this site. In addition, acetone was detected at a concentration greater than the PRG, and, thus, this compound was included as a COC with the remedial goal to be based on risk.

6.4 Site 42

This risk assessment found that the increased lifetime cancer risk associated with exposure to soil from industrial/commercial activity at Site 42 is within USEPA's target cancer risk range of $1x10^{-4}$ to $1x10^{-6}$ (or a chance of less than one additional person between ten thousand and a million people getting cancer as a result of exposure to this soil). The noncancer exposure risks resulted in a HI of less than USEPA's target of 1.

As presented in Section 5, comparison of the maximum detected concentrations of all chemicals detected in the groundwater at Site 42 to their respective MCLs showed that TCE, 1,2-DCE, benzene, VC, and arsenic were the only compounds in groundwater that exceeded drinking water standards. Thus, the MCL for these compounds were identified as the RAO for this site.

6.5 Site 43

This risk assessment found that the increased lifetime cancer risk associated with exposure to soil from industrial/commercial activity at Site 43 is within USEPA's target cancer risk range of $1x10^{-4}$ to $lx10^{-6}$ (or a chance of less than one additional person between ten thousand and a million people getting cancer as a result of exposure to this soil). The noncancer exposure risks resulted in a Hazard Index (HI) of less than USEPA's target of 1.

As presented in Section 5, comparison of the maximum detected concentrations of all chemicals detected in the groundwater at Site 43 to their respective MCLs showed that benzene, TCE, 1,2-DCA, and thallium were the only compounds in groundwater that exceeded drinking water standards. Thus, the MCL for these compounds were identified as the RAO for this site.

7.0 Statutory Requirements/Response Objectives

Remedial actions are required to address and satisfy Applicable or Relevant and Appropriate Requirements (ARARs) as mandated by the CERCLA [Section 121(d)(2)(A)]. These requirements include Federal and State environmental laws that are legally applicable or are relevant and appropriate under the circumstances of the release of site-related constituents.

There are three general types of ARARs: chemical-specific, location-specific, and action-specific. By definition, ARARs are promulgated and legally enforceable Federal and State requirements. In some cases, goals and criteria are considered to be potential ARARs because they are "relevant and appropriate." Another category of requirements includes non-promulgated criteria, advisories, guidance, and proposed Federal and State standards and is designated as "To Be Considered" (TBC). The chemical-specific, location-specific, and action-specific ARARs for the groundwater at RANGB are summarized in Tables 7-1, 7-2, and 7-3, respectively. Remedial action objectives (RAOs) were subsequently developed for each of the IRP sites, based on the ARARs. The RAOs for each of the sites are summarized below.

7.1 Site 2

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing benzene at a concentration greater than the MCL
- restore the groundwater to drinking water levels
- prevent groundwater containing benzene at concentrations greater than the MCL from migrating to the ditch or migrating offsite
- maintain future land use as industrial/commercial.

7.2 Site 21

The specific response actions for this site are to:

prevent ingestion of, or contact with, groundwater containing VOCs and thallium at concentrations greater than their MCLs and 1,2-dibromo-3-chloropropane above a concentration to be determined based on risk.

- remove contaminated soil around SB207, and, thus, reduce the potential leaching of VOCs from the soil that could cause the concentration of these VOCs in groundwater to exceed the MCL, or, in the absence of a MCL, above a concentration to be determined based on the risk.
- restore the groundwater to drinking water levels
- maintain future land use as industrial/commercial.

7.3 Site 41

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing VOCs and thallium at concentrations greater than their MCLs and acetone above a concentration to be determined based on the risk.
- remove the oil/water separator and TCE contaminated soil, and thus, reduce the potential leaching of VOCs from the soil that could cause the concentration of these VOCs in groundwater to exceed the MCL, or, in the absence of a MCL, above a concentration to be determined based on the risk.
- restore the groundwater to drinking water levels
- maintain future land use as industrial/commercial.

7.4 Site 42

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing VOCs and arsenic at concentrations greater than their MCLs
- remove contaminated soil and thus reduce the potential leaching of VOCs from the soil that could cause the concentration of these VOCs in groundwater to exceed the MCL
- restore the groundwater to drinking water levels
- maintain future land use as industrial/commercial.

7.5 Site 43

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing VOCs and thallium at concentrations greater than their MCLs
- prevent discharge of groundwater containing compounds above their MCLs into the stormwater drainage system
- remove the oil/water separator and associated backfill to reduce the potential of any ongoing sources of VOCs leaching into the groundwater
- restore the groundwater to drinking water levels

- maintain future land use as industrial/commercial.

8.0 Description of Alternatives

Five remedial alternatives were developed and screened for each of the IRP sites. This section presents the remedial alternatives developed for each site, the remedy components, common elements and distinguishing features of each alternative, and the expected outcome of each alternative.

8.1 Summary of Alternatives

Presented below are summaries of alternatives for each of the IRP sites.

8.1.1 Site 2

The alternatives developed for the groundwater at Site 2 are presented below:

- Alternative 1 - No Action
- Alternative 2 - Institutional Controls, Natural Attenuation
- Alternative 3 - Institutional Controls, Natural Attenuation, Groundwater Cutoff Trench with Treatment Wall
- Alternative 4 - Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge
- Alternative 5 - In-situ Chemical Oxidation Treatment

Alternative 1: No Action

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline with which other alternatives can be compared. Under this alternative, there would be no further action taken at this site to prevent potential exposure to groundwater. Once every five years, the groundwater would be sampled to evaluate the condition of the plume and whether action may be needed at the site.

Estimated Capital Cost: $0
Estimated Annual Operations and Maintenance (O&M) Costs: None (monitoring performed every five years)
Total Cost (Estimated Present Worth): $24,000
Months to Implement: None
Estimated Time to Achieve Remedial Goals: 15 years

Alternative 2: Institutional Controls, Natural Attenuation

A restriction would be placed on the deed ("institutional control") for Site 2 prohibiting the installation of any water wells within the plume of benzene contamination, whether drawing water from the UWBZ (where contamination is present) or from deeper aquifers.

While potential contact with groundwater is limited with a restriction on drinking water wells, the remaining benzene in groundwater would continue to decrease in concentration by natural attenuation. Natural attenuation is the process by which groundwater contamination is reduced by a combination of several natural phenomenon, including dilution, dispersion, natural chemical decay, and decay through the activity of micro-organisms. This process would continue until the benzene concentrations in groundwater are below the MCL. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-1 are met.

Estimated Capital Cost: $170,000
Estimated Annual Operations and Maintenance (O&M) Costs: $25,000
Total Cost (Estimated Present Worth): $469,000
Months to Implement: Six
Estimated Time to Achieve Remedial Goals: 15 years

Alternative 3: Institutional Controls, Natural Attenuation, Groundwater Cutoff Trench with Treatment Wall

This alternative would place a trench across the groundwater benzene plume to prevent further migration of benzene from Site 2 under the drainage ditch and into property owned by the RPA. The trench would contain a pipe, sparging air into the groundwater collected in the trench to strip out the benzene. In addition to the groundwater cutoff trench, deed restrictions and natural attenuation would also be a part of this alternative. For the first two years, groundwater data will

be collected quarterly to ensure that benzene concentrations are decreasing in the plume. At the end of two years, the collected data will be evaluated to ensure that natural attenuation is occurring, the plume is not migrating, and to get a better estimate for the projected cleanup time. A decision will be made at that time as to whether a more aggressive cleanup strategy (such as is presented for Alternatives 4 and 5 for this site) is more appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-1 are met.

Estimated Capital Cost: $224,000
Estimated Annual Operations and Maintenance (O&M) Costs: $25,000
Total Cost (Estimated Present Worth): $523,000
Months to Implement: Six
Estimated Time to Achieve Remedial Goals: 15 years

Alternative 4: Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge

This alternative would place numerous well points throughout the groundwater benzene plume area to extract contaminated groundwater. Since groundwater yields are low and the soils are tight, installation of a conventional well pump to extract the groundwater will not be effective. Instead, the water will be extracted using a vacuum which will serve to draw water towards the wells, and, which will continue to operate even if a well is dry. If the well is dry, the vacuum system will work like a soil-vapor extraction system and remove contaminants in that manner. The extracted groundwater would be treated on the surface using a carbon adsorption system to remove the benzene (and other hydrocarbons) and then discharged to the drainage ditch under a permit from OEPA. The groundwater would be periodically monitored to ensure that the concentrations of the COCs in Table 5-1 were decreasing until such time that remedial goals have been met.

Estimated Capital Cost: $139,000
Estimated Annual Operations and Maintenance (O&M) Costs: $67,000
Total Cost (Estimated Present Worth): $939,000

Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 15 years

Alternative 5: In-situ Chemical Oxidation Treatment

This alternative would locate numerous well points in the plume through which a strong chemical oxidant (hydrogen peroxide) with benign breakdown products (water and oxygen) would be used to react with the hydrocarbons in the groundwater and convert them to carbon dioxide and water. The treatment would continue until such time that remedial goals for the COCs in Table 5-1 have been met.

Estimated Capital Cost: $1,061,000
Estimated Annual Operations and Maintenance (O&M) Costs: $17,000
Total Cost (Estimated Present Worth): $1,078,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 1 to 2 years

8.1.2 Site 21

The alternatives developed for the groundwater at Site 21 are presented below:

- Alternative 1 - No Action
- Alternative 2 - Institutional Controls, Natural Attenuation
- Alternative 3 - Institutional Controls, Hot-Spot Removal, Natural Attenuation
- Alternative 4 - Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge
- Alternative 5 - In-situ Chemical Oxidation Treatment

Alternative 1: No Action

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline with which other alternatives can be compared. Under this alternative, there would be no further action taken at this site to prevent potential exposure to groundwater. Once every five years, the groundwater would be sampled to evaluate the condition of the plume and whether action may be needed at the site.

Estimated Capital Cost: $0
Estimated Annual Operations and Maintenance (O&M) Costs: None (monitoring performed every five years)
Total Cost (Estimated Present Worth): $15,000
Months to Implement: None
Estimated Time to Achieve Remedial Goals: 12 years

Alternative 2: Institutional Controls, Natural Attenuation

Similar to the discussion for Site 2, a restriction would be placed on the deed ("institutional control") for Site 21 prohibiting the installation of any water wells within the plume of VOC contamination, whether drawing water from the upper water bearing zone (where contamination is present) or from deeper aquifers. The natural attenuation process would continue until the VOC concentrations in groundwater are below the remedial goals for the COCs as shown in Table 5-2. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-2 are met.

Estimated Capital Cost: $102,000
Estimated Annual Operations and Maintenance (O&M) Costs: $17,000
Total Cost (Estimated Present Worth): $272,000
Months to Implement: Six
Estimated Time to Achieve Remedial Goals: 12 years

Alternative 3: Institutional Controls, Hot-Spot Removal, Natural Attenuation

This alternative would seek to speed up natural attenuation by removing the vadose and saturated soils in the area with the highest contamination, i.e. the "hot spot." In addition to removing the hot spot, deed restrictions and natural attenuation would also be a part of this alternative. The groundwater would be periodically monitored to ensure that VOC concentrations were decreasing in the plume. Concentrations of thallium will also be monitored. For the first two years, groundwater data will be collected quarterly. At the end of two years, the collected data will be evaluated to ensure that natural attenuation is occurring, the plume is not migrating, and to provide a better estimate for the projected cleanup time. A decision will be made at that time as to whether a more aggressive cleanup strategy (such as is presented for Alternatives 4 and 5

for this site) is more appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-2 are met.

Estimated Capital Cost: $231,000
Estimated Annual Operations and Maintenance (O&M) Costs: $17,000
Total Cost (Estimated Present Worth): $401,000
Months to Implement: 12
Estimated Time to Achieve Remedial Goals: 12 years

Alternative 4: Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge

This alternative is the same as described for Site 2. The groundwater would be periodically monitored to ensure that VOC concentrations were decreasing until such time that remedial goals for the COCs in Table 5-2 have been met.

Estimated Capital Cost: $85,000
Estimated Annual Operations and Maintenance (O&M) Costs: $69,000
Total Cost (Estimated Present Worth): $772,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: <12 years.

Alternative 5: In-situ Chemical Oxidation Treatment

This alternative is the same as described for Site 2. The treatment would continue until such time that remedial goals for the COCs in Table 5-2 have been met.

Estimated Capital Cost: $406,000
Estimated Annual Operations and Maintenance (O&M) Costs: $13,000
Total Cost (Estimated Present Worth): $419,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 1 to 2 years

8.1.3 Site 41

The alternatives developed for the groundwater at Site 41 are presented below:

- Alternative 1 - No Action
- Alternative 2 - Institutional Controls, Free-Product Removal, Natural Attenuation
- Alternative 3 - Institutional Controls, Oil/Water Separator Removal, Free-Product Removal, TCE Hot-Spot Removal, Natural Attenuation for Residual Contamination
- Alternative 4 - Oil/Water Separator Removal, Free-Product Removal, Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge
- Alternative 5 - Oil/Water Separator Removal, Free-Product Removal, In-situ Chemical Oxidation Treatment

Alternative 1: No Action

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline with which other alternatives can be compared. Under this alternative, there would be no further action taken at this site to prevent potential exposure to groundwater. Once every five years, the groundwater would be sampled to evaluate the condition of the plumes and whether action may be needed at the site.

Estimated Capital Cost: $0
Estimated Annual Operations and Maintenance (O&M) Costs: None (monitoring performed every five years)
Total Cost (Estimated Present Worth): $49,000
Months to Implement: None
Estimated Time to Achieve Remedial Goals: >30 years

Alternative 2 - Institutional Controls, Free-Product Removal, Natural Attenuation

Similar to the discussion for Site 2, a restriction would be placed on the deed ("institutional control") for Site 41 prohibiting the installation of any water wells within the plumes of VOC contamination, whether drawing water from the upper water bearing zone (where contamination is present) or from deeper aquifers. A well would be installed into the backfill of the oil/water separator to remove any free-product (oil or fuel) present in the backfill. The natural attenuation process would continue until the VOC concentrations in groundwater are below the remedial

goals for the COCs as shown in Table 5-2. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-3 are met.

Estimated Capital Cost: $125,000
Estimated Annual Operations and Maintenance (O&M) Costs: $19,000
Total Cost (Estimated Present Worth): $408,000
Months to Implement: Six
Estimated Time to Achieve Remedial Goals: 20 years

Alternative 3: Institutional Controls, Oil/Water Separator Removal, Free-Product Removal, TCE Hot-Spot Removal, Natural Attenuation for Residual Contamination

This alternative would seek to speed up natural attenuation by removing free-product present in the oil/water separator backfill; removing the oil/water separator along with associated backfill and any visibly impacted soil in the immediate vicinity of the oil/water separator; and removing vadose and saturated soils in the area with the highest TCE contamination, the "hot spot." In addition to these removal actions, deed restrictions and natural attenuation would be a part of this alternative. For the first two years, groundwater data will be collected every three months to ensure that VOC concentrations were decreasing in the plumes. Thallium concentrations would also be monitored. At the end of two years, the collected data will be evaluated to ensure that natural attenuation is occurring, the plumes are not migrating, and to get a better estimate for the projected cleanup time. A decision will be made at that time as to whether a more aggressive cleanup strategy (such as is presented for Alternatives 4 and 5 for this site) is more appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-3 are met.

Estimated Capital Cost: $405,000
Estimated Annual Operations and Maintenance (O&M) Costs: $17,000
Total Cost (Estimated Present Worth): $551,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 10 years

Alternative 4: Oil/Water Separator Removal, Free-Product Removal, Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge

This alternative incorporates removal of the free-phase hydrocarbon in the oil/water separator backfill, removal of the oil/water separator itself, and groundwater extraction in the manner described for Site 2. The groundwater would be periodically monitored to ensure that VOC concentrations were decreasing until such time that remedial goals for the COCs in Table 5-3 have been met.

Estimated Capital Cost: $502,000
Estimated Annual Operations and Maintenance (O&M) Costs: $66,000
Total Cost (Estimated Present Worth): $1,065,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: <10 years

Alternative 5: Oil/Water Separator Removal, Free-Product Removal, In-situ Chemical Oxidation Treatment

This alternative incorporates removal of the free-phase hydrocarbon in the oil/water separator backfill, removal of the oil/water separator itself, and in-situ chemical oxidation in the manner described for Site 2. The in-situ oxidation treatment would continue until such time that remedial goals for the COCs in Table 5-3 have been met.

Estimated Capital Cost: $708,000
Estimated Annual Operations and Maintenance (O&M) Costs: $15,000
Total Cost (Estimated Present Worth): $723,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 1 to 2 years

8.1.4 Site 42

The alternatives developed for the groundwater at Site 42 are presented below:

- Alternative 1 - No Action
- Alternative 2 - Institutional Controls, Natural Attenuation
- Alternative 3 - Institutional Controls, Hot-Spot Removal, Natural Attenuation
- Alternative 4 - Vacuum Enhanced Groundwater Extraction with Well Points, Ex-Situ Groundwater Treatment with Surface Discharge
- Alternative 5 - In-situ Chemical Oxidation Treatment

Alternative 1: No Action

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline with which other alternatives can be compared. Under this alternative, there would be no further action taken at this site to prevent potential exposure to groundwater. Once every five years, the groundwater would be sampled to evaluate the condition of the plume and whether action may be needed at the site.

Estimated Capital Cost: $0
Estimated Annual Operations and Maintenance (O&M) Costs: None (monitoring performed every five years)
Total Cost (Estimated Present Worth): $96,000
Months to Implement: None
Estimated Time to Achieve Remedial Goals: 60 years

Alternative 2: Institutional Controls, Natural Attenuation

Similar to the discussion for Site 2, a restriction would be placed on the deed ("institutional control") for Site 42 prohibiting the installation of any water wells within the plume of groundwater contamination, whether drawing water from the upper water bearing zone (where contamination is present) or from deeper aquifers. The natural attenuation process would continue until the VOC concentrations in groundwater are below the MCL. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-4 are met.

Estimated Capital Cost: $169,000
Estimated Annual Operations and Maintenance (O&M) Costs: $25,000
Total Cost (Estimated Present Worth): $861,000
Months to Implement: Six
Estimated Time to Achieve Remedial Goals: 60 years

Alternative 3: Institutional Controls, Hot-Spot Removal, Natural Attenuation

This alternative would seek to speed up natural attenuation by removing the vadose and saturated soils in the area with the highest contamination, the "hot spot". In addition to removing the hot spot, deed restrictions and natural attenuation would also be a part of this alternative. For the first two years, groundwater data will be collected every three months to ensure that VOC concentrations were decreasing in the plume. Arsenic concentrations will also be monitored. At the end of two years, the collected data will be evaluated to ensure that natural attenuation is occurring, the plume is not migrating, and to get a better estimate for the projected cleanup time. A decision will be made at that time as to whether a more aggressive cleanup strategy (such as is presented for Alternatives 4 and 5 for this site) is more appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-4 are met.

Estimated Capital Cost: $282,000
Estimated Annual Operations and Maintenance (O&M) Costs: $19,000
Total Cost (Estimated Present Worth): $485,000
Months to Implement: 12
Estimated Time to Achieve Remedial Goals: 13 years

Alternative 4: Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge

This alternative is the same as described for Site 2. The groundwater would be periodically monitored to ensure that VOC concentrations were decreasing until such time that remedial goals for the COCs in Table5-4 have been met.

Estimated Capital Cost: $122,000
Estimated Annual Operations and Maintenance (O&M) Costs: $79,000
Total Cost (Estimated Present Worth): $963,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: < 13 years

Alternative 5: In-situ Chemical Oxidation Treatment

This alternative is the same as described for Site 2. The treatment would continue until such time that remedial goals for the COCs in Table 5-4 have been met.

Estimated Capital Cost: $1,209,000
Estimated Annual Operations and Maintenance (O&M) Costs: $13,000
Total Cost (Estimated Present Worth): $1,222,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 1 to 2 years

8.1.5 Site 43

The alternatives developed for the groundwater at Site 43 are presented below:

- Alternative 1 - No Action
- Alternative 2 - Institutional Controls, Natural Attenuation
- Alternative 3 - Institutional Controls, Oil/Water Separator Removal, Natural Attenuation
- Alternative 4 - Oil/Water Separator Removal, Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge
- Alternative 5 - Oil/Water Separator Removal, In-situ Chemical Oxidation Treatment

Alternative 1: No Action

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline with which other alternatives can be compared. Under this alternative, there would be no further action taken at this site to prevent potential exposure to groundwater. Once every five years, the groundwater would be sampled to evaluate the condition of the plume and whether action may be needed at the site.

Estimated Capital Cost: $0
Estimated Annual Operations and Maintenance (O&M) Costs: None (monitoring performed every five years)
Total Cost (Estimated Present Worth): $10,000
Months to Implement: None
Estimated Time to Achieve Remedial Goals: 8 years

Alternative 2 - Institutional Controls, Natural Attenuation

Similar to the discussion for Site 2, a restriction would be placed on the deed ("institutional control") for Site 43 prohibiting the installation of any water wells within the plume of VOC contamination, whether drawing water from the upper water bearing zone (where contamination is present) or from deeper aquifers. The natural attenuation process would continue until the VOC concentrations in groundwater are below the MCL. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-4 are met.

Estimated Capital Cost: $87,000
Estimated Annual Operations and Maintenance (O&M) Costs: $15,000
Total Cost (Estimated Present Worth): $193,000
Months to Implement: Six
Estimated Time to Achieve Remedial Goals: 8 years

Alternative 3: Institutional Controls, Oil/Water Separator Removal, Natural Attenuation for Residual Contamination

This alternative would seek to speed up natural attenuation by removing the oil/water separator along with associated backfill. In addition to this removal action, deed restrictions and natural attenuation would also be a part of this alternative. For the first two years, groundwater data will be collected every three months to ensure that VOC concentrations were decreasing in the plume. Thallium concentrations will also be monitored. At the end of two years, the collected data will be evaluated to ensure that natural attenuation is occurring, the plume is not migrating, and to get a better estimate for the projected cleanup time. A decision will be made at that time as to whether a more aggressive cleanup strategy (such as is presented for Alternatives 4 and 5 for this site) is more appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Groundwater monitoring will continue until such time that remedial goals for the COCs in Table 5-4 are met.

Estimated Capital Cost: $116,000
Estimated Annual Operations and Maintenance (O&M) Costs: $13,000
Total Cost (Estimated Present Worth): $208,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 8 years

Alternative 4: Oil/Water Separator Removal, Vacuum Enhanced Groundwater Extraction with Well Points, Ex-situ Groundwater Treatment with Surface Discharge

This alternative incorporates removal of the oil/water separator with groundwater extraction in the manner described for Site 2. The groundwater would be periodically monitored to ensure that VOC concentrations were decreasing until such time that remedial goals for the COCs in Table 5-4 have been met.

Estimated Capital Cost: $93,000
Estimated Annual Operations and Maintenance (O&M) Costs: $59,000
Total Cost (Estimated Present Worth): $508,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: <8 years

Alternative 5: Oil/Water Separator Removal, Free-Product Removal, In-situ Chemical Oxidation Treatment

This alternative incorporates removal of the oil/water separator with in-situ chemical oxidation in the manner described for Site 2. The in-situ oxidation treatment would continue until such time that remedial goals for the COCs in Table 5-4 have been met.

Estimated Capital Cost: $213,000
Estimated Annual Operations and Maintenance (O&M) Costs: $9,000
Total Cost (Estimated Present Worth): $222,000
Months to Implement: 12-18
Estimated Time to Achieve Remedial Goals: 1 to 2 years

8.2 Selected Remedies

The AFBCA issued a public notice on the RANGB Proposed Plan in the Columbus Dispatch on December 29, 1998, and made the Proposed Plan and an informational fact sheet available to the public at the Columbus Metropolitan Library and the AFBCA Office. The proposed plan

presented the preferred alternative for each of the IRP sites. The preferred alternative for each of the IRP sites is as follows:

Site 2: Alternative 3: Institutional Controls, Natural Attenuation, and Groundwater Cutoff Trench with Treatment Wall

Site 21: Alternative 3: Institutional Controls, Hot-Spot Removal, and Natural Attenuation

Site 41: Alternative 3: Institutional Controls, Oil/Water Separator Removal, Free-Product Removal, TCE Hot-Spot Removal, and Natural Attenuation.

Site 42: Alternative 3: Institutional Controls, Hot-Spot Removal, and Natural Attenuation

Site 43: Alternative 3: Institutional Controls, Oil/Water Separator Removal, and Natural Attenuation

Section 9.0 of this document provides details on the analysis of the alternatives and Section 10.0 provides a description of the selected remedy for each of the IRP sites.

9.0 Summary of Comparative Analysis of Alternatives

This section presents a summary of the comparative analysis of the remedial alternatives for each of the IRP sites. The comparative analysis was completed using the nine criteria presented in the EPA RI/FS guidance document (EPA 1988) and CERCLA (40 CFR 300.430(e)(9)(iii)). The nine criteria are as follows:

1) Overall protection of human health and the environment
2) Compliance with ARARs (ARARs are listed in Section 7)
3) Long-term effectiveness and permanence
4) Reduction of toxicity, mobility, or volume through treatment
5) Short-term effectiveness
6) Implementability
7) Cost
8) State and USEPA acceptance
9) Community acceptance

The first two criteria are termed threshold criteria in that an alternative must meet both to be considered as the final remedy. Specifically, alternatives that do not protect human health and the environment, or do not comply with ARARs (or justify a waiver), will not meet statutory requirements for a selected remedy in the RADD.

9.1 Site 2

Overall protection of human health and the environment - The benzene plume at Site 2 has currently migrated offsite. This migration will continue in the future, albeit at a slow pace (approximately 10 feet per year based on current models), under Alternative 1 (No Action). Since deed restrictions on the use of the UWBZ is the most difficult to implement offsite, Alternative 1 would be least protective of human health and the environment.

Alternative 2 also would not stop the immediate migration of contaminants offsite and, therefore, would not be any more protective of human health and the environment than Alternative l.

Alternatives 3, 4, and 5 would stop further offsite migration of the plume, and, therefore, would rank equally under this criterion.

Alternative 5 would likely achieve remedial goals in the shortest time frame of all the alternatives while Alternative 4 would likely require less time than Alternatives 1, 2, and 3 in achieving remedial goals.

Compliance with ARARs - Alternatives 1 and 2 would eventually meet the ARAR of achieving MCLs in the groundwater within the same time frame. However, since annual monitoring would not be performed under Alternative 1, natural attenuation progress would remain undetermined and it would not be possible to determine when MCLs are reached (except for evaluation monitoring performed at the end of five years). The remaining alternatives should achieve MCLs within an estimated time of 15 years and will then comply with ARARs.

Long-term effectiveness and permanence - All alternatives will likely reduce contaminants at the site to below action levels within an estimated time-frame of 15 years.

Reduction of toxicity, mobility, or volume through treatment – Alternatives 1 and 2 would not immediately reduce the toxicity, mobility, or volume of contaminated groundwater. Alternative 3 would immediately stop the mobility of contaminated groundwater and eventually eliminate the toxicity and volume in 15 years by natural attenuation. Alternatives 4 and 5 would actively reduce the toxicity, mobility, and volume of contaminated groundwater.

Short-term effectiveness - In the short-term, Alternatives 1 and 2 would be least effective because offsite migration of contaminated groundwater would continue. Alternative 3 would be very effective in the short-term in immediately stopping offsite migration of contaminants as well as monitoring the progress of natural attenuation. The short-term effectiveness of Alternative 4 is difficult to predict at this time because it may be difficult to remove contaminants trapped within the matrix of the low-permeability soils present at this site.

Alternative 5 is expected to be very effective in the short-term in providing a final remedial solution for this site. However, a pilot-test is necessary to confirm the effectiveness of this technology.

Implementability - Alternatives 2, 3, 4, and 5 are progressively more difficult to implement since more actions are involved. Alternative 5 may involve several implementability concerns during remedial design because the technology is relatively new and a pilot-test has not been performed at this site.

Cost - Alternative 1 has no capital costs and minimal operating costs. Alternatives 2, 3, 4, and 5 are progressively more expensive to implement at this site.

State and USEPA Acceptance – The USEPA and OEPA support the selected remedy.

Community Acceptance – On February 8, 1999 the Proposed Plan was issued in its final version. Based on public comments and support from USEPA Region 5 and OEPA, the public is generally in agreement regarding the selected remedy (Alternative 3) for IRP Site 2 as presented in the Proposed Plan.

Table 9-1. Cleanup Alternatives Evaluation Table for Site 2

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
			(selected)		
Overall protection of human health and the environment	◎	◎	○	○	○
Compliance with ARARs	◎	○	○	○	○
Long-term effectiveness and permanence	⊙	⊙	○	○	○
Reduction of toxicity, mobility, or volume through treatment	◎	◎	⊙	○	○
Short-term effectiveness	◎	◎	○	○	○

Implementability	●	●	●	⊙	⊙
Cost	$24,000	$469,000	$523,000	$939,000	$1,078,000
State and USEPA Acceptance	The USEPA and OEPA support the selected remedy.				
Community Acceptance	The public is generally in agreement regarding the selected remedy.				

● Fully Meets Criteria ⊙ Partially Meets Criteria ◎ Does Not Meet Criteria

9.2 Site 21

Overall protection of human health and the environment - Alternative 1 would not be protective of human health and the environment because it does not impose restrictions on the placement of wells to allow access to the groundwater during the time-frame necessary for natural attenuation to remediate the site to below MCLs or, in the absence of an MCL, to below a risk-based concentration. Alternatives 2, 3, 4 and 5 would prevent access to the UWBZ and, thus, be protective of human health and the environment.

Alternative 3, which includes hot spot removal, would lead to lower remediation time frames because of contaminant mass removal. Alternatives 2 and 3 would be just as protective of human health and the environment (due to short travel distances of the plume and the projected use of the site), but Alternative 3 will be ranked higher due to shorter remedial time frames. Alternative 5 would likely achieve remedial goals in the shortest time frame of all the alternatives while Alternative 4 would likely require less time than Alternatives 1, 2, and 3 in achieving remedial goals.

Compliance with ARARs – All alternatives will likely achieve MCLs or, in the absence of an MCL, achieve a risk-based concentration within an estimated time of 12 years and will likely comply with ARARs.

Long-term effectiveness and permanence - All alternatives will likely reduce contaminants at the site to below action levels within an estimated time-frame of 12 years.

Reduction of toxicity, mobility, or volume through treatment – Alternatives 1 and 2 would not immediately reduce the toxicity, mobility, or volume of contaminated groundwater. Alternatives 3, 4 and 5 would actively reduce the toxicity, mobility, and volume of contaminated groundwater.

Short-term effectiveness - In the short-term, Alternatives 1 and 2 would be least effective because migration of contaminated groundwater would continue. Alternative 3 would be immediately effective in the short-term in removing a large fraction of contamination at the site. The short-term effectiveness of Alternative 4 is difficult to predict at this time because it may be difficult to remove contaminants trapped within the matrix of the low-permeability soils present at this site. Alternative 5 is expected to be very effective in the short-term in providing a final remedial solution for this site. However, a pilot-test is necessary to confirm the effectiveness of this technology.

Implementability - Alternatives 2, 3, 4, and 5 are progressively more difficult to implement since more actions are involved. Alternative 5 may involve several implementability concerns during remedial design because the technology is relatively new and a pilot-test has not been performed at this site.

Cost - Alternatives 2, 3, 4, and 5 are progressively more expensive to implement at this site.

State and USEPA Acceptance – The USEPA and OEPA support the selected remedy.

Community Acceptance – On February 8, 1999 the Proposed Plan was issued in its final version. Based on public comments and support from USEPA Region 5 and OEPA, the public is generally in agreement regarding the selected remedy (Alternative 3) for IRP Site 21 as presented in the Proposed Plan.

Table 9-2. Cleanup Alternatives Evaluation Table for Site 21

	Alternative 1	Alternative 2	Alternative 3 (selected)	Alternative 4	Alternative 5
Overall protection of human health and the environment	◎	●	●	●	●
Compliance with ARARs	◎	●	●	●	●
Long-term effectiveness and permanence	●	●	●	●	●
Reduction of toxicity, mobility, or volume through treatment	◎	⊙	●	●	●
Short-term effectiveness	◎	⊙	●	●	●
Implementability	●	●	●	⊙	⊙
Cost	$15,000	$272,000	$401,000	$772,000	$419,000
State and USEPA Acceptance	The USEPA and OEPA support the selected remedy.				
Community Acceptance	The public is generally in agreement regarding the selected remedy.				

● Fully Meets Criteria ⊙ Partially Meets Criteria ◎ Does Not Meet Criteria

9.3 Site 41

Overall protection of human health and the environment - Alternative 1 would not be protective of human health and the environment because it does not impose restrictions on the placement of wells to allow access to the groundwater during the time-frame necessary for natural attenuation to remediate the site to below MCLs or, in the absence of an MCL, to below a risk-based concentration. The remaining alternatives would prevent access to the groundwater and, thus, be protective of human health and the environment.

The projected time for the contaminants at Site 41 to achieve MCLs or, in the absence of an MCL, a risk-based concentration, by natural attenuation is 13 years provided free-product is removed from the backfill (Alternative 2). This time-frame decreases to 11 years if the TCE hot-spot and the oil/water separator and associated backfill is also removed (Alternative 3). These

times are likely to be conservative because a significant portion of contaminants at this site will be removed by the actions of Alternatives 2 and 3. Alternative 4 would likely achieve cleanup goals even more quickly, as well as address potential contamination under Building 848. However, because of uncertainties associated with mass transfer of contaminants through the clay soil at this site, Alternative 4 was assumed to require the same time as natural attenuation with free-product removal. Since the major portion of contamination appears confined to the oil/water separator backfill with low migration potential, Alternatives 2, 3, and 4 appear at least as protective of human health and the environment as Alternative 5.

Alternative 5 would likely achieve remedial goals in the shortest time frame of all the alternatives while Alternative 4 would likely require less time than Alternatives 1, 2, and 3 in achieving remedial goals.

Compliance with ARARs - All alternatives, except Alternative 3, should achieve MCLs or, in the absence of an MCL, a risk-based concentration, within an estimated time of 13 years and will then comply with ARARs. Alternative 3 has a projected cleanup time of 11 years and will also comply with ARARs at that time.

Long-term effectiveness and permanence - All alternatives will likely reduce contaminants at the site to below action levels within a projected time-frame of 13 years.

Reduction of toxicity, mobility, or volume through treatment - Alternative 1 would not immediately reduce the toxicity, mobility, or volume of contaminated groundwater. Alternatives 2, 3, 4 and 5 would actively reduce the toxicity, mobility, and volume of contaminated groundwater.

Short-term effectiveness - Alternatives 2 and 3 are more effective in the short-term than Alternative 1 because of the removal of free-product and the oil/water separator, respectively, and the progress of natural attenuation and plume migration would be known. Alternative 4

would be even more effective in reducing the contaminant levels quickly in the short-term; however, the effectiveness of the vacuum enhanced extraction system is difficult to predict at this time because it may be difficult to remove contaminants trapped within the matrix of the low-permeability clay soils present at this site. Alternative 5 is expected to be very effective in the short-term in providing a final remedial solution for this site. However, a pilot-test is necessary to confirm the effectiveness of this technology.

Implementability - Alternatives 2, 3, 4 and 5 are progressively more difficult to implement since more actions are involved. Alternative 5 may involve several implementability concerns during remedial design because the technology is relatively new and a pilot-test has not been performed at this site.

Cost - Alternative 1 has no capital costs and minimal operating costs. Alternatives 2, 3, 4, and 5 are progressively more expensive to implement at this site.

State and USEPA Acceptance – The USEPA and OEPA support the selected remedy.

Community Acceptance – On February 8, 1999 the Proposed Plan was issued in its final version. Based on public comments and support from USEPA Region 5 and OEPA, the public is generally in agreement regarding the selected remedy (Alternative 3) for IRP Site 41 as presented in the Proposed Plan.

Table 9-3. Cleanup Alternatives Evaluation Table for Site 41

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
			(selected)		
Overall protection of human health and the environment	◎	⊙	O	O	O
Compliance with ARARs	◎	⊙	O	O	O

Long-term effectiveness and permanence	⊙	⊙	●	●	●
Reduction of toxicity, mobility, or volume through treatment	◎	⊙	●	●	●
Short-term effectiveness	◎	⊙	●	●	●
Implementability	●	●	⊙	⊙	⊙
Cost	$49,000	$408,000	$551,000	$1,065,000	$723,000
State and USEPA Acceptance	The USEPA and OEPA support the selected remedy.				
Community Acceptance	The public is generally in agreement regarding the selected remedy.				

● Fully Meets Criteria ⊙ Partially Meets Criteria ◎ Does Not Meet Criteria

9.4 Site 42

Overall protection of human health and the environment - Alternative 1 would not be protective of human health and the environment because it does not impose restrictions on the placement of wells to allow access to the groundwater during the time-frame necessary for natural attenuation to remediate the site to below MCLs. The remaining alternatives would prevent access to the groundwater, and, thus, be protective of human health and the environment.

Alternative 2 would be protective of human health and the environment but Alternative 3 will be ranked higher in this criteria because of the significantly smaller remedial time-frame as a result of hot-spot removal. Because of uncertainties associated with mass transfer of contaminants through the soil at this site, Alternative 4 was assumed to require the same time as natural attenuation with TCE hot-spot removal. Alternative 5 would likely achieve remedial goals in the shortest time frame of all the alternatives while Alternative 4 would likely require less time than Alternatives 1, 2, and 3 in achieving remedial goals.

Compliance with ARARs – Alternatives 1 and 2 would eventually meet the ARAR of achieving MCLs in the groundwater within 60 years. The remaining alternatives should achieve MCLs within an estimated time of 13 years and will then comply with ARARs.

Long-term effectiveness and permanence - All alternatives will eventually reduce contaminants at the site to below action levels. However, the time-frame to achieve this remedial objective is very long for those alternatives without active remedial actions (Alternatives 1 and 2).

Reduction of toxicity, mobility, or volume through treatment – Alternatives 1 and 2 would not immediately reduce the toxicity, mobility, or volume of contaminated groundwater. Alternatives 3, 4 and 5 would actively reduce the toxicity, mobility, and volume of contaminated groundwater.

Short-term effectiveness - Alternative 2 is more effective in the short-term than Alternative 1 because the progress of natural attenuation and plume migration would be known. Alternatives 3 and 4 would be even more effective in reducing the contaminant levels quickly in the short-term; however, the effectiveness of the vacuum enhanced extraction system is difficult to predict at this time because it may be difficult to remove contaminants trapped within the matrix of the low-permeability clay soils present at this site. Alternative 5 is expected to be very effective in the short-term in providing a final remedial solution for this site. However, a pilot-test is necessary to confirm the effectiveness of this technology.

Implementability - Alternatives 2, 3, 4 and 5 are progressively more difficult to implement since more actions are involved. Alternative 5 may involve several implementability concerns during remedial design because the technology is relatively new, a pilot-test has not been performed at this site, and the proximity of the runways.

Cost - Alternatives 2, 3, 4, and 5 are progressively more expensive to implement at this site.

State and USEPA Acceptance – The USEPA and OEPA support the selected remedy.

Community Acceptance – On February 8, 1999 the Proposed Plan was issued in its final version. Based on public comments and support from USEPA Region 5 and OEPA, the public is in agreement regarding the selected remedy (Alternative 3) for IRP Site 42 as presented in the Proposed Plan.

Table 9-4. Cleanup Alternatives Evaluation Table for Site 42

	Alternative 1	Alternative 2	Alternative 3 (selected)	Alternative 4	Alternative 5
Overall protection of human health and the environment	◎	⊙	●	●	●
Compliance with ARARs	◎	⊙	●	●	●
Long-term effectiveness and permanence	⊙	⊙	●	●	●
Reduction of toxicity, mobility, or volume through treatment	◎	⊙	●	●	●
Short-term effectiveness	◎	⊙	●	●	●
Implementability	●	●	●	⊙	⊙
Cost	$96,000	$861,000	$485,000	$963,000	$1,222,000
State and USEPA Acceptance	The USEPA and OEPA support the selected remedy.				
Community Acceptance	The public is in agreement regarding the selected remedy.				

● Fully Meets Criteria ⊙ Partially Meets Criteria ◎ Does Not Meet Criteria

9.5 Site 43

Overall protection of human health and the environment - Alternative 1 would not be protective of human health and the environment because it does not impose restrictions on the placement of wells to allow access to the UWBZ during the time-frame necessary for natural attenuation to remediate the site to below MCLs. The remaining alternatives would prevent access to the UWBZ and, thus, be protective of human health and the environment.

The projected time for the contaminants at Site 43 to achieve MCLs by natural attenuation is 8 years without any additional action (Alternatives 1 and 2). Alternative 3 would speed up natural attenuation by removing the oil/water separator along with associated backfill. The oil/water separator requires removal for Alternatives 4 and 5 to allow the other remedial actions in those alternatives to work. Alternative 5 would likely achieve remedial goals in the shortest time frame of all the alternatives while Alternative 4 would likely require less time than Alternatives 1, 2, and 3 in achieving remedial goals.

Compliance with ARARs – Alternatives 1 and 2 should eventually meet the ARAR of achieving MCLs in the groundwater within an estimated time of 8 years. The remaining alternatives should achieve MCLs within an estimated time of 8 years and will then comply with ARARs.

Long-term effectiveness and permanence - All alternatives will eventually reduce contaminants at the site to below action levels within an estimated time-frame of 8 years.

Reduction of toxicity, mobility, or volume through treatment - Alternative 2 would not immediately reduce the toxicity, mobility, or volume of contaminated groundwater. Alternatives 3, 4 and 5 would actively reduce the toxicity, mobility, and volume of contaminated groundwater.

Short-term effectiveness - Alternative 2 is more effective in the short-term than Alternative 1 because the progress of natural attenuation and plume migration would be known. Alternatives 3 and 4 would be even more effective in reducing the contaminant levels quickly in the short-term; however, the effectiveness of the vacuum enhanced extraction system is difficult to predict at this time because it may be difficult to remove contaminants trapped within the matrix of the low-permeability clay soils present at this site. Alternative 5 is expected to be very effective in the short-term in providing a final remedial solution for this site. However, a pilot-test is necessary to confirm the effectiveness of this technology.

Implementability - Alternatives 2, 3, 4 and 5 are progressively more difficult to implement since more actions are involved. Alternative 5 may involve several implementability concerns during remedial design because the technology is relatively new, a pilot-test has not been performed at this site, and the proximity of the runways.

Cost - Alternatives 2, 3, 4, and 5 are progressively more expensive to implement at this site.

State and USEPA Acceptance – The USEPA and OEPA support the selected remedy.

Community Acceptance – On February 8, 1999 the Proposed Plan was issued in its final version. Based on public comments and support from USEPA Region 5 and OEPA, the public is in agreement regarding the selected remedy (Alternative 3) for IRP Site 43 as presented in the Proposed Plan.

Table 9-5. Cleanup Alternatives Evaluation Table for Site 43

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
			(selected)		
Overall protection of human health and the environment	◎	○	○	○	○
Compliance with ARARs	◎	○	○	○	○
Long-term effectiveness and permanence	⊙	○	○	○	○
Reduction of toxicity, mobility, or volume through treatment	◎	○	○	○	○
Short-term effectiveness	◎	○	○	○	○
Implementability	○	○	⊙	⊙	⊙
Cost	$10,000	$193,000	$208,000	$508,000	$222,000
State and USEPA Acceptance	The USEPA and OEPA support the selected remedy.				

Community Acceptance	The public is in agreement regarding the selected remedy.

● Fully Meets Criteria ⊙ Partially Meets Criteria ◎ Does Not Meet Criteria

10.0 Selected Remedies

This section provides the action levels for remediation and a description of the selected remedy for each of the five IRP sites identified as requiring remedial actions. The selection was based on the analysis of alternatives as outlined in the previous sections, considering the nine criteria outlined in the RI/FS guidance.

10.1 Action Levels

In accordance with USEPA Risk Assessment Guidance for Superfund, the USAF has established, with concurrence of the regulatory agencies, site specific action levels that will be protective of human health and the environment. These action levels, shown in Table 7-1, are based on Chemical-Specific ARARs (shown in Table 7-1), Action-Specific ARARs (shown in Table 7-2), Location-Specific ARARs (shown in Table 7-3), and Risk Assessment (i.e., $1x10^{-5}$ excess cancer risk level and a hazard quotient equal to one per compound) discussed in Sections 6 and 7.

10.2 Remedies

This section presents the specific response actions for each site and the remedy selected for these response actions. A brief description of the components of the remedy for each site is also provided in this section. The USAF has the responsibility to monitor, maintain, and enforce these remedies. Prior to the transference of properties comprising each IRP site, the USAF will prepare and provide a legal description of each site to the RPA. The USAF will retain the responsibility to implement, monitor, maintain, and enforce the selected remedy until all remedial cleanup levels have been met. In accordance with the requirements of CERCLA and the NCP, the USAF will review the results of the action every five years. Groundwater monitoring will continue until the cleanup levels are achieved. To document completeness of the remedial action, the USAF will propose a monitoring program of not less than four consecutive sampling events within a two-year period for which groundwater contaminants remain below cleanup levels.

10.2.1 Site 2

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing benzene at a concentration greater than the MCL
- restore the groundwater to drinking water levels
- prevent groundwater containing benzene at concentrations greater than the MCL from migrating to the ditch or migrating offsite
- maintain future land use as industrial/commercial.

The selected remedy for these response actions at Site 2 is Alternative 3 - Institutional Controls, Natural Attenuation, Groundwater Cutoff Trench with Treatment Wall. This alternative also includes quarterly monitoring for the first two years to evaluate system performance. At the end of two years, the fate of the remaining contaminants in the groundwater will be evaluated based on the collected data, and a decision will be made on the need to implement a contingent remedy. Groundwater monitoring will continue until such time that remedial goals are met.

Contaminant migration in those years of data collection is expected to be minimal due to the low groundwater velocities at this site and the presence of the reactive wall. The location of the reactive wall and the proposed monitoring wells is conceptually shown in Figure 10-1.

Based on current information, this alternative appears to provide the best balance of trade-offs among the alternatives with respect to the nine criteria that EPA uses to evaluate alternatives. The estimated capital cost to implement this remedy is $224,000 with an estimated annual operating cost of $25,000. The project time frame for this remedy to restore the groundwater to drinking water standards is 15 years.

10.2.1.1 Institutional Controls

Institutional controls, in the form of a deed restriction, will be applied basewide to prevent the installation of groundwater wells in the UWBZ and a restriction will be included that prohibits drilling into or through areas of contaminated groundwater at IRP sites until completion of the remediation. This restriction on the deed will remain in effect until remediation at all the sites is

complete, and, this measure will ensure that the new property owner has been alerted that the UWBZ is not available for consumption. Provisions will also be included in deeds to allow the United States and the State of Ohio access to the property in any case in which any such response action is found to be necessary, or where such access is necessary to carry out a response action on adjoining property. In addition, provisions will also be included in deeds stating that the property will be used for specific reuse activities (industrial/commercial) and the USAF will annually document ongoing conformation with this specified reuse. Ongoing reuse will also be evaluated during the five-year reviews mandated by CERCLA and NCP.

10.2.1.2 Natural Attenuation

Natural attenuation of residual contamination relies on the dispersion, dilution, volatilization, sorption, and biodegradation to reduce contaminants to below action levels. Regular monitoring of groundwater conditions is necessary to assess the effectiveness of natural attenuation.

Quarterly monitoring will be conducted at Site 2 for the first two years to monitor migration of contaminants and the level of the residual contamination remaining in groundwater. Ten monitoring wells (5 existing, 5 new) in the vicinity of the tank farm will be monitored for the following parameters:

Chloride	Nitrate/Nitrite	Sulfate
Alkalinity	pH	Methane
Ethane	Ethene	Dissolved Organic Carbon
VOCs	Iron (II)	Manganese
Conductivity	Temperature	Oxidation – Reduction Potential
Dissolved Oxygen	Benzene	

The parameters listed above allow for an assessment if the conditions present in groundwater are favorable for biodegradation, if biodegradation is occurring (by measurement of by-products), and through tracking of any trends in the contaminants concentrations. The data will be examined after two years to ascertain the rate of natural attenuation, the potential for ongoing plume migration, and an estimate of the time likely to be required to achieve remedial goals. The

newly calculated time projection for achieving cleanup goals will be compared to the time estimate of 15 years initially presented in the FS. A decision will be made at that time, on the basis of the comparison of site remediation time and the plume migration rates, as to whether a more aggressive cleanup strategy is appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Monitoring will continue until such time that remedial goals have been attained.

10.2.1.3 Groundwater Cutoff Trench with Reactive Wall

A groundwater cutoff trench shall be installed along "A" Avenue, within Site 2, as shown on Figure 10-1. The base of the trench shall be keyed into the clay layer, present approximately 15 feet below the ground surface, such that the full length of the trench intercepts the water bearing sand seam. Air shall be introduced to the trench, below the groundwater level, to strip out any residual VOCs present.

The trench shall be approximately 280 feet long, by 3 feet wide by 15 feet deep. The soil shall be stockpiled during excavation, sampled for waste characterization and disposed at an appropriate facility (based on waste characterization). A two-inch diameter perforated pipe shall be installed at the base of the trench, the full length of the trench. The void of the trench shall be filled with packing material. Equipment for delivery of air shall consist of a blower with necessary noise suppression equipment. All process equipment shall be housed in a small wooden enclosure.

10.2.2 Site 21

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing VOCs and thallium at concentrations greater than their MCLs and 1,2-dibromo-3-chloropropane above a concentration to be determined based on risk.
- remove contaminated soil around SB207, and, thus, reduce the potential leaching of VOCs from the soil that could cause the concentration of these VOCs in groundwater to exceed the MCL, or, in the absence of a MCL, above a concentration to be determined based on risk.

- restore the groundwater to drinking water levels
- maintain future land use as industrial/commercial

The selected remedy for these response actions at Site 21 is Alternative 3 - Institutional Controls, Hot Spot Removal, Natural Attenuation. This alternative also includes quarterly monitoring for the first two years to evaluate system performance. At the end of two years, the fate of the remaining contaminants in the groundwater will be evaluated based on the collected data, and a decision will be made on the need to implement a contingent remedy. Groundwater monitoring will continue until such time that remedial goals are met.

Contaminant migration in those years of data collection is expected to be minimal due to the low groundwater velocities at this site. The location of hot spot removal and the proposed monitoring wells is conceptually shown in Figure 10-2.

Based on current information, this alternative appears to provide the best balance of trade-offs among the alternatives with respect to the nine criteria that EPA uses to evaluate alternatives. The estimated capital cost to implement this remedy is $231,000 with an estimated annual operating cost of $17,000. The project time frame for this remedy to restore the groundwater to drinking water standards is 12 years.

10.2.2.1 Institutional Controls

Institutional controls, in the form of a deed restriction, will be applied basewide to prevent the installation of groundwater wells in the UWBZ and a restriction will be included that prohibits drilling into or through areas of contaminated groundwater at IRP sites until completion of the remediation. This restriction on the deed will remain in effect until remediation at all the sites is complete, and, this measure will ensure that the new property owner has been alerted that the UWBZ is not available for consumption. Provisions will also be included in deeds to allow the United States and the State of Ohio access to the property in any case in which any such response action is found to be necessary, or where such access is necessary to carry out a response action on adjoining property. In addition, provisions will also be included in deeds stating that the

property will be used for specific reuse activities (industrial/commercial) and the USAF will annually document ongoing conformation with this specified reuse. Ongoing reuse will also be evaluated during the five-year reviews mandated by CERCLA and NCP.

10.2.2.2 Natural Attenuation

Natural attenuation of residual contamination relies on the dispersion, dilution, volatilization, sorption, and biodegradation to reduce contaminants to below action levels. Regular monitoring of groundwater conditions is necessary to assess the effectiveness of natural attenuation.

Quarterly monitoring will be conducted at Site 21 for the first two years to monitor migration of contaminants and the level of the residual contamination remaining in groundwater. Five monitoring wells (3 existing, 2 new) will be monitored for the following parameters:

Chloride	Nitrate/Nitrite	Sulfate
Alkalinity	pH	Methane
Ethane	Ethene	Dissolved Organic Carbon
VOCs	Iron (II)	Manganese
Conductivity	Temperature	Oxidation – Reduction Potential
Dissolved Oxygen	Thallium	Arsenic

The parameters listed above allow for an assessment if the conditions present in groundwater are favorable for biodegradation, if biodegradation is occurring (by measurement of by products), and tracking of any trends in the contaminants concentrations. The data will be examined after two years to ascertain the rate of natural attenuation, the potential for ongoing plume migration, and an estimate of the time likely to be required to achieve remedial goals. The newly calculated time projection for achieving cleanup goals will be compared to the time estimate of 12 years initially presented in the FS. A decision will be made at that time, on the basis of the comparison of site remediation time and the plume migration rates, as to whether a more aggressive cleanup strategy is appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Monitoring will continue until such time that remedial goals have been attained.

10.2.2.3 Hot Spot Removal

Removal of known areas of soil contamination shall be completed by excavation. A volume of approximately 20 feet by 30 feet by 14 feet shall be excavated from an area to the east of Building 413, as shown on Figure 10-2. The soil shall be stockpiled during excavation, sampled for waste characterization and disposed at an appropriate facility (based on waste characterization). Post-excavation sampling will be conducted for use in future modeling. The excavation shall then be backfilled and finished to the existing grade. A monitoring well shall be installed within the limits of the excavation to allow monitoring of groundwater conditions in the vicinity of the former hot-spots. One additional monitoring well shall also be installed downgradient of the area.

10.2.3 Site 41

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing VOCs and thallium at concentrations greater than their MCLs and acetone above a concentration to be determined based on risk.
- remove the oil/water separator and TCE contaminated soil, and thus, reduce the potential leaching of VOCs from the soil that could cause the concentration of these VOCs in groundwater to exceed the MCL, or, in the absence of a MCL, above a concentration to be determined based on risk.
- restore the groundwater to drinking water levels
- maintain future land use as industrial/commercial.

The selected remedy for these response actions at Site 41 is Alternative 3 - Institutional Controls, Oil/Water Separator Removal, Free-Product Removal, TCE Hot-Spot Removal, Natural Attenuation for Residual Contamination. This alternative also includes quarterly monitoring for the first two years to evaluate system performance. At the end of two years, the fate of the remaining contaminants in the groundwater will be evaluated based on the collected data, and a decision will be made on the need to implement a contingent remedy. Groundwater monitoring will continue until such time that remedial goals are met.

Contaminant migration in those years of data collection is expected to be minimal due to the low groundwater velocities at this site. The location of hot spot removal and the proposed monitoring wells is conceptually shown in Figure 10-3.

Based on current information, this alternative appears to provide the best balance of trade-offs among the alternatives with respect to the nine criteria that EPA uses to evaluate alternatives. The estimated capital cost to implement this remedy is $405,000 with an estimated annual operating cost of $17,000. The project time frame for this remedy to restore the groundwater to drinking water standards is 10 years.

10.2.3.1 Institutional Controls

Institutional controls, in the form of a deed restriction, will be applied basewide to prevent the installation of groundwater wells in the UWBZ and a restriction will be included that prohibits drilling into or through areas of contaminated groundwater at IRP sites until completion of the remediation. This restriction on the deed will remain in effect until remediation at all the sites is complete, and, this measure will ensure that the new property owner has been alerted that the UWBZ is not available for consumption. Provisions will also be included in deeds to allow the United States and the State of Ohio access to the property in any case in which any such response action is found to be necessary, or where such access is necessary to carry out a response action on adjoining property. In addition, provisions will also be included in deeds stating that the property will be used for specific reuse activities (industrial/commercial) and the USAF will annually document ongoing conformation with this specified reuse. Ongoing reuse will also be evaluated during the five-year reviews mandated by CERCLA and NCP.

10.2.3.2 Natural Attenuation

Natural attenuation of residual contamination relies on the dispersion, dilution, volatilization, sorption, and biodegradation to reduce contaminants to below action levels. Regular monitoring of groundwater conditions is necessary to assess the effectiveness of natural attenuation.

Quarterly monitoring will be conducted at Site 41 for the first two years to monitor migration of contaminants and the level of the residual contamination remaining in groundwater. Six monitoring wells (2 existing, 4 new) will be monitored for the following parameters:

Chloride	Nitrate/Nitrite	Sulfate
Alkalinity	pH	Methane
Ethane	Ethene	Dissolved Organic Carbon
VOCs	Iron (II)	Manganese
Conductivity	Temperature	Oxidation – Reduction Potential
Dissolved Oxygen	Thallium	Arsenic

The parameters listed above allow for an assessment if the conditions present in groundwater are favorable for biodegradation, if biodegradation is occurring (by measurement of by-products), and tracking of any trends in the contaminants concentrations. The data will be examined after two years to ascertain the rate of natural attenuation, the potential for ongoing plume migration, and an estimate of the time likely to be required to achieve remedial goals. The newly calculated time projection for achieving cleanup goals will be compared to the time estimate of 10 years initially presented in the FS. A decision will be made at that time, on the basis of the comparison of site remediation time and the plume migration rates, as to whether a more aggressive cleanup strategy is appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Monitoring will continue until such time that remedial goals have been attained.

10.2.3.3 Oil/Water Separator and Free Product Removal

The oil/water separator at Building 848 shall be emptied and removed. In addition, any free product present in the excavation shall be removed and visibly contaminated soil in the tank pit shall be excavated and disposed of accordingly. The total volume to be excavated is approximately 30 feet by 25 feet by 18 feet deep. Post-excavation sampling will be conducted for use in future modeling.

10.2.3.4 TCE Hot Spot Removal

Soil with elevated concentrations of TCE shall be excavated. A volume of soil measuring approximately 45 feet by 20 feet by 18 feet deep shall be removed. The soil shall be stockpiled during excavation, sampled for waste characterization and disposed at an appropriate facility (based on waste characterization). Post-excavation sampling will be conducted for use in future modeling.

Storm and sanitary sewers are present in the zone to be excavated. Any damage that may occur during the remedial actions will be repaired.

10.2.4 Site 42

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing VOCs and arsenic at concentrations greater than their MCLs
- remove contaminated soil and thus reduce the potential leaching of VOCs from the soil that could cause the concentration of these VOCs in groundwater to exceed the MCL
- restore the groundwater to drinking water levels
- maintain future land use as industrial/commercial.

The selected remedy for these response actions at Site 42 is Alternative 3 - Institutional Controls, Hot Spot Removal, Natural Attenuation. This alternative also includes quarterly monitoring for the first two years to evaluate system performance. At the end of two years, the fate of the remaining contaminants in the groundwater will be evaluated based on the collected data, and a decision will be made on the need to implement a contingent remedy. Groundwater monitoring will continue until such time that remedial goals are met.

Contaminant migration in those years of data collection is expected to be minimal due to the low groundwater velocities at this site. The location of hot spot removal and the proposed monitoring wells is conceptually shown in Figure 10-4.

Based on current information, this alternative appears to provide the best balance of trade-offs among the alternatives with respect to the nine criteria that EPA uses to evaluate alternatives. The estimated capital cost to implement this remedy is $282,000 with an estimated annual operating cost of $19,000. The project time frame for this remedy to restore the groundwater to drinking water standards is 13 years.

10.2.4.1 Institutional Controls

Institutional controls, in the form of a deed restriction, will be applied basewide to prevent the installation of groundwater wells in the UWBZ and a restriction will be included that prohibits drilling into or through areas of contaminated groundwater at IRP sites until completion of the remediation. This restriction on the deed will remain in effect until remediation at all the sites is complete, and, this measure will ensure that the new property owner has been alerted that the UWBZ is not available for consumption. Provisions will also be included in deeds to allow the United States and the State of Ohio access to the property in any case in which any such response action is found to be necessary, or where such access is necessary to carry out a response action on adjoining property. In addition, provisions will also be included in deeds stating that the property will be used for specific reuse activities (industrial/commercial) and the USAF will annually document ongoing conformation with this specified reuse. Ongoing reuse will also be evaluated during the five-year reviews mandated by CERCLA and NCP.

10.2.4.2 Natural Attenuation

Natural attenuation of residual contamination relies on the dispersion, dilution, volatilization, sorption, and biodegradation to reduce contaminants to below action levels. Regular monitoring of groundwater conditions is necessary to assess the effectiveness of natural attenuation.

Quarterly monitoring will be conducted at Site 42 for the first two years to monitor migration of contaminants and the level of the residual contamination remaining in groundwater. Nine monitoring wells (3 existing, 6 new) will be monitored for the following parameters:

Chloride	Nitrate/Nitrite	Sulfate
Alkalinity	pH	Methane
Ethane	Ethene	Dissolved Organic Carbon
VOCs	Iron (II)	Manganese
Conductivity	Temperature	Oxidation – Reduction Potential
	Arsenic	
Dissolved Oxygen		

The parameters listed above allow for an assessment if the conditions present in groundwater are favorable for biodegradation, if biodegradation is occurring (by measurement of by products), and through tracking of any trends in the contaminants concentrations. The data will be examined after two years to ascertain the rate of natural attenuation, the potential for ongoing plume migration, and an estimate of the time likely to be required to achieve remedial goals. The newly calculated time projection for achieving cleanup goals will be compared to the time estimate of 13 years initially presented in the FS. A decision will be made at that time, on the basis of the comparison of site remediation time and the plume migration rates, as to whether a more aggressive cleanup strategy is appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Monitoring will continue until such time that remedial goals have been attained.

10.2.4.3 Hot Spot Removal

Soil shall be removed from the area where the highest concentrations of organic compounds were detected in the groundwater. A volume of soil measuring approximately 20 feet by 70 feet by 14 feet deep shall be removed. The soil shall be stockpiled during excavation, sampled for waste characterization and disposed at an appropriate facility (based on waste characterization). Post-excavation sampling will be conducted for use in future modeling.

There are several underground utilities in the vicinity of the excavation. These lines (fuel and water) shall be disconnected prior to the excavation activity and reconnected prior to backfill.

10.2.5 Site 43

The specific response actions for this site are to:

- prevent ingestion of, or contact with, groundwater containing VOCs and thallium at concentrations greater than their MCLs
- prevent discharge of groundwater containing compounds above their MCLs into the stormwater drainage system
- remove the oil/water separator and associated backfill to reduce the potential of any ongoing sources of VOCs leaching into the groundwater
- restore the groundwater to drinking water levels
- maintain future land use as industrial/commercial.

The selected remedy for these response actions at Site 43 is Alternative 3 - Institutional Controls, Oil/Water Separator Removal, Natural Attenuation for Residual Contamination. This alternative also includes quarterly monitoring for the first two years to evaluate system performance. At the end of two years, the fate of the remaining contaminants in the groundwater will be evaluated based on the collected data, and a decision will be made on the need to implement a contingent remedy. Groundwater monitoring will continue until such time that remedial goals are met.

Contaminant migration in those years of data collection is expected to be minimal due to the low groundwater velocities at this site. The location of oil/water separator removal and the proposed monitoring wells is conceptually shown in Figure 10-5.

Based on current information, this alternative appears to provide the best balance of trade-offs among the alternatives with respect to the nine criteria that EPA uses to evaluate alternatives. The estimated capital cost to implement this remedy is $116,000 with an estimated annual operating cost of $13,000. The project time frame for this remedy to restore the groundwater to drinking water standards is 8 years.

10.2.5.1 Institutional Controls

Institutional controls, in the form of a deed restriction, will be applied basewide to prevent the installation of groundwater wells in the UWBZ and a restriction will be included that prohibits drilling into or through areas of contaminated groundwater at IRP sites until completion of the remediation. This restriction on the deed will remain in effect until remediation at all the sites is complete, and, this measure will ensure that the new property owner has been alerted that the UWBZ is not available for consumption. Provisions will also be included in deeds to allow the United States and the State of Ohio access to the property in any case in which any such response action is found to be necessary, or where such access is necessary to carry out a response action on adjoining property. In addition, provisions will also be included in deeds stating that the property will be used for specific reuse activities (industrial/commercial) and the USAF will annually document ongoing conformation with this specified reuse. Ongoing reuse will also be evaluated during the five-year reviews mandated by CERCLA and NCP.

10.2.5.2 Natural Attenuation

Natural attenuation of residual contamination relies on the dispersion, dilution, volatilization, sorption, and biodegradation to reduce contaminants to below action levels. Regular monitoring of groundwater conditions is necessary to assess the effectiveness of natural attenuation.

Quarterly monitoring will be conducted at Site 43 for the first two years to monitor migration of contaminants and the level of the residual contamination remaining in groundwater. Four monitoring wells (1 existing, 3 new) will be monitored for the following parameters:

Chloride	Nitrate/Nitrite	Sulfate
Alkalinity	pH	Methane
Ethane	Ethene	Dissolved Organic Carbon
VOCs	Iron (II)	Manganese
Conductivity	Temperature	Oxidation – Reduction Potential
Dissolved Oxygen	Thallium	Arsenic

The parameters listed above allow for an assessment if the conditions present in groundwater are favorable for biodegradation, if biodegradation is occurring (by measurement of by products), and tracking of any trends in the contaminants concentrations. The data will be examined after two years to ascertain the rate of natural attenuation, the potential for ongoing plume migration, and an estimate of the time likely to be required to achieve remedial goals. The newly calculated time projection for achieving cleanup goals will be compared to the time estimate of 8 years initially presented in the FS. A decision will be made at that time, on the basis of the comparison of site remediation time and the plume migration rates, as to whether a more aggressive cleanup strategy is appropriate. The frequency of groundwater monitoring and the monitoring network will also be evaluated at that time. Monitoring will continue until such time that remedial goals have been attained.

10.2.5.3 Oil/Water Separator Removal

The oil/water separator at Building 926 shall be emptied and removed. In addition, any free product present in the excavation shall be removed and visibly contaminated soil in the tank pit shall be excavated and disposed of accordingly. The soil shall be stockpiled during excavation, sampled for waste characterization and disposed at an appropriate facility (based on waste characterization). Post-excavation sampling will be conducted for use in future modeling.

Any damage of the storm sewer that occurs shall be repaired prior to backfill of the excavation.

11.0 Statutory Determination

The remedial action selected for implementation at each of the five IRP sites (Sites 2, 21, 41, 42, and 43) are consistent with CERCLA and, to the extent practicable, the NCP. The selected remedies are protective of human health and the environment, attains ARARs, uses permanent solutions to the extent practicable, employs treatments that reduce toxicity, mobility and volume, and are cost effective.

11.1 The Selected Remedies are Protective of Human Health and the Environment

The selected remedy for each of the five IRP sites, will meet the response objectives of preventing human exposure to contaminated groundwater and protecting downgradient groundwater from contamination. Institutional controls will be applied basewide to prevent the installation of groundwater wells in the UWBZ. A restriction will also be included that prohibits drilling into or through areas of contaminated groundwater at IRP sites until completion of the remediation. These restrictions on the deed will remain in effect until remediation at all the sites is complete, and, this measure will ensure that the new property owner has been alerted that the UWBZ is not available for consumption. The deed will also restrict future land use of the sites as industrial/commercial.

For Site 2 an interceptor trench is to be installed to prevent migration of additional contamination off site. The remaining sites all include source removal to limit additional contamination from reaching groundwater.

11.2 The Selected Remedies Achieve ARARs

The selected remedies will attain ARARs developed in the *Final Feasibility Study Rickenbacker Air National Guard Base*, dated October 28, 1998 and also presented in Section 7 of this RADD.

11.3 The Selected Remedies are Cost Effective

In the USAF's judgement, the remedy selected for each of the IRP sites is cost effective. The overall effectiveness of each alternative that satisfied the threshold criteria (protection of human health and satisfaction of ARARs) for each site was assessed. The assessment evaluated the long term effectiveness and permanence in reduction in toxicity, mobility and volume. The overall effectiveness was then related to cost. Those measures where the effectiveness was in proportion to the cost were selected.

11.4 The Selected Remedies utilized Permanent Solutions and Alternative Treatment Resources Recovery Techniques to the Maximum Extent Practicable

The intent of this criterion is to limit the use of off site disposal as the remedial technology. This has to be balanced against providing long term effectiveness in reduction of toxicity, mobility or volume through treatment. All of the remedies are expected to provide a permanent solution and treatment is a principal element of the remedy for each site. Such treatment includes installation of a cutoff trench to prevent further migration, removal of contaminated soils and oil/water separators, and monitored natural attenuation.

The remedy selected for Site 2 satisfies this criterion. The treatment wall reduces the toxicity and mobility of the constituents present in ground water through direct treatment of groundwater as it passes through the active treatment zone of the wall. In addition, reduction of the toxicity, mobility and volume of contamination will be achieved through use of monitored natural attenuation. Regular monitoring of the groundwater conditions will document the success of the natural attenuation.

The selected remedy for Sites 21, 41, 42, and 43 each includes limited material removal and off site disposal. This was deemed the most cost effective and technically effective method to reduce the toxicity, mobility and volume of residual contamination. Through limited removal and off site disposal the overall treatment time required through natural attenuation is reduced.

In addition, the remedy for each of these sites includes monitored natural attenuation for treatment of residual contamination remaining in groundwater.

12.0 Documentation of No Significant Changes

The Air Force Base Conversion Agency presented a Proposed Plan outlining proposed remedial action for each of the five IRP sites at RANGB. The Proposed Plan was presented to the public, and public comments have been considered prior to the selection of the selected remedy.

No significant changes have been made to the selected remedies as described in the Proposed Plan. Although this RADD has been approved for implementation, such implementation may be affected by new information received or generated regarding these sites. The USAF, as the lead agency for this RADD, has the responsibility to evaluate the significance of any such new information. The type of documentation required for a post-RADD change depends on the nature of the change. Three categories of changes are recognized by USEPA: non-significant, significant and fundamental. Non-significant post-RADD changes may be documented using a memo to the Administrative Record file. Changes that significantly affect the RADD must be evaluated pursuant to CERCLA Section 117 and the NCP at 40 CFR 300.435(c)(2)(I). Fundamental changes typically require a revised Proposed Plan and an amendment to the RADD. Significant or fundamental changes to this RADD are not anticipated.

13.0 Administrative Record Index

The Administrative Record includes all information considered or relied on in selecting the remedy, including all comments from the public and from the regulatory agencies. The Administrative Record is currently available for public review at the Air Force Base Conversion Agency (AFBCA) Office, (AFBCA), 7161 2nd Street, Building 440, Columbus, Ohio. The index for the Administrative Record is also available at the Groveport and Columbus South branches of the Columbus Metropolitan Library. The following is a list of documents most relevant to this RADD:

- Engineering Science (ES), 1992, Phase I Site Investigation Report for Rickenbacker Air National Guard Base, Ohio

- Haliburton NUS Corporation (HNUS), August 1995, Removal Action Report Sites 21 and 22.

- IT Corporation (IT), 1996b, Supplemental Phase II Environmental Baseline Survey Investigation Final Report for Rickenbacker Air National Guard Base, Ohio

- IT Corporation (IT), 1998, Final - Phase II Remedial Investigation Report for RANGB

- Parsons Engineering Science, Inc. (Parsons ES), 1992, Site Investigation Report.

- Parsons Engineering Science, Inc. (Parsons ES), 1995, Rickenbacker Air National Guard Base Remedial Investigation Report Phase I Final, December 1995 (Draft Final, June 1995)

- IT Corporation (IT), 1998, Final – Feasibility Study Report

- IT Corporation (IT), 1999, Proposed Plan for Remediation of IRP Sites

APPENDIX A

Appendix A

Transcript of the Public Meeting
January 5, 1999

THE UNITED STATES AIR FORCE

BASE CONVERSION AGENCY

PUBLIC MEETING

- - -

PUBLIC MEETING IN THE MATTER OF:

Proposed Plan for Remediation of Installation Restoration Program Sites Taking Place at Rickenbacker Air National Guard Base, Ohio

- - -

BEFORE:

ALAN C. FRIEDSTROM, P.E., Presiding

- - -

Tuesday, January 5, 1999
7:05 o'clock p.m.
Hamilton Township
Community Center
6400 Lockbourne Road
Columbus, Ohio

- - -

KARI LAMBERT, RPR
REGISTERED PROFESSIONAL REPORTER

- - -

ANDERSON REPORTING SERVICES, INC.
2109 West Fifth Avenue
Columbus, Ohio 43212
(614) 487-1778
FAX (614) 487-0332

Tuesday Evening Session

7:05 o'clock p.m.

January 5, 1999

- - -

P-R-O-C-E-E-D-I-N-G-S

- - -

BE IT REMEMBERED THAT, on the 5th day of January, 1999, this cause came on for public meeting before Alan Friedstrom, P.E., and the parties appearing, as hereinafter set forth, the following proceedings were had:

MS. FRIEDSTROM: Thank you very much for coming on this very cold evening. I guess we'll get started.

Good evening and welcome to the public meeting being sponsored by the Air Force Base Conversion Agency office located at Rickenbacker Air National Guard Base, Columbus, Ohio.

My name is Alan Friedstrom. I am the Base Realignment and Closure (BRAC) Environmental Coordinator with the AFBCA office at Rickenbacker Air Force Base.

Seated at the table with me are Diana Bynum from the Ohio EPA and Laura Ripley from

USEPA. Diana, Laura, and I comprise the BRAC Cleanup Team (BCT).

Also seated at the table are Joe Tyburski and Rajib Sinha from IT Corporation, environmental consultant for the AFBCA.

The purpose of this meeting is to present the remedial alternatives, including the preferred alternative, for five Installation Restoration Program sites at Rickenbacker, and to allow the public the opportunity to ask questions and provide input.

The alternatives were evaluated in a Feasibility Study and summarized in a Proposed Plan and a Fact Sheet.

The Proposed Plan is available for viewing at two locations of the Columbus Metropolitan Library, as noted in the Fact Sheet and in the Public Notice which was published in the Columbus Dispatch on Wednesday, December 23, 1998.

The Fact Sheet was mailed to the Restoration Advisory Board members and interested parties along with the minutes of the December Restoration Advisory Board meeting.

Copies of the Fact Sheet are also

available at this meeting on the table.

There is a 30-day public comment period during which any member of the public is welcome to submit comments on the Proposed Plan and the remedial alternatives considered for each of the five IRP sites. The 30-day public comment period officially begins today, and will end on February 3, 1999.

AFBCA will not announce its final selection of remedies for those sites until all oral and written comments received from the public during the public comment period are reviewed.

Selection of the chosen remedies will be presented in the Record of Decision (ROD).

Public comments along with associated responses will be included in the Responsiveness Summary section of the ROD. Written comments should be submitted Mr. Tony Clymer, Site Manager, AFBCA, Rickenbacker Air National Guard Base, 7556 South Perimeter Road, Columbus, Ohio, 43217-5910.

With that introduction completed, I would like to ask Rajib to give a briefing of the five IRP sites and the remedial alternatives evaluated for each of the sites.

MR. SINHA: To start with, Alan mentioned five Installation and Restoration Program sites.

Site 2 is the bulk storage tank farm. I have a map of those I'll put up. Site 21 is leaking drum and oil storage area. Site 41 is an oil/water separator at building 848. Site 42 is jet engine test stand. Site 43 is test cell hush house.

This is Site 2, Site 21, Site 41, Site 42, and Site 43. The blue outline is the Rickenbacker National Guard Base.

The general remedial action objectives for all of these sites is to prevent the migration and ingestion of groundwater with contaminants above the drinking water standards -- that's what MCLs are -- and to remove potential sources of any ongoing groundwater contamination at those four sites.

Site 2 does not have any sources --

This is a brief general view of what the subsurface looks like at Rickenbacker, generally all over the base. There is clay, followed by really wet, saturated clay. Really stiff material. It's typically a continuous sand layer at a lot of these places, followed by more of the same wet clay

stuff.

This down here is a gray till material that's extremely hard and completely impermeable. Very impermeable material.

The first of the five sites is Site 2, the bulk storage tank farm. The tanks are back in here. This is the road here. And the purple line, I guess, is the one MCL (ug/L) micrograms per liter line for benzene right there. That's the extent of benzene in that site.

The chemical of concern for Site 2 is benzene in groundwater.

Groundwater is the only medium of concern at any of these sites. It's not soil. Soil is not a medium of concern here.

We evaluated five alternatives for Site 2. The first one was no action. The second was institutional controls with natural attenuation. For all of the alternatives evaluated, feasibility studies, a detailed evaluation was done for each of those.

Alternative 3, institutional controls along with natural attenuation, and groundwater cutoff trench to keep groundwater within the site.

Alternative 4 was vacuum-enhanced groundwater extraction with well points, ex-situ groundwater treatment with surface discharge.

Alternative 5 was in-situ chemical oxidation treatment.

After evaluating all ever these alternatives, we proposed that Alternative 3, which was comprised of institutional controls, which is essentially deed restrictions, natural attenuation, and the groundwater cutoff trench with reactive wall, be selected for Site 2.

The components of this are institutional controls, which is a restriction placed on the deeds against the use of groundwater at the site; natural attenuation that’s monitored for on-site and off-site contamination; groundwater cutoff trench with reactive wall that keeps the groundwater there and treats anything that goes past it; and data evaluation and reexamination of the alternative after two years to see if what was proposed is working, if what’s going on is working in the next couple of years.

This is the Conceptual Design for Site 2. There will be a bunch of new wells

installed. These will be wells installed to monitor the groundwater to make sure that contaminants are going down. This is the trench that's going to be placed. And groundwater moves in this direction, so it's placed across where the contamination was found so any groundwater that wants to go that way gets treated before it goes anywhere.

The next site is Site 21, leaking drum and oil storage area. It's right in the vicinity of the former water treatment plant on the base. And this is the shape of the contamination out there in the groundwater.

MR. TYBURSKI: That represents that benzene again?

MR. SINHA: No. These are the chemicals of concern for Site 21. Again, the medium is all groundwater. This one, vinyl chloride, cis-1,2-dichloroethene -- long names.

Again, there were five alternatives evaluated for Site 21. These all start to look the same for each of these sites because all the sites of Rickenbacker, at least from a geological and hydrogeological point, look very similar. They all have clay on top and groundwater and sand, and then

there is more clay. The alternatives are pretty much the same.

The difference here for Site 21 is the third alternative.

The first alternative is no action. That's required to be evaluated. The second would be institutional controls and natural attenuation. Third one is institutional controls with hot-spot removal -- a particular area that has the highest soil contamination to be removed -- followed by natural attenuation.

The fourth alternative was vacuum-enhanced groundwater extraction with well points, ex-situ groundwater treatment with surface discharge. And the fifth was in-situ chemical oxidation treatment in the ground.

The proposed alternative for Site 21 was Number 3, institutional controls, hot-spot removal, and natural attenuation.

What's in that alternative is, again, deed restrictions against the use of the groundwater, removal of the highest area of soil contamination that can leech contaminants into the groundwater, take the soil out so any rain water

that goes through doesn't carry more contamination into the groundwater, and natural attenuation with monitoring for residual contamination. Again, after two years, we look at the data and see if it's doing what it's projected to do at this point. See if there are any surprises, essentially.

Conceptual Design for Site 21 is this area right here. A little square here is going to get dug up. That's where the highest contamination was found. That's going to get dug up. There will be one new well put where it will get dug up, and three new wells installed. This well is existing. That will remain.

All of those wells will be monitored, essentially, until the groundwater reaches drinking water standards.

Moving on to Site 41. This is in the vicinity of buildings 848 and 849. This is building 848 here, and that's 849. And there was an oil/water separator right outside in between those two buildings. And there are actually two different types of contamination out there. One is benzene and the other is (TCE) trichloroethylene. It's pretty much associated with the oil/water separator

here. And that's pretty much associated with that oil/water separator and backfill around it.

Again, the chemicals of concern for this site are several. It's primarily halogenated compounds, chlorine compounds, and petroleum-based compounds. Dichloroethene, benzene, ethylbenzene, toluene, trichloroethylene, vinyl chloride, and thallium.

Five alternatives were evaluated for Site 41. Number 1 requires no action. The second is institutional controls, removal of any free product, any free oil that's in the backfill around the oil/water separator, then monitor for natural attenuation.

The third alternative was institutional controls, remove the oil/water separator, remove all the free product around it and backfill around it, remove an area which had the highest TCE concentration, and then let the rest of the residual contamination naturally attenuate, and monitor for that. The fourth was to remove the oil/water separator and free product, and then extract the groundwater using a vacuum, and treat that groundwater. And the fifth was, again, removal of

the oil/water separator and free product, and in-situ chemical oxidation treatment.

The proposed alternative for Site 41 is Alternative 3, which is institutional controls, oil/water separator removal, free product removal, TCE hop-spot removal, natural attenuation for residual contamination.

Institutional controls would be deed restrictions against use of the groundwater at the site. Removing oil/water separator, removing any free product associated with it, and also removing the highest areas of soil contamination. Monitor for the residual contamination, and evaluate and reexamine the data after two years to see if what's being predicted right now is indeed happening.

This sort of shows what the Conceptual Design is. The oil/water separator that's going to get taken off is in this area which has the highest TCE concentration. That area is going to get dug up.

So this area will be -- one, two, three, four. There will be five new wells put in. There are a couple existing wells that will stay. And that's going to be monitored until the drinking

water standards are reached.

MR. HAHN: How big is the one you're --

MR. FRIEDSTROM: If you have a question, could you give your name and address so we can get it on the record?

MR. HAHN: Yeah. Gary Hahn, one of the township trustees here in Hamilton Township. I have a question about this particular area there. Is that Site 21?

MR. SINHA: Forty-one.

MR. HAHN: Excuse me, 41. You're going to be digging that up?

MR. SINHA: Uh-huh.

MR. HAHN: How deep are you going? How large an area are you going to be digging square footagewise or acreagewise? How deep?

MR. SINHA: There is a scale on this. I'm not sure how accurately this translated on the drawing. But this area, this region here, is about 40 feet by about 20 feet across. We're going down to about -- below the sand lenses in this particular site. So we're going down probably in the neighborhood of 15 to 18 feet. Probably close to 18 feet down to dig up that area there.

This area there is an oil/water separator that's going to come out of the ground, and the backfill around it. All that's going to come out of the ground. And we'll dig down below that until we, again, get to below any sand lenses that happen to be out there. I'm guessing 15 to 18 feet in that region. That's what's being planned for.

MR. HAHN: Is that in the dump area that used to be on the base there?

MR. FRIEDSTROM: This is within the industrial area of the Air National Guard.

MR. HAHN: Now?

MR. FRIEDSTROM: Correct. It's still being used.

MR. HAHN: For the National Guard?

MR. FRIEDSTROM: Right.

MR. HAHN: Okay. Maybe I'm getting ahead of the area, but when are you going to get into the dump area?

MR. FRIEDSTROM: Okay. If you are referring to the landfill --

MR. HAHN: Yes. Military landfill.

MR. FRIEDSTROM: The meeting tonight is to focus on five IRP sites that we have proposed

remedial actions for. The old abandoned landfill at the base is on formerly used defense sites or former Air Force property, now currently owned by Rickenbacker Port Authority. And that is being handled by the Army Corps of Engineers.

That is really under a separate program than what we're dealing with.

MR. HANN: In other words, you're not going to get involved in that?

MR. FRIEDSTROM: We do not control the program. We don't control the funding or the program of that, because it was formerly owned property, formerly owned by the Air Force.

MR. HAHN: That's going to be very expensive.

MR. FRIEDSTROM: They are still investigating, too. But what we're talking about here are for these IRP sites, remedial action we are proposing to take. We are further along in the process.

MR. HAHN: When do you intend to start?

MR. FRIEDSTROM: Once the public comment period is completed and we do a responsiveness summary on any oral and written comments we receive,

that will go into this Record of Decision. So we won't begin that process until after February 3rd. Once the Record of Decision is completed, then we do a remedial design, which is not that different from what we're proposing at these sites.

Once a remedial design is done and approved, we actually go out in the field and begin remedial action.

We're probably talking about being out in the field sometime this summer.

MR. HAHN: Hoping to complete the project --

MR. FRIEDSTROM: We really haven't set a time frame to complete them. But I think that to get the removal of any soil we're moving or digging out or installing -- in some places installing the system to do the remedial actions -- alternative actions should be completed, I think, within a year.

The one thing we do after the installation is monitor what we have around the groundwater with our monitoring wells. And natural attenuation is proposed as part of remedial action. These wells sample the parameters for natural attenuation to insure that there is natural

attenuation occurring and a reduction in the contaminants that are remaining.

That will probably go on for about two years, quarterly sampling. That will give us a good idea of how long that natural attenuation will continue to work until such time as we are below any contaminant levels of concern.

MR. HAHN: Okay. Continue.

Thank you.

MR. SINHA: We will move on to Site 42, which is the jet engine test stand. This is right off the taxiway. Here is a list of chemicals or chemicals of concern for Site 42. Again, we have petroleum benzene in there.

Alternatives evaluated for Site 42 are, again, no action. That was required. Institutional controls and natural attenuation. Third is institutional controls, dig up the hot spot, and then do natural attenuation for the rest of the stuff that’s left behind.

Alternative 4 is vacuum-enhanced groundwater extraction, pump out the water, treat it, discharge it. Alternative 5, in-situ chemical oxidation treatment.

The proposed alternative for Site 42 is Alternative 3, institutional controls, hot-spot removal, natural attenuation of residual contamination.

Again, institutional controls is primarily deed restrictions against the use of the groundwater.

The hot-spot removal is to dig up the area of the highest area of soil contamination, and monitor whatever is left in the ground after doing that until it reaches drinking water standards, and evaluate the data and reexamine the monitored data after two years to see what's going on.

For Site 42, this is the hot spot that's going to get removed here. There will be wells placed. These are the wells that will be monitored for the natural attenuation to see that the contaminants are degrading.

Site 43 is the test cell hush house off building 926, right off the taxiway again. This one little site there.

For Site 43 we have these compounds that are chemicals of concern for this site. And, again, the alternatives evaluated are, no action;

institutional controls, natural attenuation, the second alternative. The third alternative, institutional controls, oil/water separator will be removed, and natural attenuation.

Alternative 4 was to remove the oil/water separator, pump out the groundwater, treat it, and discharge it. Alternative 5 was to remove the oil/water separator and in-situ chemical oxidation treatment.

The proposed alternative for Site 43 is, again, institutional controls, oil/water separator removal, and natural attenuation. Institutional controls will be restrictions against use of groundwater at this site, remove oil/water separator in the highest area of soil contamination, monitor the rest of the remaining contamination in the ground, and evaluate the data and reexamine the alternative after two years.

In this particular case, the oil/water separator is right in that region there that will get removed, and new wells will get installed to monitor what's going on at the site.

That sums up the proposed alternatives for alternative five sites here.

MR. HAHN: On Site 21, could you possibly get that back up on there? Maybe I'm being picky, but I want to know what the heck is going on. Okay. You said that was a pretty hot area there.

MR. SINHA: Well, that area is where the highest amount of contamination in the soil was found in this entire site. And that's why that little area there is proposed to be removed.

At the rest of the site, the soil in the rest of the site, there wasn't much found in it. And what this represents is where the groundwater contamination is.

MR. HAHN: How big an area is that, may I ask, approximately?

MR. SINHA: If I recall correctly -- correct me here -- I think that's about 200 feet.

MR. FRIEDSTROM: Your scale is more 150.

MR. SINHA: Maybe 150. And that's about 20, 30 feet across. Something along those lines.

MR. TYBURSKI: The term "hot spot" for the soil is generally referred to when you have a high concentration compared to everything else. It's kind of a qualitative term.

MR. HAHN: I have another question. The

petroleum field down there --

MR. SINHA: Site 2?

MR. HAHN: What are they going to do with that? They had a pretty good-sized hill down there -- when was it? -- two years ago.

MR. HAMMOND: It was a year ago.

MR. HAHN: Excuse me.

MR. HAMMOND: It was last year. They don’t know how long it’s been spilling.

MR. HAHN: It was spilling, and went clear down through the ditch and over in the old canal.

How far did it go?

MR. HAMMOND: Clear to the side of the river.

MR. FRIEDSTROM: That spill was not from the bulk storage area. It was from an underground storage tank area out near the flight line that the Air National Guard still operates. It came from a different area than one of the IRF sites we’re referring to here.

MR. HAHN: I’m not disputing that, but it did come from the storage area.

MR. FRIEDSTROM: In a pump house, an

underground storage.

MR. HAHN: Whether it was underground or not, I was down there around it; and it definitely come out of that area.

MR. FRIEDSTROM: Realize what we're looking at here and what the Air Force base --

MR. HAHN: I'm not disputing that. Do you know what I mean? I'm looking toward the future. Are they going to have to dig up those tanks or put those tanks, above-ground tanks, into larger tanks, like us little small guys have to do? Do you know what I mean?

MR. FRIEDSTROM: The area where the spill occurred being underground storage tanks, the Air National Guard has under construction, and hopes to complete very soon, new above-ground storage tanks. They will no longer have as part of their fueling system underground storage tanks. They will directly feed from the above-ground storage, which is located much closer to the flight line, to the refueling pits of the aircraft. Once they have stopped using those underground storage tanks, the Air Force Base Conversation Agency will come in and remove those tanks.

But, again, that spill location was an underground tank separate from the above-ground tanks located in Site 2.

MR. HAHN: Okay. How long are they going to have to bring those up to code, the above-ground tanks?

MR. FRIEDSTROM: The above-ground tanks at Site 2 will no longer be used, and the new above-ground tanks that the Air National Guard is building are brand-new and will meet code.

MR. HAHN: Okay.

MR. HAMMOND: George Hammond, village administer for Lockbourne. The spill that Gary is talking about was about two years ago.

It was from the tank farm. Right?

MR. HAHN: (Nods.)

MR. HAMMOND: Came down the ditch from the dang farm.

MR. FRIEDSTROM: I understand there has been more than one spill. The more recent one that was about a year ago was from the underground tanks, and one prior to that --

Realize that what we're focusing on here is from past contamination. I can't always answer

the questions of the ongoing operations of the base.

The other one that did occur, the Air National Guard reacted to, to my knowledge, and cleaned it up to the extent that they were required to. That's the best I can tell you.

We're two different organizations, so to speak, and I can't always answer your questions on that.

I'm hopeful if you have any input about these sites and what we're doing as far as remedial actions that we have shown you --

AUDIENCE MEMBER: I think, to reiterate what Al has said, where these two incidents occurred in the systems that the guard is presently operating, they built a whole new storage area, above-ground, brand-new tanks. It's got the latest technology.

It should eliminate, in any event, problems down the road. And I think they're probably going to open that up in February, next month.

MR. BREECH: LeRoy Breech, Hamilton County Trustee. The area that's going excavated

looks like 29,000 cubic yards. Where is the material going to?

MR. FRIEDSTROM: Depends upon what the content of the material is. And if it's only benzene petroleum contamination, depending upon that, it may be able to be remediated at a soil facility that actually remediates petroleum-contaminated soil.

If it is other contaminants, such as chlorinated solvents, then it will have to go to a hazardous waste disposal facility or some other regulated facility that can handle those by law.

So it will be taken off base and disposed of.

MR. HAHN: Are they going to take that off on truck? By rail? Or how?

MR. FRIEDSTROM: That's up to the contractor. However they take it off, it's going to have to meet all the requirements of DOT, Department of Transportation, transporting for hazardous waste.

AUDIENCE MEMBER: For the benefit of everybody, each one of those alternatives up there show that, at the end of two years, they're going to

do a data evaluation and reexamination.

What is the process or procedure if we're not getting the results that we anticipated?

MR. FRIEDSTROM: Okay. In the Record of Decision that we'll make, based upon all the comments we get and whether or not the preferred alternative we selected is the most appropriate, based on the public comment period and review, we'll have a contingency remedy --

MS. RIPLEY: It's a contingency remedy. If we are unable to demonstrate that natural attenuation is working, then the Air Force will come back in and choose a more active remedy. Because monitored natural attenuation is after the hot spots are removed. What's hoped is that contamination will -- Because the source is no longer there, it's hoped that the contamination in the groundwater will diminish, and we'll be able to achieve the drinking water standards.

However, in the event that the contamination in the groundwater is not decreasing, then there is going to have to be a more active remedy to treat the groundwater so it will eventually meet the drinking water standards.

MR. FRIEDSTROM: One other point that I did want it make, too. When we talk about a hot spot in the soil, we actually looked at the soil to see if it was a problem. And the soil itself, with the level of contamination that there is at what we're calling hot spots for removal is not actually a problem in itself. It's not a hazard. It falls within a risk assessment that there does not pose a risk.

The reason we're removing it is that, with it being there, it might contribute to the contamination to the groundwater, and we'll continue to have groundwater contamination. So if we remove that, then contamination won't go down to the groundwater.

And the contaminant levels in groundwater, to meet drinking water standards, are much more stringent than contamination in the soil. So by removing that, we hope that we eliminate any chance of further groundwater contamination. And with natural attenuation, we can clean up the groundwater.

MR. HAHN: Where the hospital was down there, what did you find there?

MR. FRIEDSTROM: The hospital, again, unfortunately, for me to answer that, is on Port Authority property, what used to be Air Force property. Anything that's being handled there, again, is being handled by the Army Corps of Engineers under the formerly used defense site.

I do know that there was an underground tank pulled from there.

MS. BYNUM: There was a UST removed, and they did remove some PCB-contaminated soil.

MR. FRIEDSTROM: And Diana has been involved with them, too. But that's from knowing or understanding what they're doing as opposed to that being under our direct jurisdiction and control.

MR. HAHN: Right. I understand that.

Is there a report available for the residents in this area that we could possibly have?

MS. BYNUM: Yes. In my office I have a copy of the report on the PCB soil removal, and also the UST removal. And the work has been completed.

MR. HAHN: Would you mind sending a copy of it up here to this office, please?

MS. BYNUM: I have one copy in my office. I could probably make copies of it.

MR. HAHN: That would being fine.

MS. BYNUM: Okay.

MR. HAHN: Do you mind?

MS. BYNUM: No. I can do that.

MR. HAHN: I would appreciate it.

MS. BYNUM: Give me an address to send it to afterward. That would be fine.

MR. HAHN: Fine.

MR. KENNEDY: My name is Paul Kennedy with Rickenbacker Port Authority. I had three questions.

One was on the natural attenuation, if you had any modeling for any of the five sites that described that half-life or the degradation, or if you have to wait for the two-year mark? I don’t know if that’s modeled or predicted yet.

MR. FRIEDSTROM: We actually did some modeling based upon limited information that we had available as far as natural attenuation. And we needed to do that in order to get some idea of what we project natural attenuation -- how long it would take, and also the cost associated with it in comparing alternatives.

Yes, we did modeling. What we really

gained is, with the additional monitoring wells at the site and two years of quarterly sampling, then we'll have a good indication of the natural attenuation.

MR. SINHA: With the removal of the soil.

MR. KENNEDY: Right now there is nothing concrete or estimated if it's five, ten, twenty-five years, or one year?

MR. FRIEDSTROM: Actually we do for each of the sites, and it's in the proposed plan.

MR. KENNEDY: Okay. The second question I had was about any kind of migration. I know each site has a defined boundary, and groundwater is the medium. Does that boundary extended outside of the contamination into uncontaminated areas.

I guess what I'm wondering is if there is any kind of migration that would happen from the site outside of those boundaries that the contaminated groundwater would continue past those, you know, magenta lines or whatever.

MR. HAHN: What you're trying to say is leeching out.

MR. KENNEDY: Any kind of migration where the monitoring wells are located would

identify migration or anything like that?

MR. FRIEDSTROM: Realize the monitoring wells we're installing at every site, there is a downgrading of monitoring wells outside the contaminated area in the direction that we project will be downgraded from the groundwater flow.

If, during any point in time we're doing the monitoring, and the contaminants reaches that monitoring well and we still need to monitor, we'll actually go in and install another monitoring well farther down so we could continue to get an idea of migration of groundwater in respect and in association with any of the natural attenuation that we anticipate is going to occur.

The groundwater flow at all of these sites is very low. The rate of flow is substantially low. It would be really -- We really don't anticipate very much movement.

MR. SINHA: We don't think after two years it's going to go much further than what's shown right now.

MR. KENNEDY: Okay.

My third question was at Site 2, for the wall or reactive wall. Just in the layman's terms,

how is that going to be constructed, or what happens?

MR. SINHA: Site 2. I kind of showed what the geology was earlier on, which showed that there were those sand lenses at Site 2, which shows going all the way, running across the picture of the Site 2. Actually pinches out there and there.

What we're proposing to do is put a trench right there, fill the trench with gravel, put a pipe underneath with holes in it; and, as the water comes in and pours into that -- the contamination at Site 2 is primarily benzene at very low concentrations -- there will be air that will be bubbled through the water that collects in this trench. What that does is strips out the benzene before it can go anywhere. That's the plan for it. The trench is going to be -- the sand cuts off here and here. Let's say the trench is going to go across the entire length where the sand is.

That's the reason for the shape, the way it is. It pinches down here as it goes. And that really follows the sand. That's all that's doing right now.

MR. KENNEDY: Okay.

MR. FRIEDSTROM: There is one or two other things that I did want to mention for clarification purposes.

When we talk about the deed restrictions that we are including with each one of the alternatives that's proposed on groundwater use, the deed restriction would prohibit groundwater use in what we refer to as the upper water-bearing zone, or you could call it the first aquifer, if you'd like, or upper aquifer.

We call it an upper water-bearing zone because it has a very -- it has continuous sand lenses. Probably unlikely it would ever be used for drinking water.

We may not prohibit groundwater use from the first true aquifer, or what's sometimes referred to as middle aquifer, which is located 60 to 100 feet below ground surface. That is where some of the local wells are located around here. It's a very high-yield aquifer. There is a thick layer of clay in between the upper aquifer where contamination exists, and has been retained because of the clay layer, which all is within, we'll say, 5 to 20 feet below ground surface.

We would, in the deed restriction, prohibit any drilling through the contamination in the upper water-bearing zone to obtain water. But that deed restriction would not prohibit drilling down to the lower or that middle aquifer that's a high-yield --

MR. HAHN: That's Teays River that goes underneath there.

MR. FRIEDSTROM: There are actually two aquifers. At 60 to 100 feet, and there is one 150 to 200 feet down that's also high-yield. Both of them are used out here. The base water supply before we tied into Columbus was down at the 150- to 200-foot level in very high yield. So it wouldn't make too much sense to limit a deed restriction the opportunity to drill to that water if it was so desired, and use that water.

Just the upper water-bearing zone where this contamination is, and don't drill through the contamination. I did want to clarify that.

I also wanted to mention again that this is the proposed plan that we've referred to of the five sites that describes in more detail what we went through in our Feasibility Study. So this is a

summary of the Feasibility Study of the five sites. And then the Fact Sheet is kind of a capsulated view of the proposed plan.

You have the Fact Sheet. The proposed plan is, as mentioned before, available at our office, AFBCA office on Second Street. It's also available at the two branches of the Columbus Metropolitan Library, the one on South High and the one on Winchester Pike, I think, in the Groveport area. You're welcome to look at those.

This is the start of the public comment period. There are 30 days. If you would like to submit written comments on any of this, there are comment sheets over there, blank sheets that you can take with you, if you'd like to fill them out. We welcome comments. And that's the whole point of the meeting and the public comment period.

The documents are to let you know what we're proposing to do, how we've evaluated the alternatives at these sites, and see what your input is.

MR. HAHN: Would I be asking too much to have a copy of that bound book there sent here to our office?

MR. FRIEDSTROM: We can have one brought over.

Again, when you say your office, you are speaking of the township trustee office. We can have one brought over, and that provides another location for people to come and look at it. That's fine, too.

We typically do for libraries because people are usually more aware of libraries and where they are located. They do their own filing. But we can do that. I'll make sure we get a copy of this over here.

MR. HAHN: Yeah. Because, you know, the residents in the township, that used to be in the township that was recently annexed to the City of Columbus. But we as residents of the township are very interested in our area and the Village of Lockbourne down here.

George, do you want one down there?

Do you mind making two while you're making one?

MR. FRIEDSTROM: So you'd like to have one at the Village of Lockbourne office? Okay. Sure.

MR. HAHN: I know, I'm a pain.

MR. FRIEDSTROM: If that is a better way and an improvement for us to get information out to you for you to have a chance to do things, that's fine. We welcome the opportunity.

MR. HAHN: That's right. If somebody asks me, it's right down there at the office. Read it.

MR. FRIEDSTROM: In fact, the other thing I suggest we do is we go ahead and leave Fact Sheets at both locations. Would you mind taking some with you tonight for the Village, and we can leave some here for you so people can take those with them, too?

MR. HAHN: That will be fine. We have a meeting coming up tomorrow night.

MR. FRIEDSTROM: Well, you can take whatever number you'd like. We'll have more available at our office, too, if we need to run off more. I think the interested parties all got Fact Sheets sent with their comments of the last RAD, so there are a number of them out there; but, certainly, there are also a number of copies that we made.

We did print up comment sheets for you to take with you in case you're interested in submitting comments back.

MR. GRANT: May I ask a question?

MR. FRIEDSTROM: Give your name.

MR. GRANT: Richard Grant, Columbus. Just could somebody explain -- You mentioned a natural attenuation reducing the chemicals in the groundwater. Can someone explain exactly what you're looking to occur? Is that bacteria in the water breaking down the chemicals? Is it rain water diluting it, or what? How is that expected to occur?

MR. SINHA: For natural attenuation, one way is bacteria breaking down the groundwater. The other is you have groundwater flow that goes through it, you have contaminants that disburse out and groundwater that flows in, so it dilutes it.

The primary method, you would be looking for bacteria to degrade contaminants that are there. Obviously, if it's there long enough, it goes away. That's natural attenuation.

MR. GRANT: Has any testing been done for bacteria?

MR. SINHA: There have been some.

MR. FRIEDSTROM: I don't recall offhand. But another thing we have been doing is, when we've gone out and sampled, we have sampled for what we call natural attenuation indicators, indicators of natural attenuation. When this occurs, various levels of other things change, like iron.

MR. SINHA: Methane, oxygen.

MR. FRIEDSTROM: Yeah. And those are all indicators. If the levels of those change, then they provide a good indication that natural attenuation is occurring.

So you don't just measure, for instance, the level of bacteria. You measure a number of other things that, all combined together, provide a good analysis of whether natural attenuation is something that can be considered.

MR. SINHA: And we also look for what they call the formation. As things break down, they form smaller and smaller compounds. You look for that as well.

MR. GRANT: Another question on the soil. It mentions that it's within the USEPA criteria of, I guess, one in ten thousand to one in a million

additional chances. How did EPA come up with that number as an acceptable number?

MS. RIPLEY: As what?

MR. GRANT: An acceptable number.

MS. RIPLEY: The one in ten thousand and one in a million? The numbers for the soils are actually for an industrial use, which is what the reuse for Rickenbacker is, a commercial industrial airport.

There is basically a table that you would compare numbers to. And they come up with specific levels in soils that, under normal industrial conditions, this is the levels that would be considered acceptable for that reuse.

We did not screen Rickenbacker for future residential use, so I am not saying that the levels at Rickenbacker in the soils are acceptable for residential. I do not know that.

MR. GRANT: One other question on the reactive trench. Is that an open trench? Can rain water get in it?

MR. SINHA: No. The way it’s going to be constructed -- We’re working on the design of construction. We certainly don’t want the water

runoff. It's going to be right along the side of the road. We don't want water running off the road to go in there, or rain water for that matter to get into that trench. So we'll design around that.

MR. FRIEDSTROM: Are there any other questions?

Thank you very much for attending. This concludes the meeting. Again, if you have any questions, you're welcome to call any of us. We welcome your comments.

Again, the public comment period ends February 3rd. And we'll take comments and provide responses and move forward with our Record of Decision.

MR. HAHN: To the questions you might receive -- okay? -- would you send a copy of the answers or the replies back to the individuals, whoever they might be, and here to our office?

MR. FRIEDSTROM: We can send you the Record of Decision. And the Record of Decision will include the comments and the responses.

MR. HAHN: I would appreciate that.

MS. RIPLEY: One other thing I'd like to mention. In the event that the public would want an

extension of 15 days for the comment period, you can basically, in one of your -- If you know that you're going to have them, but you're not going to have them by February 3rd, you can submit a comment basically requesting an extension for another 15 days to provide comments.

So it can be extended by request, but that request has to be made.

MR. HAHN: Any of the comments go to Mr. Tony Clymer.

MS. RIPLEY: Yes. Sitting right back there.

- - -

Thereupon, the proceedings concluded at approximately 8:00 o'clock p.m.

- - -

C E R T I F I C A T E

I do hereby certify that the foregoing is a true, correct, and complete written transcript of the proceedings in this matter, taken by me on the 5th day of January, 1999, and transcribed from my stenographic notes.

Kari Lambert, RPR

Kari Lambert, RPR

My commission expires 12-25-2002.

APPENDIX
B

Appendix B

Responsiveness Summary

PUBLIC NOTICE
30-DAY PUBLIC COMMENT PERIOD
AND PUBLIC MEETING UNDER IRP
THE UNITED STATES AIR FORCE
BASE CONVERSION AGENCY
Invites
PUBLIC COMMENT
On a Propose Plan for remediation of five IRP sites
At Rickenbacker Air National Guard Base, Ohio

The United States Air Force Base Conversion Agency (AFBCA) invites public comments on the Proposed Plan For Remediation of IRP (Installation Restoration Program) Sites taking place at Rickenbacker Air National Guard Base, Ohio. The AFBCA has completed a feasibility study for the evaluation of remedial alternatives for IRP Sites 2, 21, 41, 42, and 43. These sites are being investigated and remediated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, as amended). The Proposed Plan describes the alternatives evaluated and the preferred alternative for each site. A **Public Meeting** will be held on **Tuesday, January 5th, 1999,** at **7:00 p.m.** at the **Hamilton Township Community Center, 6400 Lockbourne Road.** The purpose of the meeting is to solicit verbal (and written) comments on the cleanup alternatives under consideration for the five IRP sites. The meeting, scheduled for the first day of the official 30-day public comment period (January 5th-February 3rd, 1999), will provide the public an opportunity to speak with representatives from the AFBCA, the U.S. Environmental Protection Agency (USEPA), and the Ohio Environmental Protection Agency (OEPA) about the proposed plan and the preferred cleanup alternatives. Comments made at the meeting will be transcribed, and a copy of the transcript will be added to the administrative record. The proposed plan is available at two branches of **the Columbus Metropolitan Library** located at **3540 South High St. and 4575 Winchester Pike**. All comments will be included and addressed in the Final Record of Decision documents for IRP Sites 2, 21, 41, 42, and 43.

FOR MORE INFORMATION

If you need more information or would like to submit written comments on the proposed plan for Sites 2, 21, 41, 42, and 43, please call or write:

Tony Clymer, Site Manager
Air Force Base Conversion Agency
7556 S. Perimeter Rd.
Columbus, Ohio 43217-5910
(614) 492-8065

RICKENBACKER

RICKENBACKER INTERNATIONAL AIRPORT • FOREIGN TRADE ZONE # 138

February 1, 1999

Tony Clymer
Site Manager, AFBCA
7556 S. Perimeter Rd.
Columbus, Ohio 43217-5910

7400 Alum Creek Drive

Columbus, Ohio 43217-1246

614-491-1401

Fax: 614-491-0662

E-mail: rpa@infinet.com

Re: Comments on the Proposed Plan for the IRP Sites

Dear Tony:

During both the public meeting on the proposed plan for the IRP Sites and recent Base Cleanup Team (BCT) meetings issues were raised concerning the deed restrictions that will be placed upon properties transferred to the Rickenbacker Port Authority (RPA) by the Air Force Base Conversion Agency (AFBCA) and the choice of environmental remediation alternatives. The RPA would like to make the following comments on the proposed plan:

IRP Site 2.

The proposed plan for Site 2 indicates a prohibition on water wells within the plume of contamination; however, there was discussion that lead our BCT members to think more was intended than a restriction on drinking wells. The RPA would like clarification of this issue.

The RPA would like to make sure the deed restriction will be limited to drinking wells, and that there will be no restrictions of any sort on the digging, drilling through the contamination, movement of the soil, drilling for construction, the disposal of groundwater that surfaces during excavation and construction, or the creation of storm water retention facilities....and "drilling through the contamination"....

The proposed plan also states that the groundwater will be periodically monitored to ensure the benzene concentrations were decreasing in the plume. The RPA is assuming the AFBCA would be doing the monitoring, but would like clarification and confirmation of this assumption.

As natural attenuation is the proposed remedial action for Site 2 and several others, and remediation could take quite a few years, the RPA would like clarification on (i) the timeline for determining how long natural attenuation will take, (ii) how often testing will be done to determine the level of success, (iii) what percentage of remediation will be sufficient as a basis for allowing natural attenuation to continue as opposed to seeking an alternative remedial action, and (iv) at what point is a decision to be made on the effectiveness of the natural attenuation. Further, if Alternative 3 is the selected remedial alternative, how will the AFBCA deal with the fact it only partially meets the reduction in toxicity levels?

The RPA would also like clarification on the extent of the plume which has migrated onto the RPA land to the west of Site 2, and the proposed remediation plan to correct that contamination.

Site 21

The proposed remedial action is natural attenuation. The comments of the RPA that were expressed above relate to this site as well. The RPA has expressed concerns to the AFBCA that this site is one of the first ones that will be developed due to its location. It is directly across from property that has already been developed, and next to an area where the RPA has already demolished buildings. The RPA does not find it acceptable to adopt a remediation plan that will delay construction on the site. The RPA would encourage the AFBCA to consider other alternatives for this site.

Sites 42 and 43

The proposed remedies do not seem to be a problem; however, the RPA would like to alert the AFBCA to the fact Taxiway A will be rehabilitated over the next few years. Engineering is already underway for the first phase, from Taxiway Bravo to Delta. If the proposed alternative would have any impact on that project we need to discuss the situation immediately.

The RPA appreciates the opportunity to comment on the proposed IRP plan and looks forward to your responses and clarification.

Sincerely,

Leslie A. Winters
Legal Counsel

c: Al Freidstrom
Laura Ripley
Diana Bynum
John Lengel
Paul Kennedy
Paul MacPherson
Ken Carley
Lester Fields
Bruce Miller

RESPONSES TO COMMENTS ON THE PROPOSED PLAN
FOR IRP SITES 2, 21, 41, 42 AND 43
RECEIVED FROM THE RICKENBACKER PORT AUTHORITY

IRP Site 2.

Comment: The proposed plan for Site 2 indicates a prohibition on water wells within the plume of contamination; however, there was a discussion that lead our BCT members to think more was intended than a restriction on drinking wells. The RPA would like a clarification on this issue.

The RPA would like to make sure the deed restriction will be limited to drinking wells, and that there will be no restrictions of any sort on the digging, drilling through contamination, movement of the soil, drilling for construction, the disposal of groundwater that surfaces during excavation and construction, or the creation of storm water retention facilities....and "drilling through the contamination"...

Response: The Air Force plans to construct the preferred alternative, Alternative 3: Institutional Controls, Natural Attenuation, Groundwater Cutoff Trench with Reactive Wall at Site 2. A date for the transfer of the property at Site 2 to the RPA has not been established. Since the AFBCA does not know when transfer may occur, the assumption was made for the proposed plan that, at the time of transfer, there will still be contaminated groundwater at the site. In order for USEPA to agree to the transfer of property with groundwater contamination, AFBCA will have to demonstrate that the remedial action is operating properly and successfully and will be protective of human health and the environment. To insure the protectiveness to both human health and the environment, a restriction on installation of water supply wells in the contaminated area for any water use may be included in the deed. The deed would also include language prohibiting the disruption of any remedial action that is still being conducted, whether it is the proposed reactive wall or groundwater monitoring. If the RPA determined that it needed to remove contaminated groundwater from the area, then the RPA would be responsible for any treatment of the groundwater prior to disposal to be protective of human health or the environment. The AFBCA does not anticipate that the RPA would be restricted from construction activities associated with soil movement as long as the work does not disrupt the remedial action as stated above. One other potential deed restriction may be the prohibition of drilling through the groundwater contamination down to the lower aquifer. This restriction would be put in place to insure that the groundwater contamination would not migrate to the lower aquifer.

The above discussion is based on the premise that certain conditions would exist at the time of property transfer. The actual specific deed restrictions will not be determined until the property is ready to be transferred. The environmental condition of the property could change before that time. Therefore, it is difficult to state at this time exactly what deed restrictions will be placed on the property at Site 2 at the time of property transfer.

Comment: The proposed plan also states that the groundwater will be periodically monitored to ensure the benzene concentrations were decreasing in the plume. The RPA is assuming the AFBCA would be doing the monitoring, but like clarification and confirmation of this assumption.

Response: The AFBCA will be doing the monitoring of the benzene concentrations as a part of the remedial action at the site.

Comment: As natural attenuation is the proposed remedial action for Site 2 and several others, and remediation could take quite a few years, the RPA would like clarification on (i) the timeline for determining how long natural attenuation will take, (ii) how often testing will be done to determine the level of success, (iii) what percentage of remediation will be sufficient as a basis for allowing natural attenuation to continue as opposed to seeking an alternative remedial action, and (iv) at what point is a decision to be made on the effectiveness of natural attenuation. Further, if Alternative 3 is the selected remedial alternative, how will the AFBCA deal with the fact it only partially meets the reduction in toxicity levels?

Response: The AFBCA responses to the specific points of the comment are addressed below.

(i) As stated in the proposed plan, Section 2.5, Reduction of toxicity, mobility, or volume through treatment, current estimates based on modeling indicate that the preferred alternative, Alternative 3, would eliminate the toxicity and volume in 15 years by natural attenuation. That estimate is based on the current level of contamination and other subsurface characterization data. As also stated in the proposed plan, an evaluation of the system performance will be accomplished after two years of operation. At this time the efficiency and effectiveness of the remedy will be evaluated to determine if it is operating properly and successfully. In addition, one of the objectives during the first two years of operation of the remedy is to collect additional data for the primary (i.e. concentrations of the chemicals of concern) and secondary (i.e. geochemical data) lines of evidence of natural attenuation. This data will be used to reevaluate the estimated 15 years required to achieve the site cleanup goals.

(ii) As stated in the proposed plan, first paragraph of Section 2.5, quarterly monitoring will be done for the first two years of operation to evaluate system performance. If, at that time, it is determined that the remedial action is effective, a determination will be made as to the frequency of future monitoring.

(iii) As stated in first paragraph of Section 2.5 of the proposed plan, at the end of two years the remaining contaminants in the groundwater will be evaluated based on the data collected. The evaluation of the effectiveness of the system will not be based solely on a “percentage of remediation.” Remedial action objectives (RAOs) will be established as a part of the remedial action decision document for Site 2. The RAOs will include various

criteria, including such items as source removal, prevention of exposure, implementation of institutional controls, along with a comparison of the monitoring data gathered to agreed upon "trigger mechanisms." The trigger mechanisms, which are currently being developed, will be well-defined performance standards that indicate the degree of effectiveness of the natural attenuation aspects of the remedy. Once defined, they will be laid out as clear milestones during the remedial action program. After two years of operation, the analytical data will be evaluated against the RAOs to determine the effectiveness of the remedial action, and a decision will be made on whether or not there is the need to implement a contingent remedy based on the trigger mechanisms.

(iv) As stated in the proposed plan and discussed above, the effectiveness of the remedial action, including natural attenuation, will be evaluated after two years. Further, since no specific objections to the preferred alternative (Alternative 3) for Site 2 were received during the public comment period, it is the remedial action that will be constructed by the AFBCA. It has been developed so that, once completed, the contamination will be reduced to a level that is protective of human health and the environment.

Comment: The RPA would also like clarification on the extent of the plume which has migrated onto RPA land to the west of Site 2, and the proposed remediation plan to correct that contamination.

Response: The extent of the benzene plume is shown on Figure 2-9 in the Final Feasibility Study, which the RPA reviewed and commented on. However, the figure does not show the exact location of the RPA property line. The best estimate of the AFBCA is that the boundary of the 1 part per billion benzene plume may extend approximately 50-100 feet onto RPA property. The boundary of the 5 part per billion benzene plume, which is the MCL level, would not extend as far onto the RPA property and may not have actually reached the property line.

Site 21

Comment: The proposed remedial action is natural attenuation. The comments of the RPA that were expressed above relate to this site as well. The RPA has expressed concerns to the AFBCA that this site is one of the first ones that will be developed due to its location. It is directly across from property that has already been developed, and next to an area where the RPA has already demolished buildings. The RPA does not find it acceptable to adopt a remediation plan that will delay construction on the site. The RPA would encourage the AFBCA to consider other alternatives for this site.

Response: The preferred alternative for Site 21 is Alternative 3 - Institutional Controls, Hot Spot Removal, Natural Attenuation, which is more than natural attenuation alone. It is unclear as to whether RPA's comments on Site 2 are related to Site 21, but if so, note our responses to Site 2. The AFBCA is aware that the RPA has previously stated that this area will be one of the first areas to be developed. Alternative 3 includes the removal of soil contamination, which may contribute to the groundwater contamination, followed by

the installation of additional monitoring wells. Once the monitoring wells are installed, which is scheduled to occur by early CY2000, the only proposed additional work will be sampling of the wells. Though this area may be developed sooner than other areas, the RPA has not presented the AFBCA with any specific timetable or layout plan for development of the site. Therefore, there is no indication that the remediation will delay construction on the site. In addition, an active remediation would likely involve disruption to development for a longer period of time than the soil remediation and monitoring well installation. Further, the monitoring wells can be adjusted to the ground level of any future grass or pavement to minimize any impact to development. This type of action has been successfully accomplished at other Air Force closure bases. The only foreseeable restriction to development would be the construction of a building over the monitoring wells. Early coordination between RPA and AFBCA should prevent this situation from becoming a problem.

Sites 42 and 43

Comment: The proposed remedies do not seem to be a problem; however, the RPA would like to alert the AFBCA to the fact that Taxiway A will be rehabilitated over the next few years. Engineering is already underway for the first phase, from Taxiway Bravo to Delta. If the proposed alternative would have any impact on that project we need to discuss the situation immediately.

Response: The AFBCA has not seen any plans for the rehabilitation of Taxiway A. However, we do not anticipate any impact on the RPA work. As schedules for the proposed AFBCA remediation and the RPA rehabilitation are developed, early coordination between agencies should eliminate any potential impacts that may occur.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

SRF-5J

Wednesday, 20 January 1999

Mr. Tony Clymer, Site Manager
Air Force Base Conversion Agency
7556 S. Perimeter Road
Columbus, Ohio 43217-5910

Dear Mr. Clymer:

U.S. Environmental Protection Agency (EPA) received the ***Draft, Revision 1 Proposed Plan for Remediation of IRP Sites*** which was distributed for public comment on 5 January 1999. In reviewing this report, EPA has the following comments:

2.4, 3.4, 4.4, 5.4, 6.4 Summary of Alternatives

1. General Comment: Rather than listing the months to implement the remedy, EPA recommends listing the estimated time period in which the remedy would take to "clean up" the site. This time period would include the time to construct the remedial alternative. This information would be helpful. For example, at Site 2, an in-situ chemical oxidation treatment system would take approximately 30 months (2.5 years) to cleanup while an alternative utilizing institutional controls and monitored natural attenuation would take approximately 186 months (15.5 years) These time frames are derived from what was utilized in obtaining the estimated present worth of the project plus the months to implement. This information would also be useful in determining the time frame in which compliance with applicable or relevant and appropriate requirements (ARARs) will be met.

2.4 Summary of Alternatives

2. Page 9, Lines 29-31: This sentence indicates that the deed restriction would remain in place until such time that the future owners of the property could demonstrate that benzene concentrations are below the MCL. The actual deed restriction may be incumbent upon future owners to follow, but EPA understands that it is the responsibility of the Air Force who will demonstrate that benzene concentrations are below the MCL. Please clarify.

3. Page 9, Lines 33-34: This sentence would be better phrased as "Groundwater monitoring will continue until remedial goals are met". The reference to "attenuation goals" is not appropriately referenced here because attenuation refers to the process occurring and the process can occur without the actual goals being met.

2.5 Evaluation of Alternatives and the Preferred Alternative

4. Page 12, Line 21: "USEPA" should not be included under State Acceptance. Also, to clarify, EPA has reviewed the results of the investigations conducted and agree with the alternatives proposed. However, EPA withholds our support of the preferred alternative until after public comments have been received and evaluated.

5. Table 1, Cleanup Alternative Evaluation Table for Site 2 - Although there may be some implementability concerns with alternative 5, in theory this alternative is effective and can be implemented. EPA recommends that this alternative describe implementability as partially meets criteria.

3.4 Summary of Alternatives

6. Page 17, Lines 5-6: See comment 3.

3.5 Evaluation of Alternatives and the Preferred Alternative

7. Page 19, Line 23: See comment 4.

8. Table 2, Cleanup Alternative Evaluation Table for Site 21 - See comment 5.

4.4 Summary of Alternatives

9. Page 24, Lines 6-7: See comment 3.

4.5 Evaluation of Alternatives and the Preferred Alternative

10. Page 26, Line 12: Alternative 3 may have a projected cleanup time of 11 years but so does Alternative 4. In addition, Alternative 5 has a projected cleanup time of 2.5 years (this includes the months to implement the remedy). See comment 1.

11. Page 26, Line 41: See comment 4.

12. Table 3, Cleanup Alternative Evaluation Table for Site 41 - See comment 5.

5.4 Summary of Alternatives

13. Page 30, Lines 37-38: See comment 3. In addition, the words if necessary should be eliminated from this sentence as the groundwater monitoring would continue until the remedial goals are met.

5.5 Evaluation of Alternatives and the Preferred Alternative

14. Page 33, Line 17: See comment 4.

15. Table 4, Cleanup Alternative Evaluation Table for Site 42 - See comment 5.

6.1 Site Description and History

16. Page 35, Lines 20-21: In looking at the FS, it would appear that the seepage velocity at this site was calculated as 0.003 feet per day. Groundwater flow direction and velocity were not reported since only a single elevation data point was available. This sentence should be stricken from the text.

6.4 Summary of Alternatives

17. Pages 37-38, Lines 44-1: See comments 3 and 13.

6.5 Evaluation of Alternatives and the Preferred Alternative

18. Page 40, Line 21: See comment 4.

19. Table 5, Cleanup Alternative Evaluation Table for Site 43 - See comment 5.

8. Community Participation

20. Page 43, Line 14: Mr. Alan Friedstrom should be Mr. Tony Clymer as the public notice and fact sheet indicate that Mr. Clymer is the contact person.

21. Page 43, Line 19: The public comment period began on January 5, 1999 and will end on February 3, 1999.

22. Comment Sheet: USEPA should be replaced with AFBCA. In addition, comments must be postmarked by February 3, 1999.

9. Glossary

23. Page 46, Line 25: This is AFBCA's preliminary recommendation not U.S. EPA's.

24. Page 48, Line 8: This should be State Acceptance rather than Agency Acceptance.

If you have any questions in regards to this letter, please feel free to contact me: (312)886-0850.

Sincerely,

Laura J. Ripley
Remedial Project Manager

cc: Diana Bynum, OEPA
Al Friedstrom, AFBCA
Joseph Tyburski, IT via e-mail
John Lengel, CDM via e-mail
Dan Mooney, AFCEE via e-mail
Section File

Air Force Base Conversion Agency Responses to
USEPA Comments Dated 20 January 1999 on the
Draft, Revision 1 Proposed Plan for the Remediation of IRP Sites

2.4, 3.4, 4.4, 5.4, 6.4 Summary of Alternatives

1. Response to General Comment: The estimated time period required to achieve remediation goals for each alternative for each site has been incorporated into the Remedial Action Decision Document.

2.4 Summary of Alternatives

2. Page 9, Lines 29-31: Text has been included in the Remedial Action Decision Document which states that the Air Force will retain responsibility for maintaining and enforcing the selected remedy until all remedial cleanup levels have been met.

3. Page 9, Lines 33-34: The statement "Groundwater monitoring will continue until all remedial cleanup levels have been met" has been included in the description of the selected remedy for each site in the Remedial Action Decision Document.

2.5 Evaluation of Alternatives and the Preferred Alternative

4. Page 12, Line 21: The Air Force determined that it would prefer to include USEPA's acceptance since Rickenbacker is a non-NPL base. Therefore, this is a logical place to recognize Federal regulatory agency acceptance.

5. Table 1, Cleanup Alternative Evaluation Table for Site 2 - Alternative 5 for Site 2 (as well as for Sites 21, 41, 42, and 43) is shown as Partially Meets Criteria for Implementability in the Remedial Action Decision Document.

3.4 Summary of Alternatives

6. Page 17, Lines 5-6: See response to Comment 3.

3.5 Evaluation of Alternatives and the Preferred Alternative

7. Page 19, Line 23: See response to Comment 4.

8. Table 2, Cleanup Alternative Evaluation Table for Site 21 - See response to Comment 5.

4.4 Summary of Alternatives

9. Page 24, Lines 6-7: See response to Comment 3.

4.5 Evaluation of Alternatives and the Preferred Alternative

10. Page 26, Line 12: See response to Comment 1.

11. Page 26, Line 41: See response to Comment 4.

12. Table 3, Cleanup Alternative Evaluation Table for Site 41 - See response to Comment 5.

5.4 Summary of Alternatives

13. Page 30, Lines 37-38: See response to Comment 3. The words "if necessary" are not included in the applicable sections of the text in the Remedial Action Decision Document.

5.5 Evaluation of Alternatives and the Preferred Alternative

14. Page 33, Line 17: See response to Comment 4.

15. Table 4, Cleanup Alternative Evaluation Table for Site 42 - See response to Comment 5.

6.1 Site Description and History

16. Page 35, Lines 20-21: Groundwater flow direction and velocity were not reported in the Phase II Remedial Investigation since only one data elevation point was available at that time. During the Feasibility Study field effort, temporary piezometers were installed to facilitate evaluation of the groundwater flow direction. The groundwater flow direction and velocity based on these additional measurements are included in both the Feasibility Study and the Remedial Action Decision Document.

6.4 Summary of Alternatives

17. Pages 37-38, Line 44-1: See responses to Comments 3 and 13.

6.5 Evaluation of Alternatives and the Preferred alternative

18. Page 40, Line 21: See response to Comment 4.

19. Table 5, Cleanup Alternative Evaluation Table for Site 43 - See response to Comment 5.

8. Community Participation

20. Page 43, Line 14: Comment noted. The change was not made to the document since the Public Notice and the Fact Sheet clearly stated that comments on the Proposed Plan should be sent to Mr. Tony Clymer. This information was also provided at the Public Meeting held on January 5, 1999.

21. Page 43, Line 19: Comment noted. The change was not made to the document since the Public Notice and the Fact Sheet clearly stated that the public comment period was January 5 - February 3, 1999. This information was also provided at the Public Meeting held on January 5, 1999.

22. Comment Sheet: The Comment Sheet handed out to the public at the public meeting correctly stated that the BRAC Cleanup Team was interested in the public comments and also correctly identified February 3, 1999 and the postmark date for comments.

9. Glossary

23. Page 46, Line 25: Comment Noted. The Declaration section of the Remedial Action Decision Document correctly states that the Air Force selected the remedy for each site and the USEPA and OEPA have approved the selection.

24. Page 48, Line 8: The Remedial Action Decision Document correctly states the criteria as State and USEPA Acceptance rather than Agency Acceptance.

OhioEPA

State of Ohio Environmental Protection Agency

STREET ADDRESS: Central District Office MAILING ADDRESS:

3232 Alum Creek Drive
Columbus, OH 43207-3417

TELE: (614) 728-3778 **FAX:** (614) 728-3898

P.O. Box 1049
Columbus, OH 43216-1049

January 25, 1999

RE: Rickenbacker ANGB
Franklin County
Ohio EPA #125-0685
Proposed Plan

Mr. Alan C. Friedstrom
AFBCA/DB Rickenbacker
Rickenbacker IAP
7556 South Perimeter Road
Columbus, Ohio 43217-5910

Dear Mr. Friedstrom:

Ohio EPA received the Draft, Revision 1, Proposed Plan for Remediation of IRP Sites for Rickenbacker Air National Guard Base on December 17, 1998 and has the following comments.

1. Page 4, line 3 - Please check on who the property owner is for Site 41 and correct the document in error. On Figure 1-3 in the feasibility study (FS) report, it indicates that the property is owned by the Air Force Base Conversion Agency (AFBCA) and the Army Reserves.

2. Page 6, Section 2.1 Site Description and History, line 38 - Please update the time of closure for the fuel hydrant line.

3. Page 8, line 4 - Please check on the ground water velocity provided here. From reading the FS, it appears that 0.054 feet per day is the hydraulic conductivity.

4. Page 9, Alternative 2, lines 29-31- What future property owners is this sentence referring to? The AFBCA should be responsible for meeting the remedial action objectives (RAOs). Please correct this.

5. Page 9, Alternative 2, lines 33 and 34; page 17, lines 5 and 6; page 24, lines 6 and 7; page 30, lines 37 and 38 and page 38, line 1 - These sentences should state that ground water monitoring will continue until RAOs are met.

6. Page 9, Alternative 3, lines 43 and 44 and line 1 of the next page - This sentence is confusing as written. Perhaps it could say that the RPA is leasing the land to a farmer to be farmed.

7. Pages 13, 20, 27, 34 and 41, Tables 1-5 - For Alternative 5, under "Implementability" wouldn't "partially meets criteria" be more appropriate?

8. Page 32, Overall protection of human health and the environment, lines 26-30 - Alternative 5 was not discussed and should be added.

9. Page 35, Section 6.1 Site Description and History, line 21- Please check on the velocity given here. According to the FS, page 2-50, line 33, the ground water velocity is 0.02 feet per day.

10. Page 43, Section 8. Community Participation, line 14 - The Fact Sheet states that comments should be sent to Mr. Tony Clymer. Please change this. In addition, the public comment period needs to be corrected to read January 5 - February 3, 1999.

11. Page 44, Comment Sheet - This form states that USEPA is interested in public comments but this is being published by the AFBCA. It might be more appropriate to say that the AFBCA is interested in public comments.

If you have any questions, you may reach me at (614) 728-3826.

Sincerely,

Diana L. Bynum

Diana L. Bynum
Site Coordinator
Division of Emergency and Remedial Response
Central District Office

DB/sb **rangbppl.wpd**

cc: Laura Ripley, USEPA, Region V, SRF-5J
Ray Beaumier, DERR/CO
Catherine Stroup, Legal
File, DERR/CDO

Air Force Base Conversion Agency Responses to
Ohio EPA Comments Dated 20 January 1999 on the
Draft, Revision 1 Proposed Plan for the Remediation of IRP Sites

1. Page 4, Line 3 - Comment Noted. Text in the Proposed Plan was not changed. However, Section 2 of the Remedial Action Decision Document correctly states a brief history of the use of Site 41 including the most recent use by the Air Force Base Conversion Agency.

2. Page 6, Section 2.1 Site Description and History, line 38 - The text is essentially correct in that it states the fuel line was scheduled for closure in December 1998, even though closure did not occur until later. Therefore, no changes to the text were made.

3. Page 8, Line 4 - The 0.054 feet per day was incorrectly identified as the groundwater velocity in the text. The rate is correctly identified as the hydraulic conductivity in the Remedial Action Decision Document.

4. Page 9, Alternative 2, Lines 29-31 - Text has been included in the Remedial Action Decision Document which states that the Air Force will retain responsibility for maintaining and enforcing the selected remedy until all remedial cleanup levels have been met.

5. Page 9, Alternative 2, Lines 33 and 34; page 17, lines 5 and 6; page 24, lines 6 and 7; page 30, lines 37 and 38 and page 38, line 1 - The statement "Groundwater monitoring will continue until all remedial cleanup levels have been met" has been included in the description of the selected remedy for each site in the Remedial Action Decision Document.

6. Page 9, Alternative 3, Lines 43 and 44 and line 1 of the next page - The status of the property is clarified in the Remedial Action Decision Document with the statement that the RPA owns the land west of the drainage ditch and currently leases the property for farming purposes.

7. Pages 13, 20, 27, 34, and 41, Tables 1-5 - Alternative 5 for Site 2 (as well as for Sites 21, 41, 42, and 43) is shown as Partially Meets Criteria for Implementability in the Remedial Action Decision Document.

8. Page 32, Overall protection of human health and the environment, Lines 26-30 - Alternative 5 for Site 42 is discussed in this paragraph of the Summary of Comparative Analysis of Alternatives section of Remedial Action Decision Document.

9. Page 35, Section 6.1 Site Description and History, Line 21 - The average groundwater velocity for Site 43 was originally calculated to be 0.003 feet per day as stated on Page 2-50, line 29 of the Feasibility Study (FS). However, as stated in the following sentences in the FS, this value was considered to be unrealistically small. A

higher hydraulic conductivity was then used to compute the velocity of 0.02 feet per day. The Proposed Plan incorrectly identified the groundwater velocity as 0.003 feet per day. The Remedial Action Decision Document correctly identifies the hydraulic conductivity at this site as 0.024 feet per day and does not mention the groundwater velocity.

10. Page 43, Section 8 Community Participation, Line 14 - Comment noted. The change was not made to the document since the Public Notice and the Fact Sheet clearly stated that comments on the Proposed Plan should be sent to Mr. Tony Clymer and that the public comment period was January 5 - February 3, 1999. This information was also provided at the Public Meeting held on January 5, 1999.

11. Page 44, Comment Sheet - The Comment Sheet handed out to the public at the public meeting and correctly stated that the BRAC Cleanup Team was interested in the public comments.

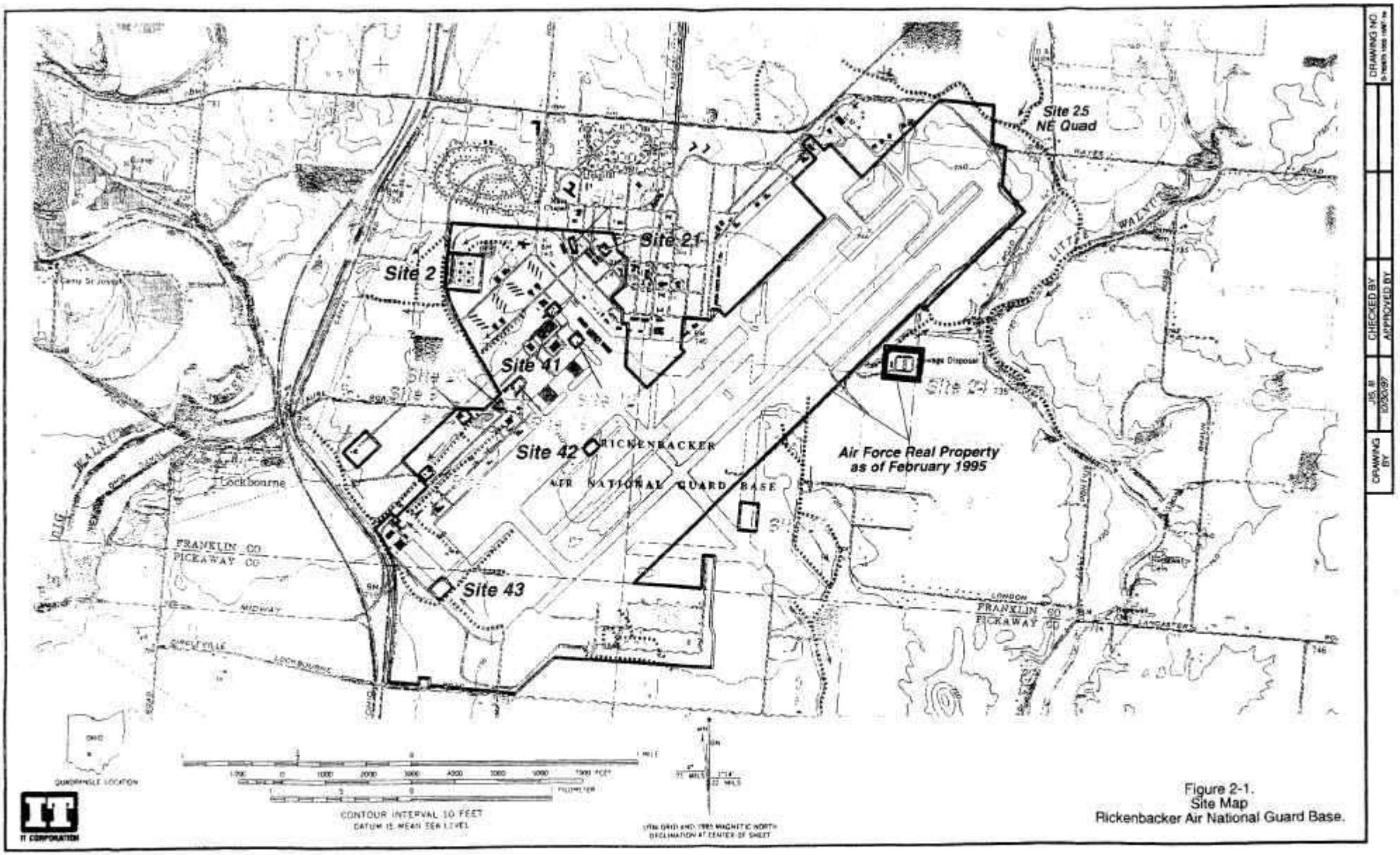


Figure 2-1.
Site Map
Rickenbacker Air National Guard Base.

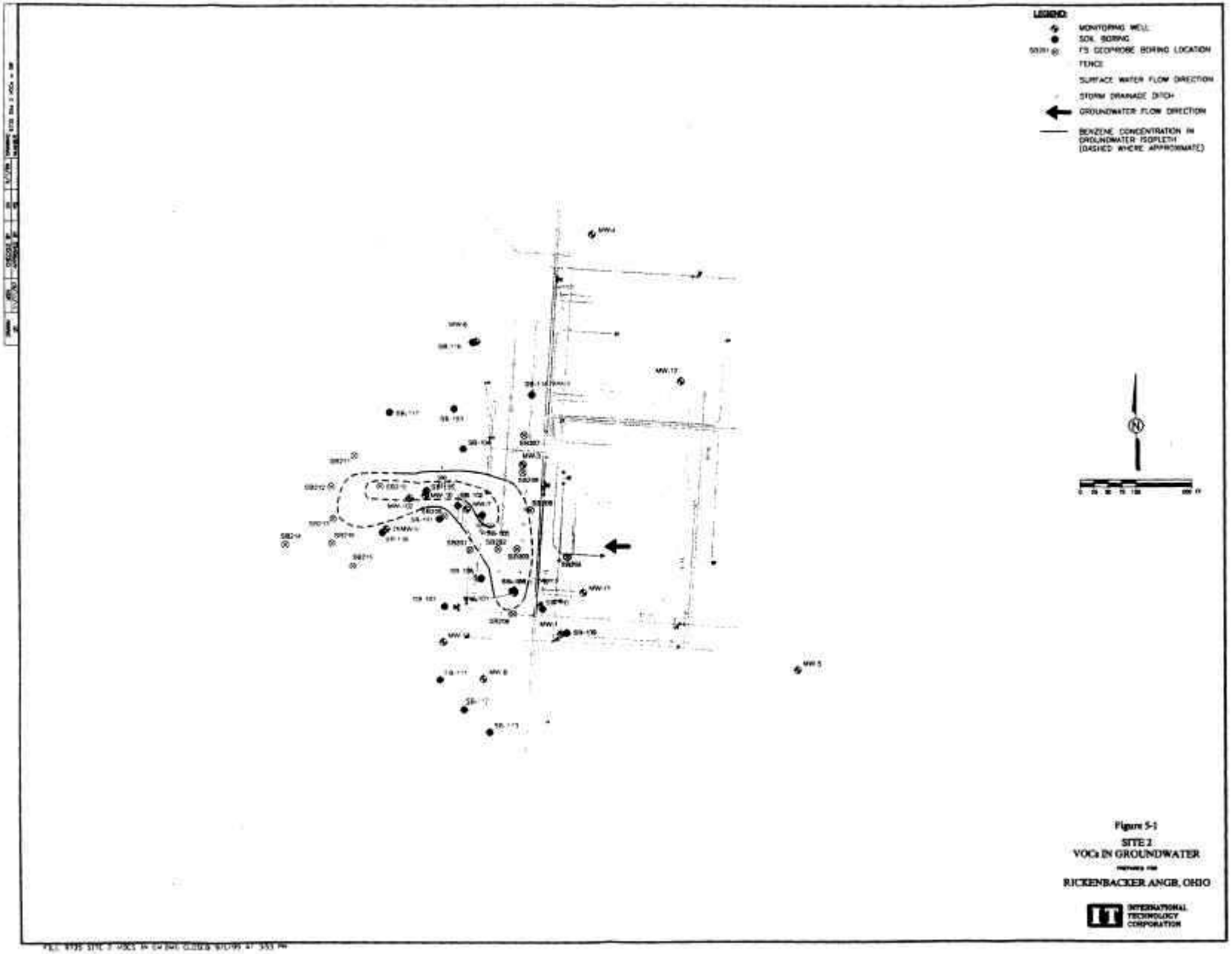


Figure 5-1

SITE 2
VOCs IN GROUNDWATER

RICKENBACKER ANGB, OHIO

INTERNATIONAL TECHNOLOGY CORPORATION

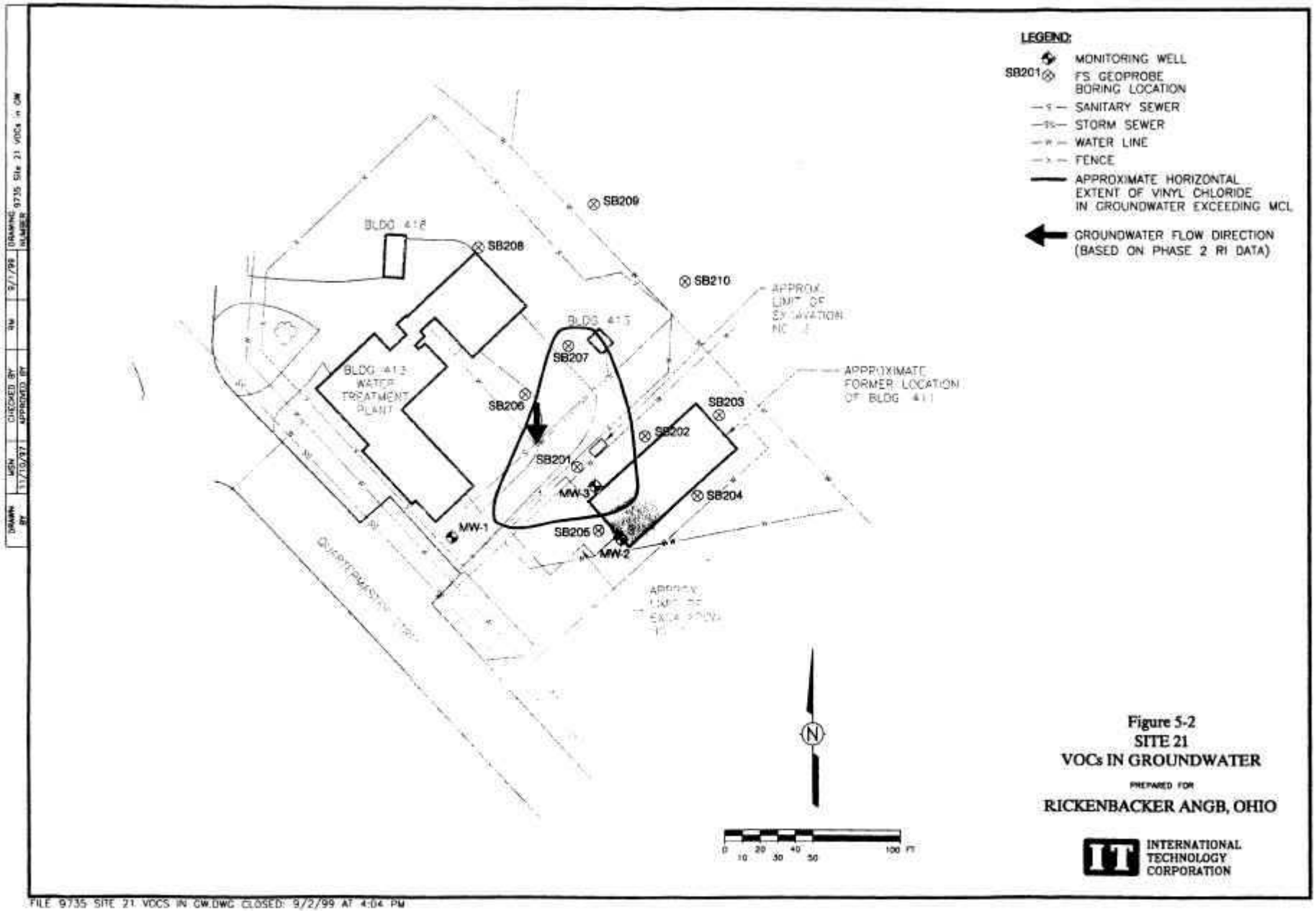


Figure 5-2
SITE 21
VOCs IN GROUNDWATER

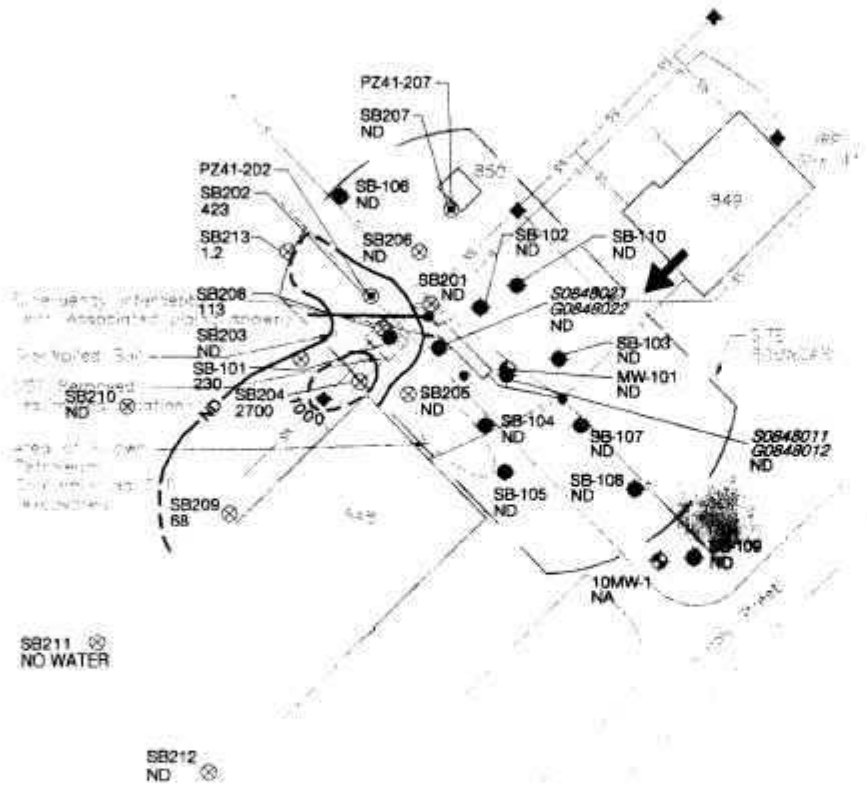
PREPARED FOR

RICKENBACKER ANGB, OHIO

INTERNATIONAL TECHNOLOGY CORPORATION

DRAWN BY | WSH 11/10/97 | CHECKED BY | APPROVED BY | REV | 9/1/99 | DRAWING NUMBER 9735 Site 21 VOCs in GW

FILE: 9735 SITE 21 VOCS IN GW.DWG CLOSED: 9/2/99 AT 4:04 PM



LEGEND:

- MONITORING WELL
- SOIL BORING
- SB201 FS GEOPROBE BORING LOCATIONS
- —S— SANITARY SEWER
- —SS— STORM SEWER
- EXTENT OF TRICHLOROETHYLENE IN GROUNDWATER (DASHED WHERE APPROXIMATE)
- GROUNDWATER FLOW DIRECTION

NA –NOT ANALYZED
ND –NOT DETECTED

NOTE: CONCENTRATION IN GROUNDWATER (µg/L)

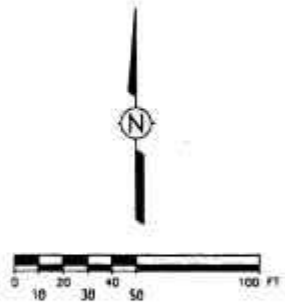


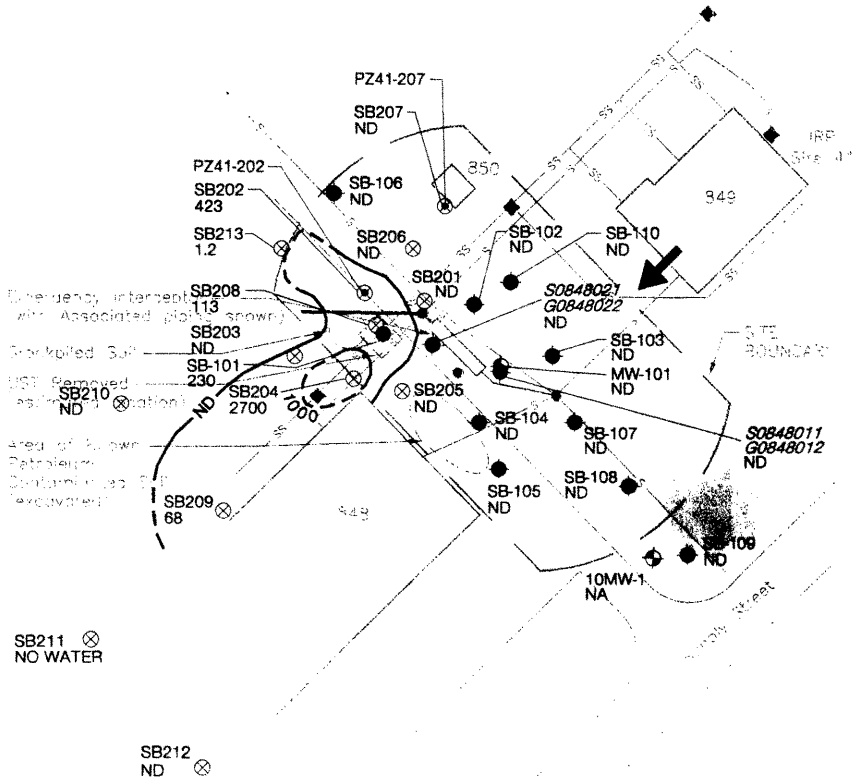
Figure 5-4
SITE 41
TCE CONCENTRATION IN GROUNDWATER

PREPARED FOR

RICKENBACKER ANGB, OHIO

INTERNATIONAL TECHNOLOGY CORPORATION

FILE 9735 SITE 41 TCE IN GW.DWG CLOSED 9/1/99 AT 3:35 PM



LEGEND:

- MONITORING WELL
- SOIL BORING
- SB201 FS GEOPROBE BORING LOCATIONS
- —S— SANITARY SEWER
- —SS— STORM SEWER
- EXTENT OF TRICHLOROETHYLENE IN GROUNDWATER (DASHED WHERE APPROXIMATE)
- GROUNDWATER FLOW DIRECTION

NA –NOT ANALYZED
ND –NOT DETECTED

NOTE: CONCENTRATION IN GROUNDWATER (µg/L)

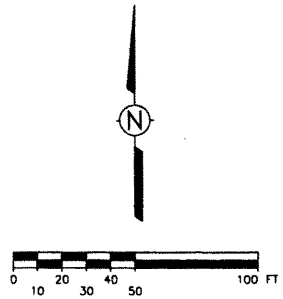


Figure 5-4
SITE 41
TCE CONCENTRATION IN GROUNDWATER

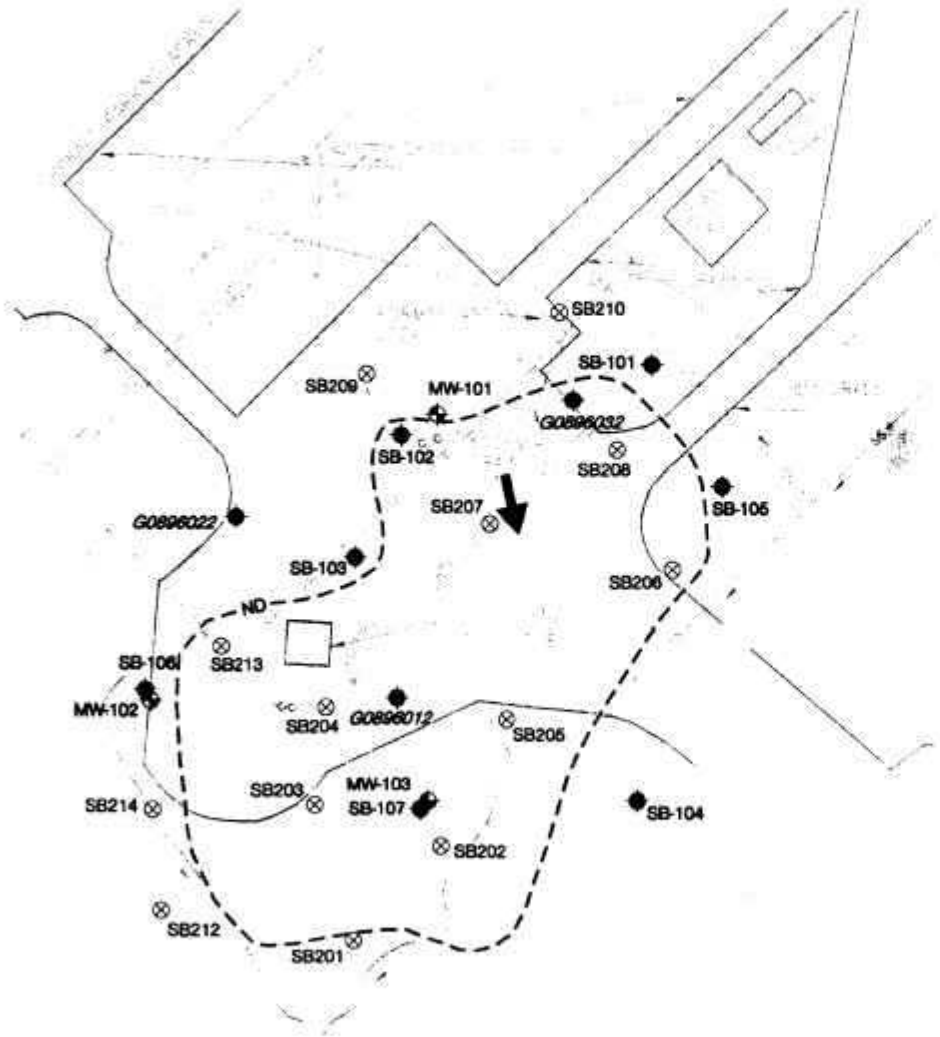
PREPARED FOR

RICKENBACKER ANGB, OHIO

INTERNATIONAL TECHNOLOGY CORPORATION

DRAWN BY | WSN | 11/10/97
CHECKED BY | APPROVED BY | SH | RS
9/1/99
DRAWING NUMBER 9735 Site 41 TCE in GW

FILE 9735 SITE 41 TCE IN GW.DWG CLOSED: 9/1/99 AT 3:35 PM



LEGEND:

- MONITORING WELL
- SOIL BORING
- SB201 FS GEOPROBE BORING LOCATIONS
- UNDERGROUND FUEL LINE
- ELECTRICAL LINE
- STORM SEWER
- TELEPHONE LINE
- WATER LINE
- SWALES/DITCHES
- FLOW DIRECTION
- APPROXIMATE HORIZONTAL EXTENT OF VINYL CHLORIDE IN GROUNDWATER
- GROUNDWATER FLOW DIRECTION

N

0 10 20 30 40 50 100 FT

Figure 5-5
SITE 42
VOCs IN GROUNDWATER

PREPARED FOR

RICKENBACKER ANGB, OHIO

INTERNATIONAL TECHNOLOGY CORPORATION

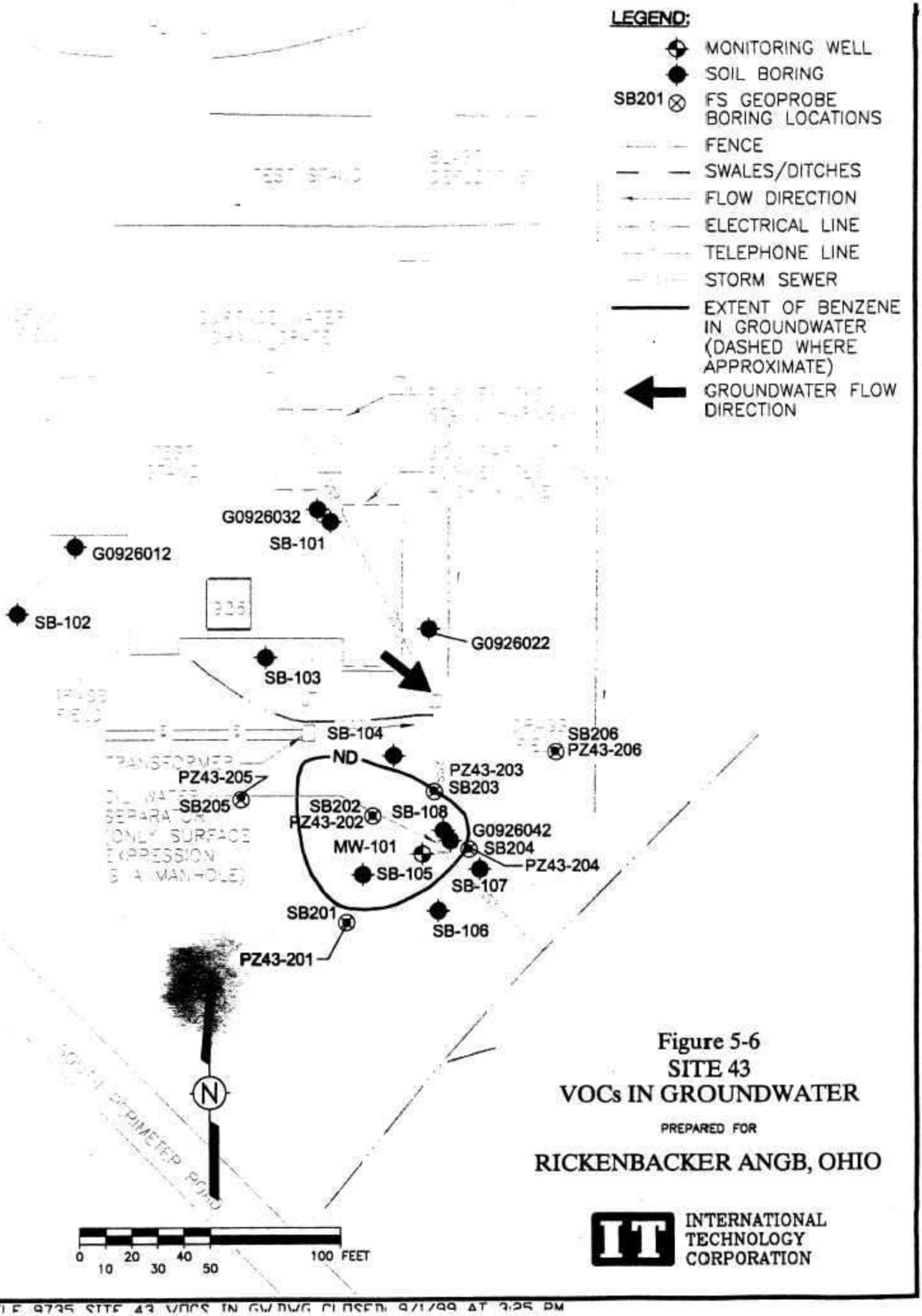
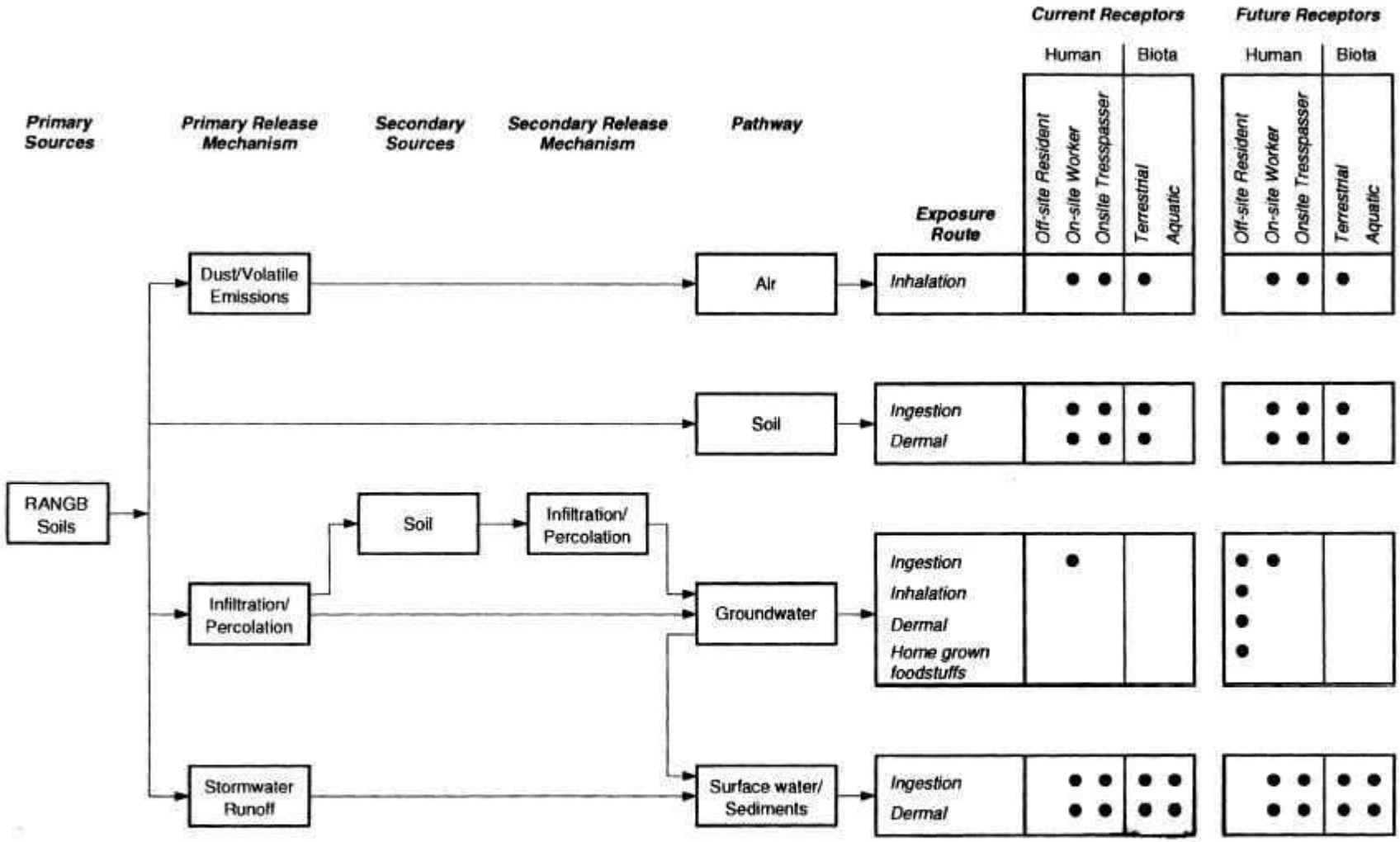


Figure 5-6
SITE 43
VOCs IN GROUNDWATER

PREPARED FOR

RICKENBACKER ANGB, OHIO

INTERNATIONAL TECHNOLOGY CORPORATION



INTERNATIONAL TECHNOLOGY CORPORATION

Figure 6-1.
Conceptual Site Model for RANGB.

DRAWING BY	JJS, III	CHECKED BY			DRAWING NO.
	3/8/96	APPROVED BY			S-782970.10031300-3/96-D

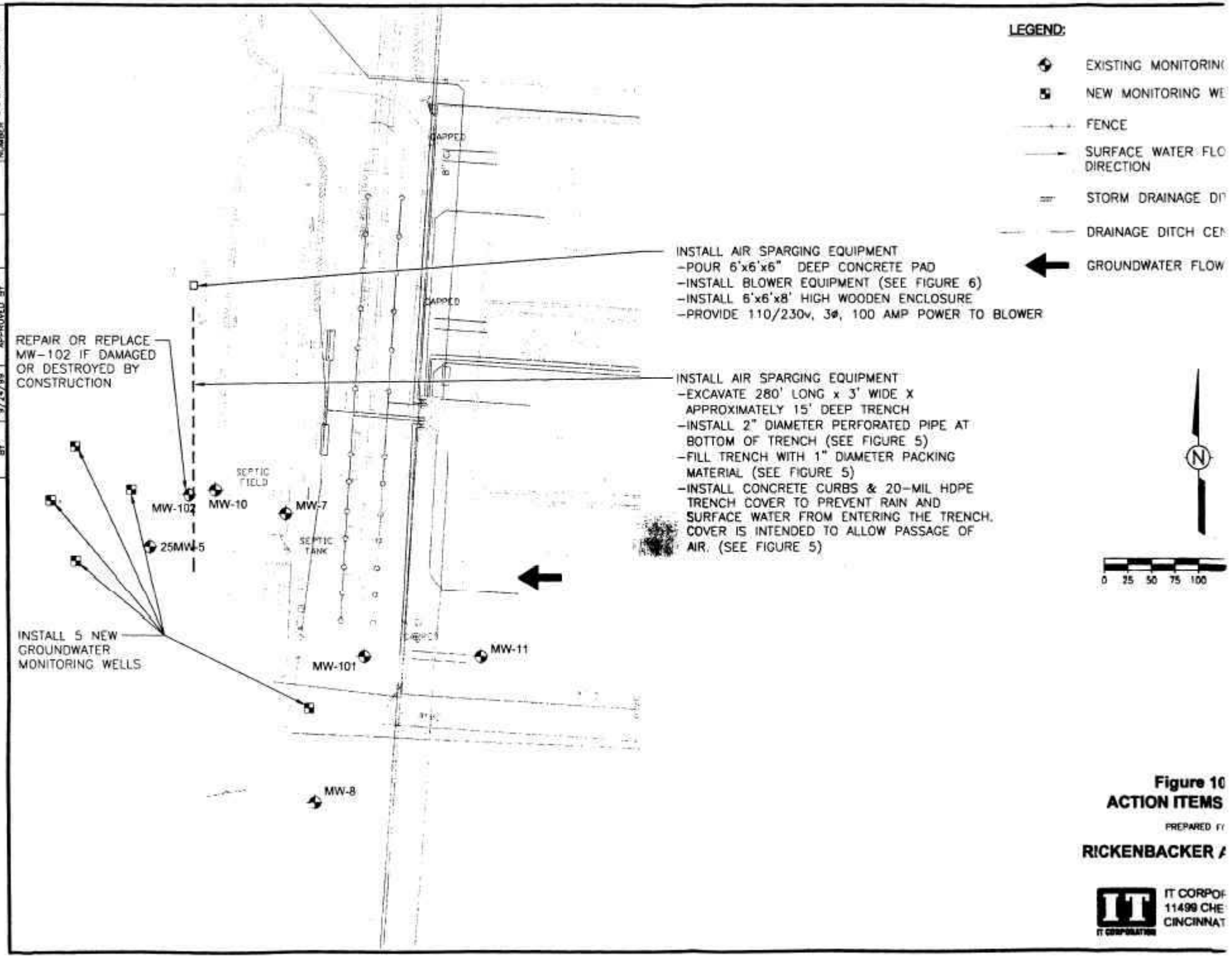


Figure 10
ACTION ITEMS

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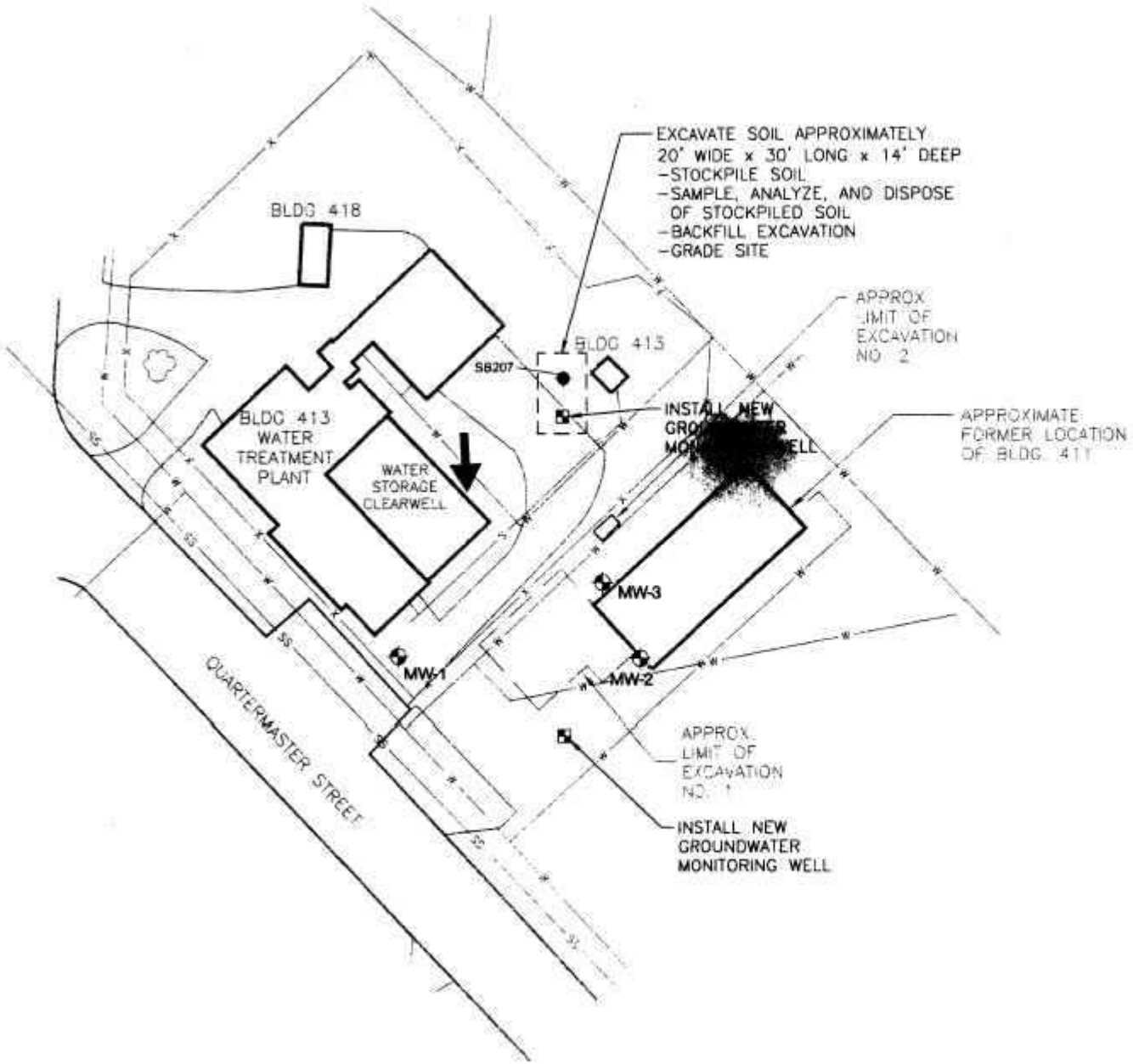

LEGEND:

- EXISTING MONITORING WELLS
- NEW MONITORING WELL LOCATION
- SOIL BORING LOCATION
- —S— SANITARY SEWER
- —SS— STORM SEWER
- —W— WATER LINE
- —X— FENCE
- GROUNDWATER FLOW DIRECTION

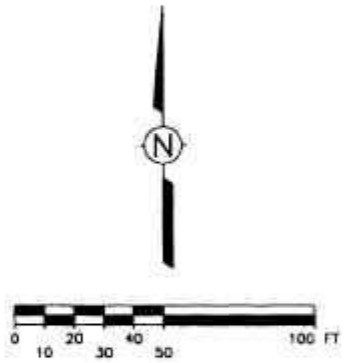

Figure 10-2
ACTION ITEMS - SITE 21

PREPARED FOR

RICKENBACKER ANGB, OHIO

IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

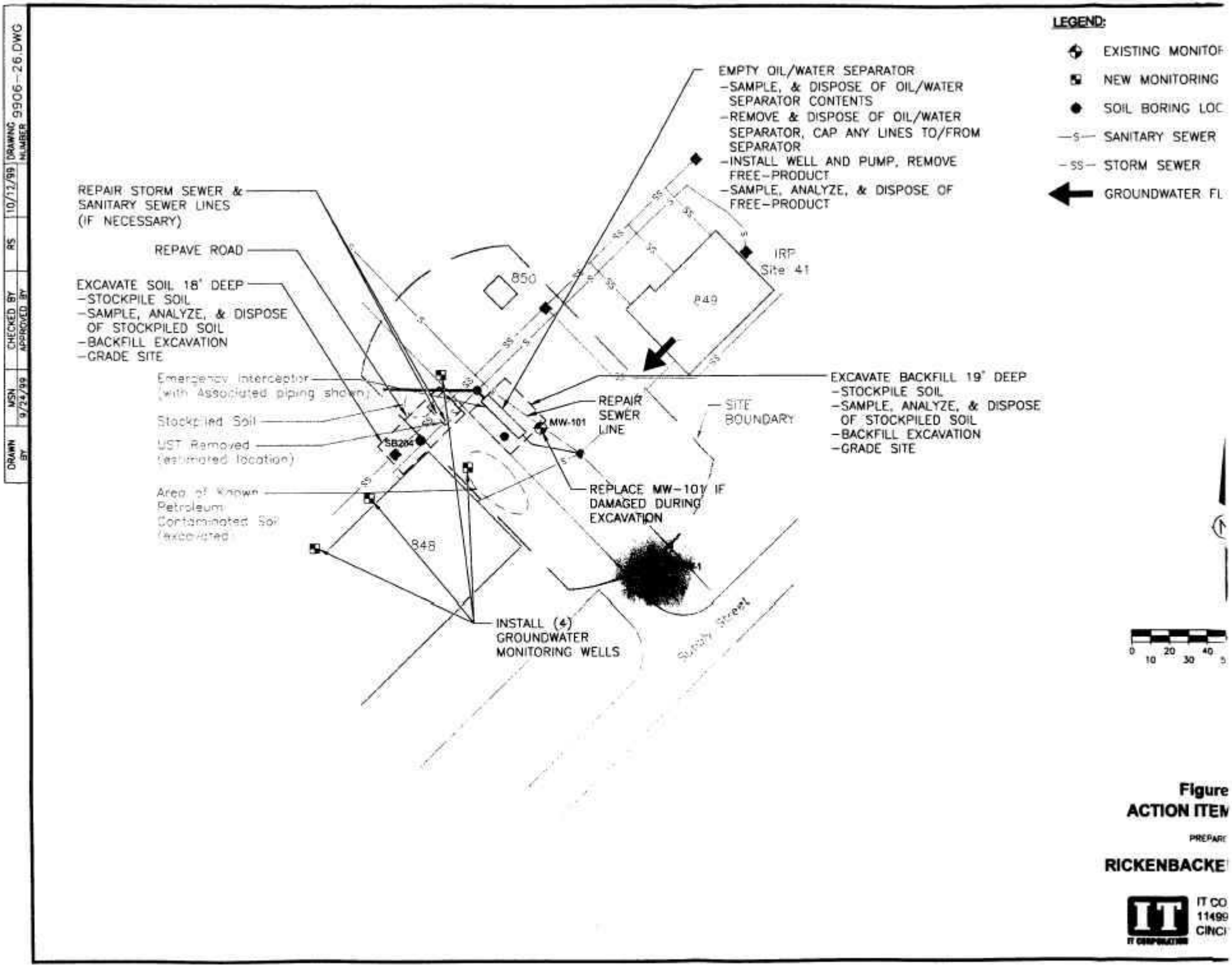

Figure
ACTION ITEM

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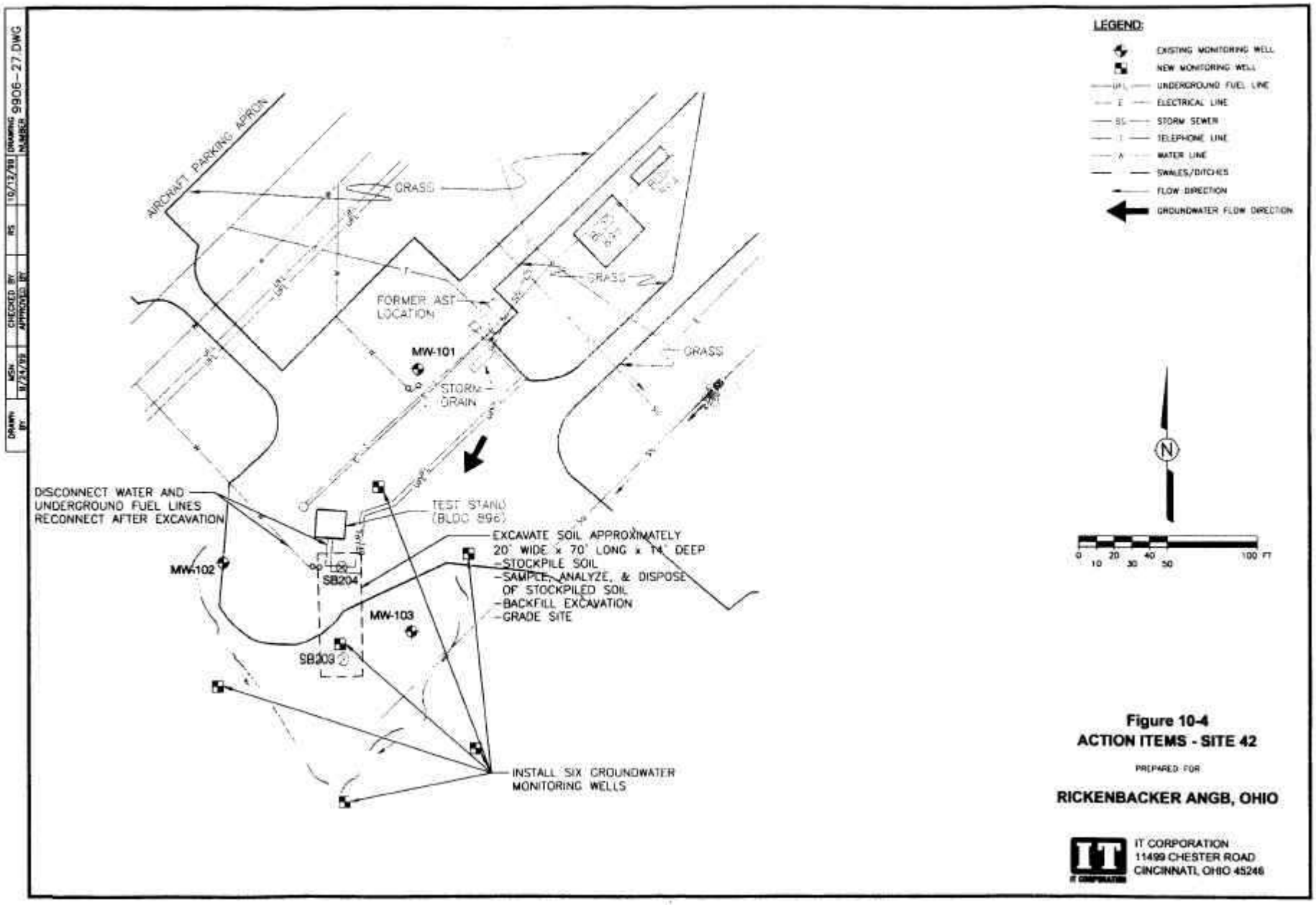

Figure 10-4
ACTION ITEMS - SITE 42

PREPARED FOR

RICKENBACKER ANGB, OHIO

IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

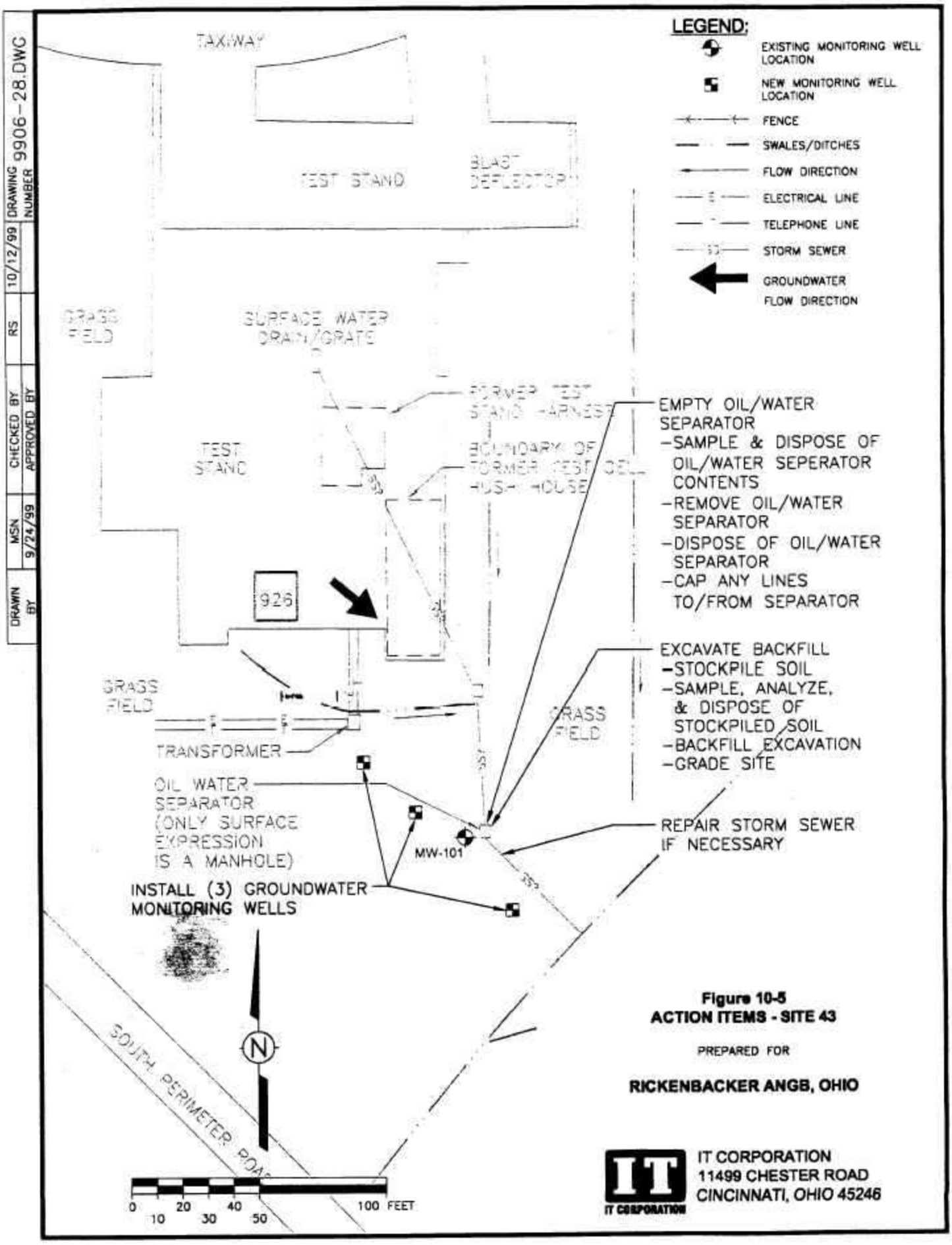

Figure 10-5
ACTION ITEMS - SITE 43

PREPARED FOR

RICKENBACKER ANGB, OHIO

IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

TABLES

Appendix A

Risk Tables

Table 5-1
Contaminants of Concern, Site 2
Rickenbacker ANGB, OH

Chemical of Concern[a]	Maximum Value, mg/L	Background mg/L	MCL mg/L[b]
VOLATILE ORGANIC COMPOUNDS			
BENZENE	2.6E-01	NA	5.0E-03

[a] Chemicals expressing cancer risk above 1E-5 and noncancer hazard above 0.1.
[b] Maximum Contaminant Level. NA = not available.

Table 5-2

Contaminants of Concern, Site 21
Rickenbacker ANGB, OH

Chemical of Concern[a]	Maximum Value, mg/L	Background mg/L[d]	MCL mg/L[b]
INORGANICS			
THALLIUM	1.3E-02	NA	2.0E-03
VOLATILE ORGANIC COMPOUNDS			
CIS-1,2-DICHLOROETHENE	3.0E+00	NA	7.0E-02
TRICHLOROETHYLENE	5.1E+00	NA	5.0E-03
VINYL CHLORIDE	3.0E-02	NA	2.0E-03
1,2-DIBROMO-3-CHLOROPROPANE	1.2E-03	NA	[c]

[a] Chemicals expressing cancer risk of 1E-5 and noncancer hazard above 0.1.
[b] Maximum Contaminant Level. NA = not available.
[c] MCL not available. Risk based clean-up goal will be determined.

Table 5-3
Contaminants of Concern, Site 41
Rickenbacker ANGB, OH

Chemical of Concern[a]	Maximum Value, mg/L	Background mg/L	MCL mg/L[b]
INORGANICS			
THALLIUM	6.8E-03	NA	2.00E-03
VOLATILE ORGANIC COMPOUNDS			
1,2-DICHLOROETHENE (TOTAL)	3.7E-01	NA	7.0E-02
BENZENE	5.3E+00	NA	5.0E-03
CIS-1,2-DICHLOROETHENE	3.9E-01	NA	7.0E-02
ETHYLBENZENE	2.8E+01	NA	7.0E-01
TOLUENE	3.5E+00	NA	1.0E+00
TRICHLOROETHYLENE	2.7E+00	NA	5.0E-03
VINYL CHLORIDE	2.8E-01	NA	2.0E-03
ACETONE	4.1E+00	NA	[c]

[a] Chemicals expressing cancer risk above 1E-5 and noncancer hazard above 0.1.
[b] Maximum Contaminant Level. NA = not available.
[c] MCL not available. Risk-based cleanup goal will be determined.

Table 5-4
Contaminants of Concern, Site 42
Rickenbacker ANGB, OH

Chemical of Concern[a]	Maximum Value, mg/L	Background mg/L	MCL mg/L[b]
INORGANICS			
ARSENIC	7.2E-02	2.2E-02	5.0E-02
VOLATILE ORGANIC COMPOUNDS			
BENZENE	7.1E-02	NA	5.0E-03
CIS-1,2-DICHLOROETHENE	1.2E+01	NA	7.0E-02
VINYL CHLORIDE	3.3E+00	NA	2.0E-03
TRICHLOROETHYLENE	9.3E+00	NA	5.0E-03

[a] Chemicals expressing cancer risk above 1E-5 and noncancer hazard above 0.1.
[b] Maximum Contaminant Level. NA = not available.

Table 5-5
Contaminants of Concern, Site 43
Rickenbacker ANGB, OH

Chemical of Concern[a]	Maximum Value, mg/L	Background mg/L	MCL mg/L[b]
INORGANICS			
THALLIUM	5.8E-03	NA	2.0E-03
VOLATILE ORGANIC COMPOUNDS			
BENZENE	7.2E-01	NA	5.0E-03
1,2-DICHLOROETHENE	1.2E-02	NA	5.0E-03
TRICHLOROETHYLENE	2.2E-02	NA	5.0E-03

a Chemicals expressing cancer risk above 1E-5 and noncancer hazard above 0.1.
b Maximum Contaminant Level. NA = not available.

Table 7-1
Chemical-Specific ARARs for Contaminants of Interest in Groundwater
Rickenbacker ANGB, OH

Constituent	Federal MCL (mg/L) 40 CFR 141.11	Ohio MCL (mg/L) OAC 3745-81-11, 12	Action Level (mg/L)
Inorganics			
Arsenic	5.0E-02	5.0E-02	5.0E-02
Thallium	2.0E-03	2.0E-03	2.0E-03
Volatile Organic Compounds			
Benzene	5.0E-03	5.0E-03	5.0E-03
cis-1,2-Dichloroethene	7.0E-02	7.0E-02	7.0E-02
1,2-Dichloroethane	5.0E-03	5.0E-03	5.0E-03
1,2-Dichloroethene	7.0E-03	7.0E-03	7.0E-03
1,2-Dichloroethene (total)	7.0E-02[b]	7.0E-02[a]	7.0E-02[b]
Ethylbenzene	7.0E-01	7.0E-01	7.0E-01
Toluene	1.0E+00	1.0E+00	1.0E+00
1,1,2-Trichloroethane	5.0E-03	5.0E-03	5.0E-03
Trichloroethene	5.0E-03	5.0E-03	5.0E-03
Vinyl Chloride	2.0E-03	2.0E-03	2.0E-03

MCL = Maximum Contaminant Level
[a] Value based on traps-1,2-dichloroethene.
[b] Value represent the MCL for cis-1,2-dichloroethene.

Table 7-2

Summary of Location-Specific ARARs for RANGB Groundwater Alternatives
Rickenbacker ANGB, Ohio
Page 1 of 2

Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
16 USC 661 33 CFR 320 40 CFR 6	Protection of the Environment	Requires the protection of wetlands, floodplains, important farmlands, coastal zones, wild and scenic rivers, fish and wildlife, and endangered species.	Consult with U.S. Fish & Wildlife Service regarding proposed actions for the sites where appropriate.	Applicable to all alternatives; remedial action will occur in or near river and streams and some alternatives involve discharge to surface water.
16 USC 1531 50 CFR 200, 402	Endangered Species Act of 1973 and Regulations	Requires action to avoid jeopardizing the continued existence of threatened species or modification of their habitats.	Determine presence of endangered or threatened species, consult with U.S. Fish and Wildlife and plan actions so as to conserve endangered or threatened species and their habitats.	Applicable to all alternatives; actions must not adversely impact endangered or threatened species or their habitats.
EO 11990	Protection of Wetlands	Requires wetlands protection.	Must take action to avoid adverse impact to existence and quality of wetlands.	Applicable to all alternatives; must plan actions as to avoid adverse impacts to wetlands.
ORC 3734.02 (H)	"Digging" Where Hazardous or Solid Waste Facility was Located	Prohibits digging at sites where hazardous or solid waste had been located.	Filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated is prohibited without prior authorization from the Director of the Ohio EPA.	Relevant and appropriate to alternatives which involve digging.
ORC 3734.20 (A)	Investigation Initiated by Director of Environmental Protection	Authorizes the Director of Environmental Protection to conduct investigations at any location within the state for which it is believed that hazardous waste was treated, stored, or disposed.	The Director, or appropriate representatives, may enter the facility and perform those measures necessary to abate or prevent air or water pollution or soil contamination.	Relevant and appropriate to all alternatives.

Table 7-2

Summary of Location-Specific ARARs for RANGB Groundwater Alternatives
Rickenbacker ANGB, Ohio
Page 2 of 2

Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
OAC 3745-9-04 (A,B)	Location/Siting of New Ground Water Wells	Requirements for siting new groundwater wells.	Mandates that groundwater wells be: a) located and maintained so as to prevent contaminants from entering the well and b) located so as to be accessible for cleaning and maintenance. Pertains to all groundwater wells on the site that will be installed. Also pertains if new wells are constructed for treatability studies during the FS.	Relevant and appropriate to alternatives which may require installation of groundwater wells.
ORC 1518.02 OAC 1501-18-1 OAC 1501-31-23 -01(A) and (B)	Endangered Plant Species, List of Endangered Plant species, List of Endangered Animal Species	Prohibits removal or destruction of endangered plant species. Lists of plant and animal species considered endangered in Ohio.	See Requirement Synopsis.	Relevant and appropriate to removal actions that involve movement of large volumes of surface soil, or where activities may disrupt habitats.

Table 7-3

Summary of Action-Specific ARARs for RANGB Groundwater Alternatives
Rickenbacker ANGB, Ohio
Page 1 of 9

Citation	Title/Subject	Required Synopsis	Compliance Standard	Applicability
33 CFR 320-330 40 CFR 230 Clean Water Act Sec. 404	Disposal of Dredged or Fill Material	Prohibits discharge of dredged or fill material into waters of the U.S. without a permit. Discusses potential impacts on physical, chemical and biological characteristics of the aquatic ecosystem, as well as special aquatic sites (including wetlands). Describes the policy and procedures used to issue, modify, suspend, or revoke a nationwide permit (NWP) designed to regulate activities which may impact navigable waters of the U.S.	Must take action to avoid discharge of dredged or fill material into waters of the U.S. without permit. NWPs are a type of general permit issued by the Army Corps of Engineers that may regulate certain activities that may impact the aquatic environment.	Applicable to all alternatives; must plan actions as to avoid adverse impacts to the aquatic ecosystem and special aquatic sites.
40 CFR 122.26	EPA Administered Permit Programs: The National Pollutant Discharge Elimination System	Provides requirements for discharges of storm water runoff associated with industrial facilities and construction projects.	Requirements for storm water runoff discharged to surface waters of the U.S. and municipal and non-municipal storm sewer systems under NPDES.	Applicable to storm water runoff associated with construction activities on site.
40 CFR 122.41, 122.44 40 CFR 131	EPA Administered Permit Programs: The National Pollutant Discharge Elimination System	Provides requirements for: 1)monitoring treatment system effluent; 2)compliance with additional substantive conditions; 3)compliance with Federally-approved State water quality standards, and 4) use of Best Available Technology (BAT).	See Requirement Synopsis.	Applicable to all alternatives which involve discharge to surface waters.

Table 7-3

Summary of Action-Specific ARARs for RANGB Groundwater Alternatives
Rickenbacker ANGB, Ohio
Page 2 of 9

Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
40 CFR 125 Subpart K	Criteria and Standards for the NPDES	Requires that a Best Management Practices program be designed and implemented to prevent the release of toxic or hazardous pollutants to waters of the U.S.	The Best Management Practices program must establish specific procedures for the control of toxic and hazardous pollutant spills; include projections of direction, rate of flow and total quantity of constituents in cases where equipment failure is possible; and assure proper solid and hazardous waste management under RCRA.	Applicable for all alternatives which involve discharge to surface waters.
40 CFR 136	Test Procedures for the Analysis of Pollutants	Provides detailed requirements for analytical procedures and quality controls.	Approved test methods for waste constituent to be monitored must be followed. Methods provide details on analytical procedures, quality control, sample preservation, container materials, and holding times.	Applicable for all alternatives which involve discharge to surface waters.
40 CFR 144	Underground Injection Control (UIC) Program	Describes requirements of the UIC Program.	UIC Program prohibits injection activities that allow movement of contaminants into underground sources of drinking water which may result in violations of the MCLs or adversely affect health. Regulations define classes of wells for underground injection, permitting requirements, and operating requirements.	Applicable to alternatives for which materials are to be injected underground.
40 CFR 262	Standards Applicable to Generators of Hazardous Waste	Hazardous waste generators must manage waste properly.	Defines procedures for accumulation, reporting and shipment of hazardous waste.	Applicable to alternatives that generate hazardous waste through treatment of groundwater.
40 CFR 264 Subparts I-O, X, AA-DD	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	Defines standards for construction and operation of on-site waste management facilities.	See Requirement Synopsis.	Applicable to alternatives involving on-site storage or treatment of hazardous waste generated through treatment of groundwater.

Table 7-3

Summary of Action-Specific ARARs for RANGB Groundwater Alternatives
Rickenbacker ANGB, Ohio
Page 3 of 9

Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
40 CFR 264 Subpart AA	Air Pollution Emission Standards for Control Devices	Provides air pollutant emission standards for process vents, closed-vent systems, and control devices at hazardous waste treatment, storage and disposal facilities (TSDFs).	Regulation applies to equipment which includes air stripping operations. It establishes performance standards for total organic emissions.	Applicable to vacuum enhanced recovery used to treat hazardous wastes with total organic concentrations greater than 10 parts per million by weight (ppmw).
ORC 6111.03	Powers of Director of Environmental Protection	Describes the authority and the responsibilities of the Director of Environmental Protection	Authorizes the state to participate in the National Pollutant Discharge Elimination System	Applicable to alternatives which may involve discharges to surface water.
ORC 6111.04.2	Rules Requiring Compliance with National Effluent Standards	Establishes regulations requiring compliance with National Effluent Standards.	Requires compliance with national effluent limitations, national standards of performance for new sources, and national toxic and pretreatment effluent standards unless a permit has been issued under Section 6111.03.	Applicable to alternatives which may involve discharges to surface water.
OAC 3745-15 -06 (A1, A2) and -07 (A)	Air Pollution Control	Describes procedures for maintenance and reporting malfunctions of air pollution control equipment. Also prohibits pollution nuisances.	Establishes protocol and scheduled maintenance. Also defines air pollution nuisances as the emission or escape into the air from any source(s) of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, and combinations of the above that endanger health, safety or welfare of the public or cause personal injury or property damage. Such nuisances are prohibited.	Applicable to alternatives which may involve emissions of particulates or vapors, and relevant and appropriate to alternatives which may involve air pollution control equipment.
40 CFR 268	Land Disposal Restrictions	Identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise restricted waste may continue to be land disposed.	Movement of excavated materials to a new location or on land will potentially trigger land disposal restrictions for excavated waste or closure requirements for the unit in which waste is being placed.	Relevant and appropriate to all alternatives which may involve drilling of additional wells, excavation, or trenching.

Table 7-3

Summary of Action-Specific ARARs for RANGB Groundwater Alternatives
Rickenbacker ANGB, Ohio
Page 4 of 9

Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
Clean Air Act Section 112	Lists of Source Categories and Hazardous Pollutants to be Regulated	Lists source categories and 189 substances to be regulated by EPA as air toxics under Section 112.	Under Section 112, EPA identifies categories of industrial facilities which will emit substantial quantities of each air toxic. The standard for listed source categories will require the maximum achievable degree of reduction in emissions. Actions which contribute significantly to emissions at the Base may be subject to provisions of the Title V permit.	Relevant and appropriate for vacuum enhanced recovery operations which may emit gases and vapors into ambient. Emissions from these sources will be controlled and are not expected to be significant. WPAFB, in its entirety, is considered a ●major source●.
OAC 3745-9 -04, -05, -06 (A,B,D,E), -07 (A-F), -08 (A-C), -09 A-C, D1, E-G	Water Well Standards	Specifies minimum siting, construction, and well casing requirements, establishes specific surface design, start up and operation requirements, and maintenance and modification requirements for new groundwater wells.	Pertains to all groundwater wells on site that will be installed. Also pertains if new wells are used for treatability studies during the FS.	Relevant and appropriate to alternatives which may require installation of groundwater wells.
OAC 3745-34-13	Class V Wells	Specific requirements for Class V wells for purposes of underground injection.	See Requirement Synopsis.	Applicable to alternatives involving injection of materials underground.

Table 7-3

Summary of Action-Specific ARARs for RANGB Groundwater Alternatives
Rickenbacker ANGB, Ohio
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Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
ORC 3734.02 (I), .03, and .05 (D) (6) (c)		Prohibits airborne emissions from hazardous waste facilities as well as open dumping and burning of solid waste. A hazardous waste facility installation and operation permit shall not be approved unless it proves that the facility represents minimum adverse environmental impact, considering the state of available technology, the nature and economics of various alternatives, and other pertinent considerations.	See Requirement Synopsis.	Relevant and appropriate to alternatives which involve soil-moving activities and/or vacuum enhanced recovery, and to the installation of a treatment facility.
ORC 3767.13 and .14	Prohibition of Nuisances	Defines nuisances that are prohibited in waterways.	Prohibits noxious exhalations or smells and the obstruction of waterway. Also prohibits throwing refuse, oil, or filth into lakes, streams, and drains.	Relevant and appropriate to alternatives which involve potential discharge to surface waters.
ORC 6111.04 and .07 (A,C)	Pollution Prohibitions	Prohibits pollution of waters of the State and describes duty to comply with water pollution control requirements.	Prohibits pollution of waters of the State. Also prohibits failure to comply with requirements of Sections 6111.01 thru 6111.08 or any rules, permit or order issued under those sections. Pertains to any site which has contaminated ground or surface water or will have discharges to on-site surface or groundwater.	Relevant and appropriate to all alternatives.

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Summary of Action-Specific ARARs for RANGB Groundwater Alternatives
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Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
OAC 3745-1 -04 (A-E), -06 (A,B) and -07 (C)	Water Quality Standards	Specifies criteria applicable to all waters, antidegradation, mixing zones, as well as water use designations and criteria.	Requires that criteria for water quality and establishing mixing zones shall be in accordance with documents specified in 3745-1. Also, requires that all surface waters of the State be free from: 1)objectionable suspended solids; 2)floating debris, oil, and scum; 3)materials that create a nuisance; 4)toxic, harmful, or lethal substances; and 5)nutrients that create nuisance growth.	Relevant and appropriate to alternatives which involve discharge to surface water.
OAC 3745-21 -02 (A,B,C) -03 (B,C,D) -05, -07 (A,B,G,I,J) -09 (DD) OAC 3745-21 -02 (A,B,C) -03 (B,C,D) -05, -07 (A,B,G,I,J) -09 (DD) (continued)	Emissions of Organic Compounds and Carbon Monoxide	Prohibits significant and avoidable deterioration of air quality. Defines requirements for stationary sources which emit organic materials. Describes emission control requirements for volatile organic compounds from stationary sources.	Prohibits significant and avoidable deterioration of air quality in any part of the area where presently existing air quality is equal to or better than that required by OAC 3745-21-02. Requires control of emissions of organic materials from stationary sources. Requires best available technology. Establishes limitations for emissions of volatile organic compounds for specified sources.	Relevant and appropriate to alternatives involving vacuum enhanced recovery operations as these may produce emissions in air.
OAC 3745-27-13 (c)	Authorization to Engage in Filling, Grading, Excavating, Building, Drilling, or Mining on Land Where a Hazardous Waste Facility or Solid Waste Facility Was Operated.	Requires a detailed plan which describes proposed site activities and demonstrates that these activities will not create a nuisance.	Requires that a detailed plan be provided to describe how any proposed filling, grading, excavating, building, drilling or mining on land where a hazardous or solid waste facility was operated will be accomplished. This information must demonstrate that proposed activities will not create a nuisance or adversely affect public health or the environment.	Relevant and appropriate to alternatives which may involve drilling of additional extraction wells or excavating.

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Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
OAC 3745-31-05	Criteria for Decision by the Director	Defines criteria for water and air permits.	A permit to install (PTI) or plans must demonstrate best available technology (BAT) and shall not interfere with or prevent the attainment or maintenance of applicable ambient air quality standards.	Relevant and appropriate to alternatives for which new installations or modifications will occur.
OAC 3745-32-05	Water Quality Criteria for Decision by the Director	Defines the criteria for water permit.	Specifies substantive criteria for Section 401, Water Quality Criteria for dredging, filing, obstructing, or altering waters of the State.	Relevant and appropriate to alternatives which involve potential discharge to surface waters.
OAC 3745-38	NPDES Permit	Covers discharges to state waters from area sources and storm water point sources. The Notice of Intent permit requirements are identified as are the overall features of the general permit program.	The Notice of Intent requirements include: 1) permit number, 2)identification of owner/operator; 3)location of discharge source; 4)description of the process generating the discharge; 5)map of discharge area; 6)recieving water body; and 7)other pertinent information.	Relevant and appropriate to alternatives which involve potential discharge to surface waters.
OAC 3745-52 -11 (A-D), -20, -22, -23, -30 thru -34	Generators of Hazardous Wastes	Requires generators of waste to determine whether waste is hazardous and designate the facility (and an alternative) to receive hazardous waste. Specifies hazardous waste manifesting, packaging, package marking, labeling, and placarding requirements. Defines maximum time periods, types of waste, and quantities of waste for accumulation of hazardous waste.	See Requirement Synopsis.	Relevant and appropriate to all alternatives where hazardous waste may be generated, such as carbon adsorption that may require disposal as a hazardous waste.

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Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
OAC 3745-55 -71 thru -74	Management of Hazardous Wastes: Closure and Post-Closure	Require that containers holding hazardous waste be maintained in good condition and compatible with the waste. Also, describes requirements for managing and inspecting containers of hazardous waste.	See Requirements Synopsis	Relevant and appropriate to all alternatives where hazardous waste may be generated, such as carbon used for carbon adsorption that may require disposal as hazardous waste.
ORC 317.08	Records to be kept by County Recorder	Describes five sets of records that the County Recorder is required to keep: deeds, mortgages, powers of attorney, plats, and leases.	Require the County Recorder to keep records, as described in this rule.	Applicable to alternatives involving deed restrictions or property transfers.
ORC 5301.25(A)	Recording Requirements	Describes the recording requirements for conveyance or encumbrance of lands.	Requires that all deeds, land contracts, and instruments of writing properly executed for the conveyance or encumbrance of lands are recorded in the Office of the County Recorder.	Applicable to alternatives involving deed restrictions or property transfers.
Guidance on Remedial Actions for Groundwater	"Guidance on Remedial Actions for Conta-minated Ground Water at Superfund Sites" (EPA/540/G-88/003, December 1988).	Focuses on key issues in the development, evaluation, and selection of groundwater remedial actions at Superfund sites. Provides discussion on selection of ARARs.	None	To be considered for all alternatives.
Guidance on Air Pathway Analysis	"Volume I – Application of Air Pathway Analysis for Superfund Activities (EPA 450/1-89-001, July, 1989).	Provides guidance on the evaluation of no action alternatives and for evaluating potential emissions during response.	None	To be considered for alternatives which may involve impact on air quality via generation of fugitive dusts from soil-moving activities of emission or grasses and vapors.

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Citation	Title/Subject	Requirement Synopsis	Compliance Standard	Applicability
Guidance on Monitored Natural Attenuation	"Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites," OSWER Directive 9200.4-17.	Provides guidance on evaluation and selection of monitored natural attenuation as a remedial alternative.	None.	To be considered for alternatives which involve natural attenuation.