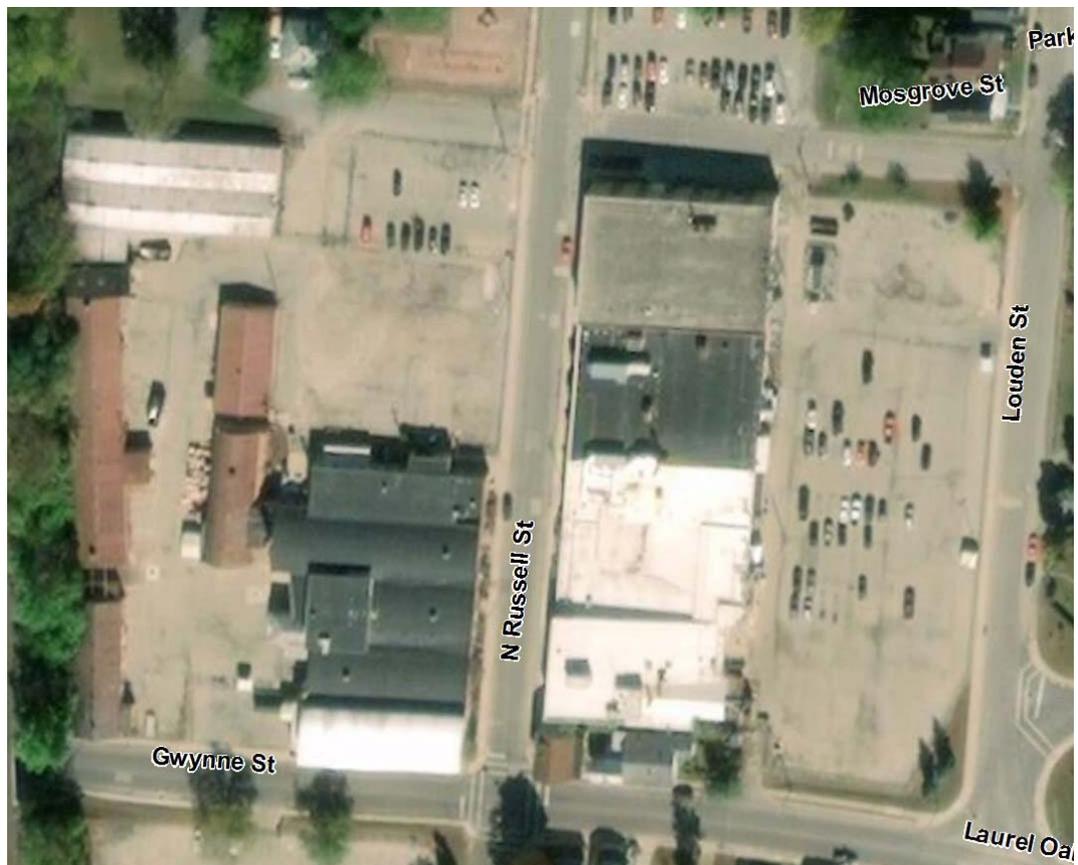




PREFERRED PLAN

FOR THE REMEDIATION OF THE
HONEYWELL AEROSPACE SITE
515 NORTH RUSSELL STREET
URBANA, CHAMPAIGN COUNTY, OHIO



Division of Environmental Response and Revitalization
Southwest District Office

March 2019

Ohio EPA's Division of Environmental Response and Revitalization (DERR) - Remedial Response Program			Preferred Plan For the Remediation of the Honeywell Aerospace Site Urbana, Champaign County, Ohio		
THE REMEDIAL RESPONSE PROCESS					
(1) Preliminary Assessment & Site Inspection	(2) Remedial Investigation & Feasibility Study	(3) Remedy Selection (Preferred Plan & Decision Document)	(4) Remedial Design	(5) Remedial Action	(6) Remedy Operation, Maintenance & Monitoring

This Preferred Plan is subject to public comment. Ohio EPA may modify the preferred remedial alternative or select another alternative presented in this Preferred Plan based on new information or public comments that are received. Therefore, the public is encouraged to review and comment on the remedial alternatives presented in this Preferred Plan. Once the final remedial alternative is selected, it will be presented in a Decision Document, defining the final remedy decision. All documents referenced herein can be found in the repository located at Ohio EPA on 401 East Fifth St., Dayton, Ohio, 45402.

Written public comments on this preferred plan will be accepted during the comment period that runs until May 17, 2019. Ohio EPA will hold a public meeting to explain this preferred plan. Oral and written comments will be accepted at this meeting, which will be held on May 9, 2019 at 6:30 PM in the public meeting room of the Champaign County Library, located at 1060 Scioto Street, Urbana, OH 43078. Additional information on the Honeywell Aerospace, formerly Grimes Aerospace, Site is available from Ohio EPA's Southwest District Office, located at 401 East Fifth Street, Dayton, Ohio 45402, by contacting Leslie Williams at (937) 285-6054, or via e-mail at Leslie.Williams@epa.ohio.gov. This Preferred Plan is also available via the internet at <https://epa.ohio.gov/derr/#113282715-whats-new> in the Announcements/Highlights section of the website.

SUMMARY

The purpose of this Preferred Plan is to select a final remedy for the ground water contamination emanating from the Honeywell facility (collectively, Site). The Honeywell facility is one of several separate volatile organic compounds (VOC) sources that are responsible for commingled ground water VOC plumes due to historical releases in Urbana. The Honeywell facility is located on approximately 12 acres at 515 North Russell Street in Urbana, Champaign County, Ohio, as shown in Figures 1-1 and 1-2 (facility). On October 2, 1998, the Director of Ohio EPA issued Final Findings and Orders (Orders) to Grimes Aerospace Company which required the completion of a Source Control Interim Action (SCIA) and Plume Delineation/Characterization study. Honeywell International, Inc., through its division Honeywell Aerospace (Honeywell), continued operations at the facility with its acquisition of Grimes Aerospace Company.

As part of the SCIA, excavation, in-situ chemical oxidation, air sparging/soil vapor extraction (AS/SVE) and emulsified zero-valent iron (EZVI) injections have been implemented in both the vadose and saturated zones at source areas located on the facility. The SCIA for the facility's East Russell Building (ERB) was conducted under the Additional Work Clause (Section VII, paragraph 15 of the October 2, 1998 Orders) to address the additional source area of the ground water contamination. Through this SCIA, the VOC contaminated soils were excavated and disposed at an off-Site landfill in 2004. The Honeywell facility is one of several separate VOC sources that are responsible for commingled ground water VOC plumes in Urbana. The plume associated with the Honeywell facility has been designated Plume 2 as defined in a 2002 Plume Delineation Report produced by Honeywell's environmental consultants, Cox-Colvin & Associates, Inc. On March 5, 2015, Honeywell International, Inc., entered into a Consent Decree (Consent Decree) with Ohio EPA to perform a Plume Delineation/Characterization (PDC) and Focused Feasibility Study (FFS). Under the Consent Decree, Honeywell proceeded to investigate the extent of contamination and develop remedial alternatives to address the residual contamination in ground water after completing a source control interim action to address soil contamination. The primary source of drinking water in the Urbana area comes from the Mad River Buried Valley Aquifer which is part of the broader Great Miami River Buried Valley Aquifer, designated by U.S. EPA as a sole-source aquifer. The PDC documented the existence of contamination at the Site above Safe Drinking Water Act Maximum Contaminant Levels (MCLs). The FFS evaluated several ways to address this contaminated ground water at the Site, one of which will be selected by Ohio EPA as the final cleanup plan for the Site.

This Preferred Plan summarizes the range of remedial alternatives evaluated, identifies Ohio EPA's preferred remedial alternative, and explains the reasons for selection of the preferred remedial alternative. The preferred remedial alternative is designed to reduce human health risks to within acceptable limits, and to protect human health and the environment from exposure to historical contamination in soil under an existing facility buildings (EFB) and in ground water underlying the property. Also, the remedial alternative is designed to prevent exposure to volatile emissions from contamination in ground water or soil gas to indoor air.

The expectations for the preferred remedial alternative include:

- Reduction of human health risks to within acceptable limits from exposure to COCs in ground water.
- Short and long-term protection of human health and the environment.
- Compliance with applicable or relevant and appropriate requirements (ARARs).
- Continued operation and maintenance of the existing remedial action and monitoring systems.

The major elements of the preferred remedial alternative include:

- Institutional controls through the establishment of an Environmental Covenant, including to limit the facility property to commercial/industrial use.
- A maintenance and repair program for the building slab and the VI mitigation system as current engineering controls for the ERB.
- Monitored Natural Attenuation (MNA) of ground water with implementation of a contingent remedy if ground water cleanup goals are not met within 5 years.

- A Risk Mitigation Plan (RMP) for implementation under the Environmental Covenant for the facility.
- An existing city ordinance which prohibits the installation of water wells within city limits.
- Continuation of city requirement on connecting any new structures to the city's water system.

BACKGROUND

Facility and Site Descriptions

The facility is located within a mixed residential/commercial/light industrial neighborhood on approximately 12 acres at 515 North Russell Street in Champaign County, Urbana, Ohio, as shown in Figures 1-1 and 1-2. To the west, the facility is bounded by a Penn Central Rail line; to the north by residences and a school on Mosgrove Street; to the east by residences on Loudon Street; and to the south by residences on Gwynne Street and vacant property. The facility is used for production of lighting products for fixed wing and rotary aircraft. Prior to Honeywell's ownership, the facility was owned by Grimes Aerospace Company, which used the facility for aircraft lighting systems production since the early 1940s. Previous operations that may have contributed to the contamination from the facility and resulting in the plume, include the following: machining, molding, plating, degreasing, heat treating, buffing, painting, testing, and shipping. These activities would have resulted in hazardous materials being stored and used at the facility such as solvents, paints, lubricants, and acids. Contamination at and from the facility property is caused by such historical releases that comprise the collective Site. The Grimes Aerospace Company and Honeywell International, Inc. are subject to the Orders dated October 2, 1998, and the Consent Decree dated March 5, 2015 to address the Site contamination. Two releases are documented to have occurred: 1) a 1987 PCE spill of 50 gallons while filling an above-ground tank and 2) the release of an unknown quantity of PCE discovered in 1990 during the excavation and removal of several underground storage tanks (USTs).

History of Contamination and Response Actions

Prior remedial activities associated with the Site include:

- 1987 – Excavation of PCE contaminated soil (completed prior to October 2, 1998 Orders).
- 1990 – Excavation of contaminated soils in the former PCE UST Area
- July 16 to August 8, 2001 – Potassium permanganate injections at the former hazardous waste storage area and PCE UST area.
- August 2004 – Excavation of PCE contaminated soils near Building 500.
- January 2005 to October 2008 – Air Sparging/Soil Vapor Extraction (AS/SVE) for the 500 Building from December 2004 to March 2009 and for the PCE UST Area.
- November 2011 to June 2012 – SVE at the ERB with a High Vacuum Dual Phase Extraction system.
- July 23 to 26, 2012 – Emulsified Zero Valent Iron injections the ERB
- September 2016 – Preemptive installation of a vapor-mitigation system in the ERB

PCE and other chlorinated solvents were first detected in the Urbana Mad River Well Field during compliance monitoring by the city of Urbana, as required by Ohio EPA. These detections prompted an investigation of the Urbana area by Ohio EPA's then Division of Emergency and Remedial Response beginning in 1993. In a letter dated September 28, 1993, Ohio EPA requested that Grimes determine whether spilled PCE at the facility had contaminated ground water. Ohio EPA received the August 3, 1990 UST removal report on May 26, 1994. The report noted that during removal of the USTs, stained soils were observed on the north side of the excavation pit. Ohio EPA requested that Grimes expand its investigation of ground water contamination to include the former UST area of the facility. Grimes sampled soil and ground water on May 31 through June 2, 1995. Ohio EPA analytical results for a ground water sample taken in the 1987 spill area showed TCE and PCE above its respective MCL.

Soil and ground water samples collected by Grimes on June 2, 1995 showed PCE around the perimeter of the UST excavation area. Grimes installed a monitoring well adjacent to the UST excavation area and PCE was found above the MCL. Waste PCE and other hazardous wastes were formerly accumulated in a hazardous waste accumulation area located near the northwest corner of the facility. Additional sampling indicated that a second source for PCE was in the hazardous waste accumulation area. In 1997 additional work was done by Ohio EPA's contractor, Earth Tech, Inc, and by Cox-Colvin. Ohio EPA's efforts were to determine sources contributing to the VOCs found in Urbana's ground water, which resulted in identifying multiple sources up and down gradient of the facility. A series of investigations by Cox-Colvin determined ground water flow and identified what was flowing onto and off the facility. As a result of these investigatory activities, a commingled plume was identified as related to the Site. Grimes signed the Orders to perform the SCIA for the plume originating from historical releases at the facility, also known as "Plume 2".

SITE CHARACTERISTICS

Physical Characteristics and Land Use

Champaign County is in the Till Plains section of the Central Lowlands Physiographic Province. The area is characterized by low to moderate relief rolling hills and moderately dissected rivers. The topography in this area is primarily the result of glaciation. Many of the hills are glacial moraines, while broad valleys are formed by glacial outwash. The land use in the area is a mix of residential, industrial, and agricultural. Within the immediate location of the Site, an elementary school is located to the north, residential areas are to the east and west of the Site, and an open lot is to the south.

Hydrogeology

The local hydrogeology consists of surficial soils and glacial till overlying sand and gravel deposits of the Mad River Valley Buried Aquifer, part of the Great Miami Buried Aquifer System which is a U.S. EPA-designated sole-source aquifer. The facility is located above this aquifer. The Urbana Mad River Well Field utilizes ground water from this aquifer outwash, a unit referred to as the Middle Sand. Ground water movement in the aquifer beneath the facility is to the southwest. Cox-Colvin designated the units within the glacial till overlying

sand and gravel deposits as the Lower Till, Lower Sand, Middle Till, Middle Sand, Upper Till, and Upper Sand, respectively.

The Middle Sand is the uppermost aquifer in the area. This aquifer is unconfined, with a saturated thickness in the vicinity of the NRSF is approximately 20 to 25 feet and thickens to the south and west toward the Mad River. The Upper Till represents a significant confining unit in the area and helps to protect ground water within the Middle Sand from releases that occur at the surface, or within the Upper Sand. At the Old Troy Pike Well Field, the saturated thickness is approximately 50 feet. Muzzy Lakes are located due north of the Old Troy Pike Well Field. These manmade lakes are fed by ground water and precipitation and penetrate the Middle Sand aquifer to depths of 30 to 40 feet.

INVESTIGATIVE FINDINGS

For the large comingled plume in Urbana, separate responsible parties have used various regulatory clean-up programs to address their respective contamination that was determined unacceptable to current and future human health and environmental receptors based on the following exposure pathways: contaminated ground water, surface and subsurface soil, inhalation of contaminated soil and/or ground water via vapor intrusion, and direct contact with contaminated ground water.

The primary concern for Plume 2 is the ingestion of ground water, given that the ground water contains tetrachloroethene (PCE) and trichloroethene (TCE) at concentrations that do not yet meet MCLs. Additional pathways evaluated to ensure protectiveness in the future for the Site are inhalation of vapors, and direct contact with soil, ground water, and surface water. None of these additional pathways are currently complete. The primary contaminants of concern (COCs) and the remedial goals (RGs), now termed final remediation levels (RLs), and the health risks associated with them are listed in Table 1.

TABLE 1: CONTAMINANTS OF CONCERN (COCs) / REMEDIATION LEVELS (RLs)			
Medium	COC	RL	RL Basis
Ground Water: Potable	Tetrachloroethene	5 ppb	MCL
	Trichloroethene	5 ppb	MCL
	Cis-1,2-Dichloroethene	70 ppb	MCL
Soils: Direct Contact	Tetrachloroethene	3 mg/kg	HELP model
	Trichloroethene	1.7 mg/kg	HELP model
Ground Water: Vapor Intrusion to Indoor Air	Tetrachloroethene	130 ppb	VISL
	Trichloroethene	11 ppb	VISL
	Tetrachloroethene	130 ppb	VISL
Ground Water: Discharge to Surface Water	Tetrachloroethene	89 ppb	OAC 3745-1-34, OMZA
	Trichloroethene	810 ppb	OAC 3745-1-34, OMZA

During the PDC sampling in 2015 and 2016, all the ground water monitoring wells located in Plume 2 had TCE and cis-1,2-dichloroethene (cis-DCE) concentrations below the ground water remediation level. The maximum concentration of cis-DCE in ground water at the Site since October 2002 was 4.4 ug/l, compared to the ground water MCL of 70 ug/l. TCE and

cis-DCE are not of current concern but will be retained as a RL. Shallow soil contamination was found at the 500 Building and ERB. This soil was excavated and disposed of at an off-Site landfill in 2004 as part of the SCIA. Direct contact with soils at the facility is no longer a complete pathway.

A few domestic wells were located within Plume 2 and had intercepted ground water containing COCs at concentrations exceeding their drinking water standards. Honeywell replaced residential wells over the ground water plume with connections to City water beginning in 2004. Honeywell also installed a carbon treatment system at the City's Old Troy Pike wellfield, which removes low-level PCE and TCE from ground water prior to distribution. PCE and TCE are present in raw water at the City's Old Troy Pike wellfield but have never exceeded MCLs. By 2006, Honeywell had provided permanent connections from Urbana's water supply to the individual households. Connection of the homeowners to the public water supply, and treatment of the public water prior to delivery has successfully eliminated the ingestion pathway for ground water.

The direct contact pathway for surface water at the Site is incomplete. Water from Muzzy Lakes was sampled and analyzed in 2002. The maximum observed concentrations of PCE and TCE in Muzzy Lakes surface water were 9.5 ug/l and 4.5 ug/l, respectively, which are below the standards based on OAC 3745-1-34, Water Quality Criteria for the Ohio River Drainage Basin, for the non-drinking water Outside Mixing Zone Average (OMZA), within 500 feet of a public water supply.

The risk of vapor intrusion from ground water in Plume 2 is acceptable for both residential and commercial receptors. The residential ground water vapor intrusion screening levels (VISLs) for PCE and TCE are 130 ug/l and 11 ug/l, respectively. The maximum ground water concentrations of PCE and TCE in Plume 2 were 15 ug/l and 2.4 ug/l, respectively. Based on sub-slab sampling, Honeywell preemptively installed a vapor mitigation system in the ERB in September 2016. The results of sub slab soil gas and indoor air samples collected from ERB in February and October 2016, indicate that soil gas vapor concentrations exceed U.S. EPA's VISLs for a commercial/industrial setting, but indoor air concentrations were acceptable for that land use.

Honeywell also completed a vapor intrusion study for the area of Urbana that could be affected by the plume emanating from the facility. The vapor intrusion (VI) investigation was completed in January 2017, with a report submitted to Ohio EPA in May of 2017. The report found that for homes in Urbana within Plume 2, ground water contamination was below U. S. EPA's VISLs, therefore, the exposure pathway is not complete for VI in the residential area.

After completion of the SCIA, Grimes/Honeywell submitted a PDC/FFS which was approved by Ohio EPA on March 7, 2018. Ground water results from the PDC/FFS sampling indicate that volatile organic compounds (VOC) concentrations in Plume 2 are continuing to decline as a result of source removal activities completed at the facility. Among the 21 monitoring wells within Plume 2, 17 wells contained PCE above the ground water remediation goal of 5 micrograms/liter (ug/l). However, concentrations are declining, and analysis of concentration trends indicates that PCE concentrations may continue to decline. TCE is below its ground water remediation goal of 5.0 ug/l in all monitoring wells within Plume 2, and cis-DCE and vinyl chloride were not detected in any monitoring wells during the PDC/FFS investigation of

Plume 2. Plume 2 extends to Muzzy Lakes, but detections of COCs are within an acceptable risk range for protection of human health and the environment. The results of sub-slab soil gas and indoor air collected at the facility in February and October 2016, indicate that soil vapor concentrations exceed VISLs for a commercial/industrial setting, but indoor air concentrations are acceptable. The ground water VOC concentrations in Plume 2 are below VISL for commercial/industrial and residential settings.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) were developed for the Site to identify goals that a remedy would need to achieve to ensure protection of human health and the environment. The RAOs for the Site are listed in Table 2.

TABLE 2: REMEDIAL ACTION OBJECTIVES	
Ground water	
Human Health Risk	Prevent ingestion of Plume 2 contaminants in ground water in excess of their respective MCLs or carcinogens in excess of a total excess lifetime cancer risk (for all contaminants) greater than 1×10^{-5} or a HQ or HI greater than 1.
Human Health Risk	Restore ground water in Plume 2 to its beneficial use (i.e., drinking water).
Human Health Risk	Prevent inhalation in on-site structures of TCE and PCE in vapors emanating from ground water in excess of a 1×10^{-5} excess lifetime cancer risk or a HQ or HI greater than 1.
Soil	
Human Health Risk	Prevent ingestion/direct contact with soil located at the former PCE UST area, NRSF, and ERB contaminated with PCE in excess of a total excess lifetime cancer risk greater than 1×10^{-5} or a HQ or HI greater than 1.

HQ - Hazard Quotient is the ratio of the potential exposure to a substance and the level at which no adverse effects are expected. If the Hazard Quotient is calculated to be less than 1, then no adverse health effects are expected as a result of exposure.

HI - Hazard Index A summation of the hazard quotients for all chemicals to which an individual is exposed. A hazard index value of 1.0 or less that no adverse human health effects (noncancer) are expected to occur.

SUMMARY OF REMEDIAL ALTERNATIVES

Four remedial alternatives were considered in the FFS for Plume Remediation Actions (PRAs), as shown in Table 3 and further described below.

TABLE 3: SUMMARY OF SITE REMEDIAL ALTERNATIVES FOR GROUND WATER		
Technology	Alternative	Description of Remedial Alternative
	PRA-1	No Action
AS/SVE	PRA-2	<ul style="list-style-type: none"> Installation of an air sparge/soil-vapor extraction (AS/SVE) system across Plume 2 to remove VOCs from ground water. Granular activated carbon treatment of the air stream followed by discharge to the atmosphere; regeneration of spent carbon

		<ul style="list-style-type: none"> • Direct discharge of condensate and entrained ground water to the sanitary sewer. • Engineering, management, permitting, application, and monitoring of AS/SVE system(s). • Subtitle D disposal or beneficial reuse of soil from drilling and trenching. • Connection to the city of Urbana municipal water supply for property owners. • Environmental Covenant that would include prohibiting use of ground water at the Honeywell facility, requirement for Honeywell to monitor Plume 2 until ground water cleanup goals are achieved and inclusion of a Risk Mitigation Plan. • City of Urbana ordinance prohibiting the use of ground water • O&M responsibilities
Direct Injection of ZVI	PRA-3	<ul style="list-style-type: none"> • 151 ZVI injection locations within saturated zone along transects of Plume 2 perpendicular to ground water flow, totaling three injection transects • Engineering, management, permitting, application, and monitoring of injections • Connection to the city of Urbana municipal water supply for property owners • Environmental Covenant that would include prohibiting use of ground water at the Honeywell facility, requirement for Honeywell to monitor Plume 2 until ground water cleanup goals are achieved and inclusion of a Risk Mitigation Plan • City of Urbana ordinance prohibiting the use of ground water • O&M responsibilities
Monitored Natural Attenuation (MNA)	PRA-4	<ul style="list-style-type: none"> • Periodic ground water sampling in Plume 2 until VOC concentrations fall below their ground water remediation goals • Connection to the city of Urbana municipal water supply for property owners • Environmental Covenant that would include prohibiting use of ground water at the Honeywell facility for any purpose other than monitoring, requirement for Honeywell to monitor Plume 2 until ground water cleanup goals are achieved and inclusion of a Risk Mitigation Plan • City of Urbana ordinance prohibiting the use of ground water • O&M responsibilities

GROUND WATER PLUME REMEDIATION ALTERNATIVES

To protect the environment and human health, all Plume Remediation Alternatives include a Risk Mitigation Plan if buildings are razed or expanded on the entire facility, including the ERB and the PCE UST excavation area. All PRAs include the city of Urbana ordinance prohibiting the use of ground water and maintaining the connection to the municipal water supply for property owners. An EC would be placed on the facility property to prohibiting use of ground water at the property and limiting land use to commercial/industrial.

PRA-1: No Action

The “no action” alternative for ground water is included to serve as a baseline for the comparison of other remedial alternatives. Under this alternative, no remedial activities or monitoring would be conducted at the Site to prevent exposure to contaminated media.

PRA-2: Air Sparging/Soil Vapor Extraction (AS/SVE)

PRA-2 would require the installation of three AS/SVE systems and five buildings to house the systems. Air sparging is the injection of air below the water table. The injected air forms bubbles which move horizontally and vertically through the ground water and soil column, stripping contaminants by volatilization. The air bubbles carry the volatilized contaminants into the vadose zone, where they are captured by a vacuum system and removed. If needed, treated water would be discharged into the City’s sewer system. Captured sub-surface vapors would be treated using granulated activated carbon which would be disposed of or regenerated. AS/SVE was successfully employed for source-area treatment at the facility at a significantly smaller scale than would be required to treat Plume 2. One scale-up issue would potentially be the existence of multiple locations that could not be reached by the injection points and extraction wells due to above-ground and underground obstructions or access to private property. To estimate costs for this alternative, a total of 76 sparge points and 61 SVE wells would need to be installed based on the combined lengths of AS transects and plume width. This alternative would involve construction and some disruption to local streets and businesses may occur. Obtaining property access agreements may be needed to house equipment such as blowers and compressors for the AS/SVE system. The effectiveness could potentially be limited due to the relatively low contaminant concentrations within Plume 2. AS/SVE may reduce the concentrations in ground water in order to achieve MCLs thereby meeting RLs and restore ground water in Plume 2 to its beneficial use.

PRA-3: Injection of Zero-Valent Iron (ZVI)

PRA-3 would require 151 ZVI injection locations within the saturated zone along transects of Plume 2 perpendicular to ground water flow with three total injection transects throughout the saturated zone of the Middle Sand. ZVI is a common type of chemical which can degrade PCE fully through reductive dichlorination potentially to ethene, which is relatively non-toxic. The emulsified substrate that is mixed with the ZVI can enhance reductive dichlorination, increase the mobility of the ZVI through aquifer material, and assist in maintaining the reductive abilities of ZVI. Emulsified ZVI was successfully utilized for source area treatment at the facility. However, effectiveness issues may exist with forms of ZVI, when applied over a much larger area, both in terms of sufficient coverage and contaminant-residence time. Although effectiveness may be limited when upscaled, the direct injection of ZVI as a process option was retained for development of potential PRAs because the technology was successfully applied to the ERB SCIA in 2012. During injections there may be some disruption to streets and local businesses; some access agreements may be required to optimize injection locations. The general cost of this process option, relative to other retained process options within the same technology type, is considered moderate. ZVI injections may reduce the concentrations in ground water in order to achieve MCLs thereby meeting RLs and restore ground water in Plume 2 to its beneficial use.

PRA-4: Monitored Natural Attenuation (MNA)

PRA-4 relies on the monitoring of natural subsurface processes to demonstrate a reduction of contaminants in ground water to acceptable levels. The efficacy of MNA is based on the

ability of natural attenuation processes to achieve cleanup objectives within a reasonable timeframe while potential exposure pathways with unacceptable risk remain incomplete. In general, sites at which source remediation has been performed, ground water contaminant concentrations are relatively low, and subsurface conditions can be favorable for MNA. MNA also has the advantage of having minimal interference from above-ground and underground obstructions. The extent of Plume 2 has not increased since monitoring began in 2001. In fact, the extent of Plume 2 that is above the PCE ground water remediation goal has decreased. The natural attenuation processes responsible for the observed decreasing concentrations of PCE, and the extrapolated future decreases, are likely due to a combination of dispersion, dilution, volatilization, and chemical reactions. As the infrastructure required for MNA is the current monitoring well network, there is no need for extensive construction. This will limit the disruption to residents and businesses. Implementation of MNA would require the collection and evaluation of ground water data at a frequency that is appropriate to assess performance of the abiotic processes. Prior to each monitoring event, owners of property on which wells are located would be contacted as appropriate. If MNA is selected, a monitoring plan would be prepared, which would include a schedule and performance evaluation criteria. If performance standards were not met, a contingency plan would be implemented for additional remedial actions if necessary. MNA may reduce the concentrations in ground water in order to achieve MCLs thereby meeting RLs and restore ground water in Plume 2 to its beneficial use.

COMPARISON CRITERIA

Eight (8) criteria have been established to evaluate the various remedial alternatives individually and compare them with each other to select a preferred remedy. The eight evaluation criteria include: the threshold criteria (1. overall protection of public health and the environment, and 2. compliance with ARARs), balancing criteria (3. Long-term effectiveness and performance, 4. Reduction of toxicity, mobility, or volume of contaminants through treatment, 5. Short-term effectiveness, 6. Implementability, and 7. Cost), and modifying criteria (8. Community acceptance).

The Threshold Criteria are comprised of two criterions. The first criterion is the overall protection of public health and the environment which evaluates whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, treatment, etc. The second criterion is compliance with Applicable or Relevant and Appropriate Requirements (ARARs) which evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the Site, or whether a waiver is justified. Any acceptable remedy must comply with both criteria.

The Balancing Criteria are comprised of five (5) criterion. The first criterion is Long-Term Effectiveness and Permanence, which evaluates the ability of an alternative to maintain protection of human health and the environment over time. The second criterion is the Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment, which evaluates the amount of contamination present, the ability of the contamination to migrate, and the use of treatment to reduce harmful effects. The third criterion is Short-Term Effectiveness, which evaluates the length of time needed to implement an alternative and the risks the alternative poses during implementation. The fourth criterion is Implementability

which evaluates the technical and administrative feasibility of implementing the alternative. The fifth criterion is Cost, which is an estimate of the capital and annual operation and maintenance costs. Evaluation of the Balancing criterion is used to select the most appropriate remedial alternative.

The Modifying Criterion is Community Acceptance, which considers whether the local community agrees with the analyses and preferred alternative as proposed. The Modifying Criterion is evaluated through public comment on the alternatives received during the comment period.

EVALUATION OF ALTERNATIVES

A summary of the evaluation of the Site remedial alternatives and the costs associated with each is included in Table 4.

TABLE 4: EVALUATION OF SITE REMEDIAL ALTERNATIVES								
Remedial Alternatives	Threshold Criteria		Balancing Criteria				7. Costs	Modifying Criteria
	1. Protects Human Health & Environment	2. Compliance with ARARs	3. Long Term Effectiveness	4. Reduces T, M and/or V by Treatment	5. Short Term Effectiveness	6. Implementable		
Ground Water								
PRA-1 No Action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0	
PRA-2 AS/SVE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	\$ 2,607,960	TBD
PRA-3 ZVI Injections	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	\$ 1,273,680	TBD
PRA-4 MNA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	\$ 250,800	TBD
<p> <input checked="" type="checkbox"/> = Fully Meets Criteria <input checked="" type="checkbox"/> = Partially Meets Criteria <input type="checkbox"/> = Does Not Meet Criteria </p>								

PREFERRED REMEDIAL ALTERNATIVE

Ohio EPA's preferred remedial alternative for the Honeywell Aerospace Site involves PRA-4, which is the monitored natural attenuation (MNA) of the historical contamination from the facility, known as Plume 2, where the plume is monitored until clean up goals are met. A contingency plan will be implemented as needed to achieve the goals. Further, the preferred alternative includes enhanced use of institutional controls and engineering controls in support of the MNA approach for the Site, as described below.

A 5-year MNA study of the plume will be required to establish that MNA will reach MCLs in a timely manner and to ensure that there are no complete exposure pathways of unacceptable risk to human health and the environment. The monitoring plan would consist of routine collection and evaluation of ground water data to assess the performance of natural attenuation via abiotic processes. The monitoring plan would include a schedule and performance evaluation criteria. In conjunction with the monitoring plan, a contingency plan will be required in case clean up goals are not met through MNA within 5 years. A contingency plan would include compliance wells, to detect any concentration at which Plume 2 would cause a complete exposure pathway, and an additional remedy to be activated if performance standards are not met within 5 years. Implementation of MNA is favored over an additional active remedy because the significantly higher costs of an active remedy do not provide greater certainty in remediation timeframe or overall effectiveness. MNA will not disrupt residents or businesses because monitoring wells and access agreements are already in place. The approximate cleanup timeframe of 5 years for Plume 2 in association with PRA-4 is considered reasonable due to the lack of current and future potential exposure pathways with unacceptable risk.

The MNA and contingency plan rely on supporting engineering controls and institutional controls as commonly used strategies that have been widely applied at other sites with similar soil and ground water impacts. This preferred remedial alternative, as detailed below, may change in response to Ohio EPA's consideration of public comment or new information.

Engineering controls consist of the current facility building slab and the vapor mitigation system, for implementation as long as contamination from historical releases remains in soil or ground water underlying the property. Implementation of the engineering controls is to occur in compliance with an Ohio EPA-approved operation and maintenance (O&M) plan.

The institutional controls for the preferred alternative also include use of an environmental covenant (EC), which will establish activity and use limitations for the facility property that would govern property use into the future. One limitation will restrict the facility property use to commercial and/or industrial purposes. Another limitation will prohibit the use of ground water for any potable purpose until MCLs are achieved. As part of the EC, an Ohio EPA-approved RMP will be implemented to maintain protectiveness in the future from any expansion or demolition activities at the property. Further, the EC will require implementation of the current and any future engineering controls in compliance with an Ohio EPA approved O&M plan.

Institutional controls include continued reliance on the city of Urbana to maintain its ordinance that prohibits ground water extraction during MNA of the plume and that requires any new construction within the city to connect to the municipal water system. The city regulation ensures protectiveness by preventing private water supply wells within the plume.

Monitoring the COCs in ground water through the MNA process ensures that carcinogenic and non-carcinogenic TCE vapors emanating from ground water are not above a 1×10^{-5} excess lifetime cancer risk and remain an incomplete pathway to human health. The residences and businesses over the remaining portions of Plume 2 are connected to the city of Urbana's water supply, MNA will continue to restore ground water in Plume 2 containing COCs in excess of MCLs or having carcinogens/non-carcinogens in excess of a total excess

lifetime cancer risk (for all contaminants) greater than 1×10^{-5} . The preferred alternative will meet Site RAOs within 5 years and if it does not, a contingency plan will be implemented.

Performance Standards:

- COCs within Plume 2 will meet MCLs at all locations in 5 years
- Over the length of the remedy implementation, no complete exposure pathways presenting an unacceptable risk will be permitted to occur

The preferred remedial alternative, in summary, consists of:

- Periodic ground water sampling in Plume 2 until VOC concentrations fall below their ground water remediation goals, as part of MNA program
- Engineering, management and monitoring for MNA and other Site activities
- O&M responsibilities, including repair of the existing building slab and VI mitigation system (engineering controls)
- Environmental covenant establishing activity and use limitations (institutional controls) for facility property:
 - Prohibit extraction and use of ground water for potable purposes until meets MCLs
 - Limit property to commercial or industrial land use
 - Implement engineering controls in compliance with an Ohio EPA-approved O&M plan
 - Implement an Ohio EPA-approved RMP during any building or excavation activities
- City of Urbana ordinance prohibiting the use of ground water (institutional control)
- City of Urbana requirement for property owners to connect to the municipal water supply (institutional control)

Ohio EPA encourages the public to review and comment on this document, and other documents contained in the administrative record file for the Site, to gain a better understanding of the Site, and the activities that have been conducted there.