PROPOSED PLAN
Tucson International Airport Area Superfund Site, Area B

U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • October 2011

Executive Summary

The U.S. Environmental Protection Agency (EPA) has reviewed alternatives for remediation at Area B of the Tucson International Airport Area (TIAA) Superfund Site in Tucson, Arizona. Area B includes the West Plume B, Arizona Air National Guard, West-Cap, and Texas Instruments sites.

Preferred Alternative:

In-situ *(onsite)* ***chemical oxidation*** *using potassium permanganate at the Arizona Air National Guard, West-Cap and Texas Instruments sites, and* ***monitored natural attenuation*** *at the West Plume B site.*

EPA Announces Proposed Plan

This Proposed Plan identifies the Preferred Alternative for cleaning up the contaminated soil and groundwater at Area B of the TIAA Superfund Site in Tucson, Arizona, and provides the rationale for this preference. In addition, this Plan includes summaries of other cleanup alternatives evaluated for use at this Site. This document is issued by the EPA, the lead agency for Site activities. The State of Arizona Department of Environmental Quality (ADEQ) is the support agency for the Site. EPA will select a final remedy for the Site after reviewing and considering all information submitted during the 30-day public comment period. EPA may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on ***all*** the alternatives presented in this Proposed Plan.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan. This Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation and Feasibility Study reports and other documents contained in the Administrative Record file for this Site. EPA and ADEQ encourage the public to review these documents to gain a more comprehensive understanding of the Site and Superfund activities that have been conducted at the Site. These documents can be found at the locations listed in the following box.

Dates to Remember

Mark Your Calendar

Public Comment Period:

October 26, 2010 – November 30, 2011

EPA will accept written comments on the Proposed Plan during the public comment period.

Public Meeting:

November 16, 2011

EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at the Arizona Department of Environmental Quality Southern Regional Office, 400 West Congress Street, Tucson, Arizona, at 6:30 p.m.

For more information, see the Information Repository at the following locations

El Pueblo Public Library
101 W. Irvington Road
Tucson, AZ 85714
(520) 594-5250
Hours:

Monday	9 am–6 pm
Tuesday	9 am–6 pm
Wednesday	10 am–6 pm
Thursday	10 am–6 pm
Friday	10 am–5 pm
Saturday	9 am–5 pm
Sunday	Closed

U.S. EPA Records Center
Region 9
Mail Stop SFD-7C
95 Hawthorne Street
Room 403
San Francisco, CA 95104
(415) 536-2000
Hours:
Monday–Friday 8 am–5 pm

Web site: www.epa.gov/region09/tucsonairport

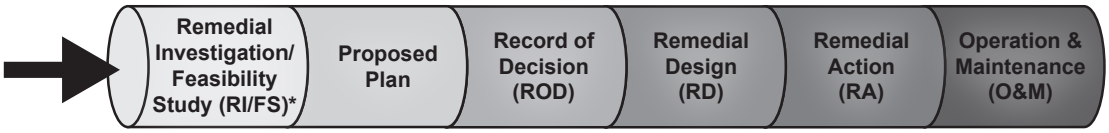
Contents

Executive Summary 1
Site History 2
Site Characteristics 3
Summary of Site Risks 4
Remedial Action Objectives 6
Summary of Remedial Alternatives 6
Evaluation of Alternatives 8
Summary of the Preferred Alternative 10
Community Participation 10

The Superfund Pipeline

Pre-Remedial Response Process

- Preliminary Assessment
- Site Inspection
- Placement on National Priority List



**Completed in 2011*

RI: This document is an in-depth study that investigates the nature and extent of contamination.
FS: This document provides a description and analysis of potential cleanup alternatives.
Proposed Plan: This plan provides a **summary** of the evaluation presented in the **Feasibility Study** and identifies and describes the selected remedial alternative. This is the only document in which public comment is required, and these comments are documented along with a responsiveness summary in the final decision (ROD).
ROD: This is a public decision document that explains which remedial alternative will be used to clean up a Superfund Site and officially records the chosen remedial strategy as well as the level of cleanup to be achieved.
RD: This document is written after the Record of Decision and is intended to guide implementation of the selected remedial action. The Remedial Design provides the technological and implementation details of the cleanup.
RA: This activity is the actual construction and implementation of the remedy.
O&M: After the remedy has been put in place, it is usually followed by several years of Operation and Maintenance until the contamination has been cleaned up to the goals set in the ROD.

Site History

In 1981, **volatile organic compounds (VOCs)** including trichloroethene (TCE), 1,1-dichloroethene (DCE), trans-1,2-DCE, and chloroform were detected in groundwater wells in the vicinity of the Site. The Site was named a Federal Superfund Site in 1982. For the purpose of investigating and remediating groundwater contamination, EPA divided the Site into two geographic areas. Area A, which comprises the main groundwater contamination plume, is located to the west of the airport. Area B, which includes the West Plume B, Arizona Air National Guard, Texas Instruments and former West-Cap project areas, is located to the north of the airport (see map of Area B on next page).

In August of 1988, EPA published a Record of Decision (ROD) of groundwater extraction and treatment at Area B. The 1988 ROD explained that the assumptions made regarding Area B were preliminary and were subject to further investigation. The ROD indicated that the remedy for Area B could require some modification as additional information was gathered, as long as any remedial alternative achieved the same level of protection of human health and the environment and the same level of compliance with appropriate requirements as the remedy selected in the 1988 ROD.

In September of 2004, EPA published a ROD Amendment that selected groundwater extraction and treatment as the remedy for the West-Cap and West Plume B areas. The ROD Amendment also stated that monitored natural attenuation may be considered for West Plume B if groundwater monitoring data suggested that VOC concentrations were decreasing.

The ROD will be amended again based on alternatives presented in this Proposed Plan to document the selected remedy for Area B.

West Plume B

West Plume B is considered to be the result of past migration of VOCs downgradient from the Arizona Air National Guard. Operation of a groundwater extraction and treatment system at the Arizona Air National Guard has stopped this migration and separated the Arizona Air National Guard and West Plume B plumes. No active treatment has taken place at the West Plume B site. Remediation of upgradient sites has removed the input of VOCs to the West Plume B area and VOC concentrations have been decreasing for almost 10 years due to natural attenuation.

Arizona Air National Guard

The Arizona Air National Guard Base became operational in 1956. The property is currently used to provide aircraft training to fighter pilots from around the world. Operations also include aircraft and ground vehicle maintenance. Remedial investigations performed in 1987 identified TCE-impacted groundwater at the West Base Parking Lot, the Old Wash Rack Area A (also known as Site 5), and near the edges of the Aircraft Parking Area. A source of VOC contamination was identified at Site 5.

An extended **soil vapor extraction** (SVE) pilot test was conducted at Site 5 between April and November 1997. Results of soil gas samples collected after operations of the vapor extraction system indicated that VOC levels in soil gas were reduced to concentrations below the target cleanup goal, and Site 5 was closed in October 1998.

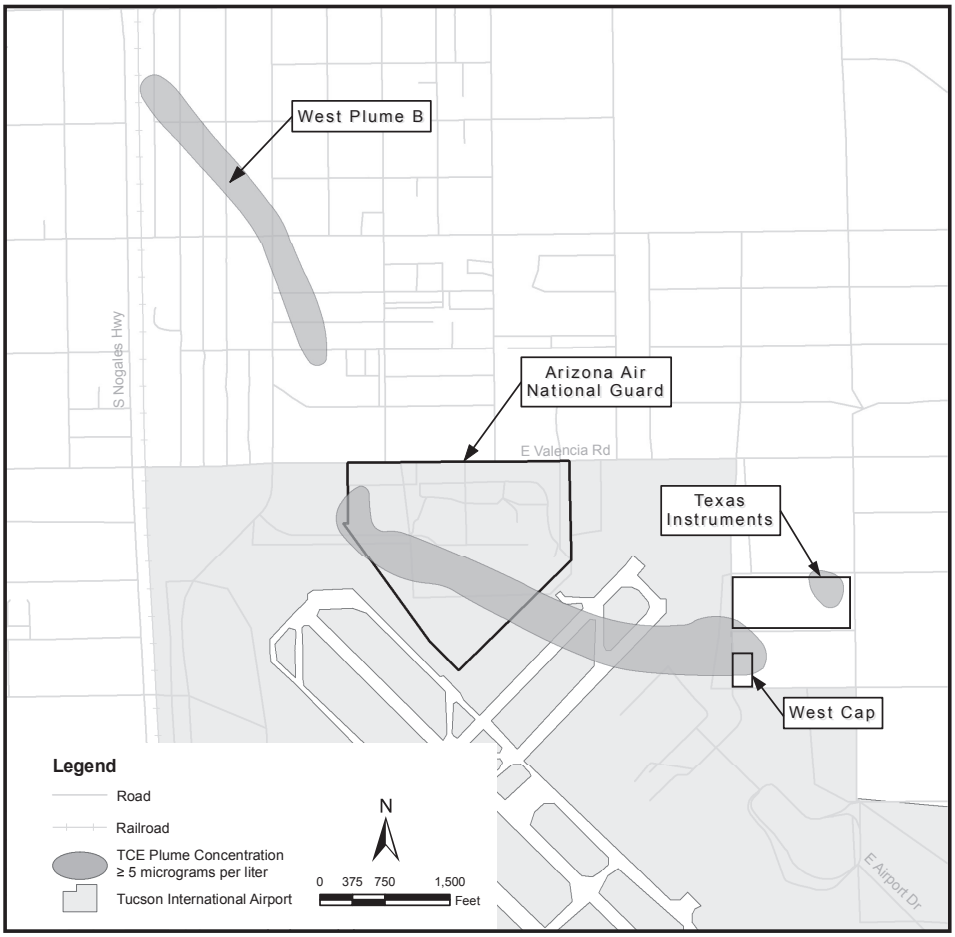
A groundwater extraction, treatment, and recharge system was installed at the Arizona Air National Guard property in May 1997 to capture and treat elevated levels of TCE in groundwater and to prevent offsite migration of TCE. Groundwater is removed from up to 11 extraction wells, treated with an **air stripping** system, and re-injected into the vadose zone (the soil layer above the saturated groundwater zone). The air stripping system transfers the VOCs from the groundwater as a vapor and treats the vapor with a **carbon adsorption** vessel that removes the TCE before discharging the vapor into the atmosphere.

An **in-situ chemical oxidation** pilot test was conducted in 2009 to evaluate the effectiveness of potassium permanganate in breaking down TCE in groundwater. The results of the pilot test indicated that the permanganate effectively removed TCE from groundwater, as TCE concentrations decreased in both the upper and lower subunits of the pilot test area. Continued monitoring will be necessary to assess the long-term performance of this test.

West-Cap

From the early 1960s to the late 1980s, the former West-Cap property, located adjacent to the Tucson International Airport, was occupied by the West-Cap of Arizona Corporation, which used solvents during manufacturing of small film capacitors and magnets. It is believed that West-Cap disposed of solvents into floor drains, which subsequently leaked into the soil.

In early 1998, EPA initiated a **time critical removal action** for the remediation of the groundwater plume below the West-Cap project area, as the plume was migrating offsite. Contaminated groundwater was extracted and pumped to the treatment system at the Texas Instruments property. Increasing the extraction rate to control the plume exceeded the capacity of the existing treatment system, and groundwater extraction was discontinued in 2006. The use of permanganate to break down TCE in groundwater was tested in 2009 and the results indicate the successful delivery of permanganate and the oxidation (destruction) of VOCs in the target zone.



Texas Instruments

The Texas Instruments site, formerly operated by Burr-Brown Corporation, operated a microchip manufacturing facility between 1969 and 2009. The presence of VOCs in soil and groundwater beneath the manufacturing facility has been attributed to past operational and disposal practices, particularly those related to former chemical storage areas. A groundwater extraction and treatment system operated at the Texas Instruments site between 1992 and 2009. A pilot test using permanganate was initiated in 2009, and the results indicated the successful delivery and the oxidation of VOCs in the target zone.

Site Characteristics

Various remedial investigations and actions have been performed in Area B since 1982. The 2004 ROD Amendment listed TCE, tetrachloroethene (PCE), 1,1-DCE, cis-1,2-DCE, and vinyl chloride as the contaminants of concern within Area B. Of these, only TCE and PCE routinely exceed water quality standards at the Site. The presence of PCE is generally limited to a small area near the former West-Cap facility. TCE and PCE are industrial solvents previously used by entities in the vicinity of the TIAA Site. Important characteristics of the Site are summarized as follows:

- The VOC plume at West Plume B is shrinking in area and has no further input of VOCs. The plume is approximately 2,000 feet in length, is located to the northwest of the Arizona Air National Guard site, and is located at a depth of approximately 85 to 135 feet below ground surface. Concentrations of TCE have been less than 20 ppb since 2002, and are decreasing.

- The existing groundwater extraction and treatment system at the Arizona Air National Guard site has been successful in containing VOC contamination to the area south of Valencia Road. The VOCs in groundwater at this site are confined to the property at a depth of approximately 90 to 120 feet below ground surface. Concentrations of TCE at the Arizona Air National Guard site are below 10 ppb and are generally decreasing. The majority of the Site 5 soil contamination has been treated by the SVE system.

- Residual VOCs in a deep clay layer located about 100 feet below ground surface at the former West-Cap facility continue to contribute to a groundwater plume that extends approximately 500 feet to the north and approximately 2,500 feet to the west. The depth of this plume is approximately 110 to 140 feet below ground surface. Prior to the permanganate pilot test, the maximum concentrations of TCE were 790 ppb in the clay layer directly underneath the West-Cap property, and less than 30 ppb to the west of the property.

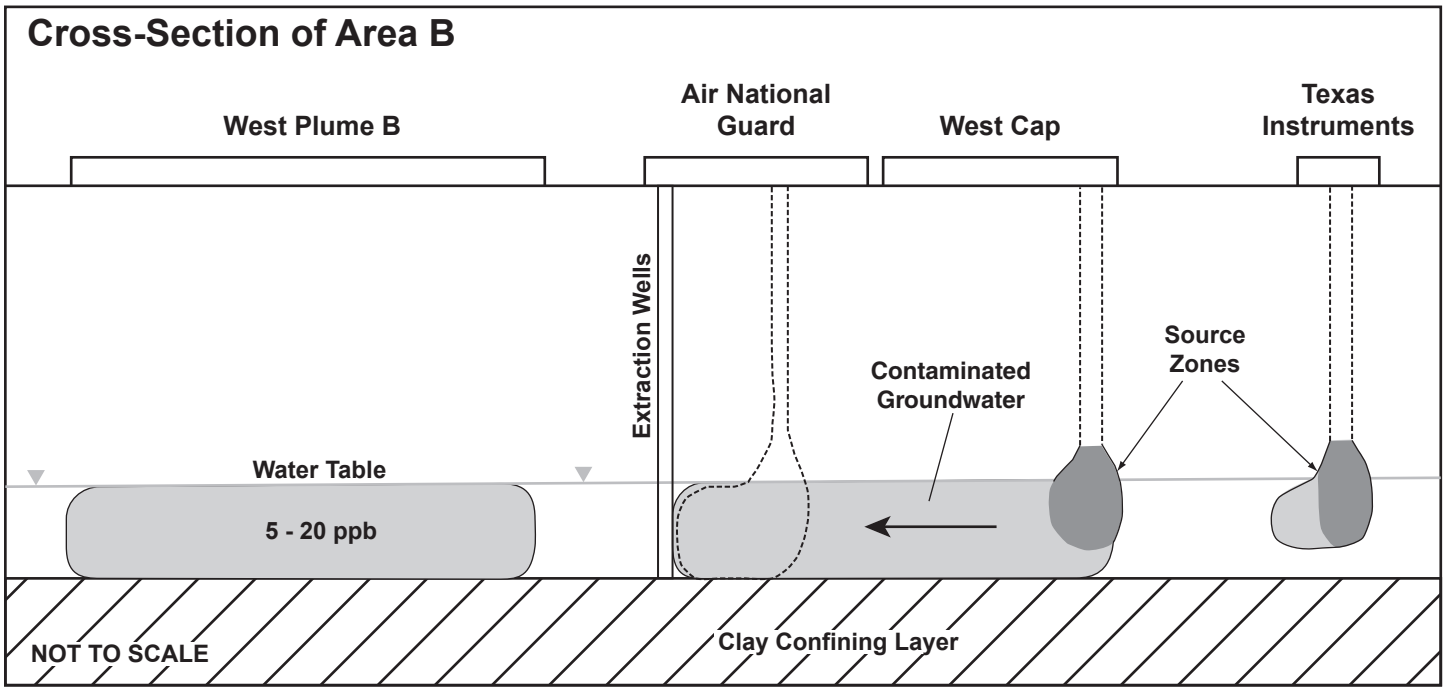
- Residual VOCs in a deep clay layer at the Texas Instruments site contribute to a groundwater plume that has remained on-site and was previously contained by the groundwater extraction and treatment system. Prior to the permanganate pilot test, the groundwater plume extended less than 400 feet from the former chemical storage areas, at a depth of approximately 110 to 130 feet below ground surface. Concentrations of TCE have been below 10 ppb since 2001 in all wells except Extraction Well BB-2, which contained up to 76 ppb before 2009. This well currently contains permanganate due to the permanganate pilot test and is not sampled for VOC analysis.

Scope and Role of the Action

This proposed action will be the final action for Area B. The goals of this action are to address the residual VOC contamination that exist in the clay layers and minimize migration of contaminants in groundwater away from industrial areas. Eliminating or reducing the amount of residual VOCs present in the clay layers at the Site is strategically important to reduce or eliminate the contribution to the groundwater plume. The previous remedy, groundwater extraction and treatment, is not considered cost effective or technically effective for eliminating the residual VOCs at Area B, although it has been shown to be effective in preventing migration of the contaminants. Through the use of new treatment technologies, this proposed action will permanently reduce the toxicity, mobility, and volume of VOCs in Area B.

Summary of Site Risks

In 1996, the Arizona Department of Health Services conducted a baseline human health risk assessment to determine the current and potential future effects of contaminants on human health. The risk assessment was updated in 2010 based on more-recent contaminant concentration data. The risk assessment evaluated risks associated with soil, groundwater, and soil gas exposures to residential and industrial receptors under potential current and future land use conditions to chemicals from sources at the Site. The southern part of Area B is used for industrial and aerospace activities and the northern part of Area B is used primarily for residential use. The groundwater within Area B is classified as a potential drinking water source.



Human Health Risks

The highest TCE (970 ppb) and PCE (110 ppb) concentrations in Area B were found beneath the West-Cap property in January 2009. Because there are no local ordinances or state laws that prevent the drilling of private drinking water wells in contaminated areas, or for converting irrigation wells into drinking water wells, there is potential for an exposure pathway to exist in the future. The risk for contracting cancer from drinking the groundwater from this area over a lifetime is approximately two in 1,000, which exceeds the Superfund acceptable risk range for known and suspected carcinogens. The primary contributors to the risk are PCE (one in 1,000) and TCE (five in 10,000). Because these are the highest concentrations observed in Area B, the risk from drinking the groundwater in other areas would be lower. The overall hazard index for using groundwater from Area B for drinking water is 1, which is equal to the threshold for taking action.

These risks and hazard levels indicate that there is significant potential risk to human health should exposure to contaminated groundwater occur.

Ecological Risks

Because the VOC contamination exists at more than 85 feet below ground surface with no pathway to ecological receptors, the potential for significant ecological impacts to occur is quite small.

It is the lead agency's current judgment that the Preferred Alternative identified in this Proposed Plan—or one of the other active measures considered in the Proposed Plan—is necessary to protect public health, welfare, and the environment from actual or threatened releases of hazardous substances into the environment.

GLOSSARY

Applicable or Relevant and Appropriate Requirements (ARARs): Cleanup standards, criteria, or limitations that that must be met by a **remedy**.

Air stripping: When groundwater is mixed with air, VOCs are captured by the air stream, cleaning the water.

Attenuation parameters: Compounds or properties in groundwater that measure whether natural processes are acting to reduce VOC concentrations.

Carbon adsorption: When water or air containing VOCs is passed through a vessel containing activated carbon, the VOC molecules stick to the carbon, which cleans the air or water.

In-situ chemical oxidation: Adding oxygen-containing compounds to a contaminated area to "oxidize" or destroy contaminants through chemical reactions.

Institutional controls: Legal controls that help minimize the potential for human exposure to contamination. For instance, zoning restrictions that prevent site land uses, like residential uses, that are not consistent with the level of cleanup

Monitored natural attenuation (**MNA):** MNA uses monitoring of natural physical, chemical, and biological processes to measure the attenuation (reduction) of contaminants.

Parts per billion (ppb): Term used to describe one molecule of a chemical in a billion molecules of water. An analogy would be less than 1 teaspoon in an Olympic-sized pool. The safe drinking water standard for TCE and other common VOCs is 5 ppb.

Permeable reactive barrier: Installation of a material that allows groundwater to flow through it, but contains reactive compounds that destroy contaminants through physical, chemical, or biological processes.

Pilot test: Testing a remediation technology at a site to determine its effectiveness.

Remedy: The remedial alternative that is selected, documented in a ROD, and implemented at a site.

Soil vapor extraction (SVE): SVE uses a fan to pull the air from between soil particles, also removing VOCs.

Time critical removal action: This is done in situations where contamination poses an immediate threat to human health or the environment and the cleanup response must be expedited; EPA has the authority to move more quickly than in a typical Superfund remedial action.

Volatile Organic Compound (VOC): Organic chemicals that evaporate readily and have low to medium solubility in water.

Remedial Action Objectives

The Remedial Action Objectives for the Site described in the 2004 ROD Amendment have been combined and simplified into the following two objectives:

- Reduce the risk of potential exposure to contaminants
- Restore contaminated groundwater to support existing and future uses, i.e. drinking water

A third objective was developed during the feasibility study process:

- Prevent or reduce migration of groundwater contamination above maximum contaminant levels

The preliminary cleanup goals for the contaminated groundwater at the Site were developed from chemical-specific **ARARs** and are defined as the "maximum contaminant levels" for each contaminant of concern. Maximum contaminant levels are concentrations that EPA has determined to be safe for drinking water and are generally relevant and appropriate for groundwater that may be used as a source of drinking water. Maximum contaminant levels are summarized in the box below.

Compound	Maximum Contaminant Level (parts per billion)
Trichloroethene (TCE)	5
Tetrachloroethene (PCE)	5
1,1-dichloroethene	7
Cis-1,2-dichloroethene	70
Vinyl Chloride	2

This proposed action will reduce the excess cancer risk associated with exposure to contaminated groundwater by reducing the concentrations of VOCs in groundwater to the cleanup goals.

Summary of Remedial Alternatives

Five remedial alternatives were identified in the 2011 Feasibility Study—no action, groundwater extraction and treatment, permanganate injection, permeable reactive barriers, and monitored natural attenuation. The numbering differs slightly from the 2011 Feasibility Study due to inclusion of the "no action" alternative in this Proposed Plan. Based on evaluations of contaminant concentration trends at West Plume B, and consistent with the 2004 ROD Amendment, monitored natural attenuation is proposed as the remedy for West Plume B in all of the alternatives considered. The 2004 ROD Amendment stated that monitored natural attenuation could be selected as the remedy for West Plume B if groundwater data suggested that the plume was attenuating.

Currently, a combination of natural attenuation and permanganate injection is recommended to address the contamination at Area B (Alternative 3).

Common Elements

The alternatives evaluated in the 2011 Feasibility Study were combined in a way that generated common components. The "active" alternatives—those other than the "no action" alternative—include treatment or containment of residual VOCs and the use of natural attenuation outside of the residual zones. For *all* active alternatives, monitoring of treatment system operation (if any) and concentrations of VOCs and **attenuation parameters** in groundwater would be performed to ensure the effectiveness of the remedy. All active alternatives are expected to attain the Remedial Action Objectives. The active alternatives also include **institutional controls**, which regulate public access to portions of the areas with contaminated groundwater, such as industrial property, the Tucson International Airport property, or the Arizona Air National Guard property. Consistent with expectations set out in the Superfund regulations, none of the remedies rely exclusively on institutional controls to achieve protectiveness.

Alternative 1: No Action

Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth (Total) Cost: $0
Estimated Construction Timeframe: ..... None

Regulations governing the Superfund program generally require that the "no action" alternative be evaluated to establish a baseline for comparison. Under this alternative, EPA would take no action at the Site to prevent exposure to the groundwater contamination. This is not considered an acceptable alternative, as the Site presents an unacceptable risk to human health.

Alternative 2: Groundwater Extraction, Treatment and Injection

Estimated Capital Cost: $2,502,650
Estimated Annual O&M Cost: $1,028,217
Estimated Present Worth Cost (Total): $18,952,502
Estimated Construction Timeframe: ..... 18 months
Estimated Time to Achieve RAOs: ..... 30+ years

This alternative involves the extraction, treatment, and injection of groundwater at the West-Cap, Texas Instruments, and Arizona Air National Guard sites to remove VOCs. Groundwater extraction

would target the residual VOCs in the clay zones at the West-Cap and Texas Instruments sites, and would prevent migration of VOCs north of Valencia Road at the Arizona Air National Guard site.

Treatment of extracted groundwater at the Arizona Air National Guard and Texas Instruments sites would be accomplished using existing air stripping systems present at those locations, and a new liquid-phase granular-activated carbon treatment system would be constructed at the former West-Cap facility. Treated water would be re-injected back into the aquifer. Concentrations of VOCs at the West Plume B site have been decreasing through natural attenuation, and no groundwater extraction is proposed for this area. Instead, monitored natural attenuation would be used to manage the VOCs present in the West Plume B area.

Alternative 3: Permanganate Injection – *Preferred Alternative*

Estimated Capital Cost: $2,891,488
Estimated Annual O&M Cost: $350,452
Estimated Present Worth Cost: $7,421,369
Estimated Construction Timeframe: ..... 6 months
Estimated Time to Achieve RAOs: ..... 13-20 years

Alternative 3 involves injection and recirculation of potassium permanganate solution into the clay zone and plume area at the West-Cap site, injection into the clay zone at the Texas Instruments site, and injection into the plume area at the Arizona Air National Guard site. The injected permanganate solution would break down the organic contaminants in place and leave only water and harmless salts as by-products. At the Area B sites, permanganate has been successfully tested and is proposed for continued use. Treatment of the residual VOCs in the clay zones would prevent further contamination of the aquifer and allow for plume reduction through natural attenuation processes. Monitored natural attenuation would be used to manage the VOCs present in the West Plume B area.

The use of permanganate was considered during development of the 2004 ROD Amendment. At the time, it was not considered a cost-effective alternative, as injection methods had not been developed. The permanganate injection pilot tests conducted in 2009 demonstrated that permanganate can be effectively delivered to the target treatment zones.

Alternative 4: Permeable Reactive Barrier at Arizona Air National Guard and Permanganate Injection at West-Cap and Texas Instruments

Estimated Capital Cost: $12,678,538
Estimated Annual O&M Cost: $517,119
Estimated Present Worth Cost: $19,690,456
Estimated Construction Timeframe: ..... 18 months
Estimated Time to Achieve RAOs: ..... 20 years

Alternative 4 involves the installation of an underground permeable reactive barrier to prevent offsite plume migration at the Arizona Air National Guard, and injecting permanganate solution into the subsurface at the West-Cap and Texas Instruments areas, similar to Alternative 3. The permeable reactive barrier would allow water to flow through, but would contain zero-valent iron, which destroys TCE and PCE contaminants as water flows through the barrier. Areas outside of the treatment zones of West-Cap and Texas Instruments would be allowed to remediate through natural attenuation processes. Monitored natural attenuation would be used to manage the VOCs present in the West Plume B area.

Summary of Remedial Alternatives

Alternative Number	Implementation by Site			
	Arizona Air National Guard	West Cap	Texas Instruments	West Plume B
1	No Action	No Action	No Action	No Action
2	Pump and Treat	Pump and Treat	Pump and Treat	Natural Attenuation
3 (Preferred)	Permanganate	Permanganate	Permanganate	Natural Attenuation
4	Permeable Reactive Barrier	Permanganate	Permanganate	Natural Attenuation
5	Natural Attenuation	Permanganate	Permanganate	Natural Attenuation

Alternative 5: Natural Attenuation at Arizona Air National Guard and Permanganate Injection at West-Cap And Texas Instruments

Estimated Capital Cost: *$1,126,998*
Estimated Annual O&M Cost: *$350,452*
Estimated Present Worth Cost: *$5,927,442*
Estimated Construction Timeframe: .....*6 months*
Estimated Time to Achieve RAOs: ..... 13 to 20 years

Alternative 5 is similar to Alternative 3, as it involves injection and recirculation of potassium permanganate solution into the subsurface at the West-Cap and Texas Instruments areas. However, under Alternative 5, no active treatment would take place at the Arizona Air National Guard site and groundwater in this area would be allowed to remediate through natural attenuation processes. Monitored natural attenuation would be used to manage the VOCs present in the West Plume B area. This alternative would not prevent migration of the VOC plume to the north of Valencia Road.

Evaluation of Alternatives

Nine criteria are used to evaluate the different remediation alternatives individually and against each other to select a remedy. The first two cleanup evaluation criteria are considered threshold criteria that must be met by the selected remedy. The next five criteria are balanced to achieve the best overall solution. The final two modifying criteria that are considered in remedy selection are state acceptance and community acceptance. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how each compares to the other options under consideration. The nine evaluation criteria are discussed as follows. The "Detailed Analysis of Alternatives" is presented in the 2011 Feasibility Study.

1. Overall Protection of Human Health and the Environment

For all alternatives except the "no action" alternative, human health and environment are protected for Area B. All of the active alternatives provide for treatment of the areas of highest TCE concentration. Alternatives 2, 3, and 4 prevent migration of VOCs north across Valencia Road and into the adjacent mixed-use neighborhood. Alternative 5 (natural attenuation at the Arizona Air National Guard) does not prevent offsite plume migration.

Because Alternative 1 (no action) is not protective of human health and the environment, it was eliminated from consideration under the remaining eight criteria.

2. Compliance with Applicable or Relevant and Appropriate Requirements

Alternatives 2 through 5 would comply with the applicable or relevant and appropriate requirements.

3. Long-Term Effectiveness and Permanence

Alternatives 2 through 5 would maintain protection of human health and the environment over time by treating or containing VOCs in groundwater. Alternative 2 would use groundwater extraction to contain and remove VOCs from groundwater. Alternatives 3, 4 and 5 would maintain protectiveness by treating the residual VOCs that are contributing to groundwater contamination. Alternative 5 is less effective than the other alternatives at preventing migration of VOCs because it does not treat VOCs present on the Arizona Air National Guard site. This could reduce the effectiveness of natural attenuation in the West Plume B area.

4. Reduction of Toxicity, Mobility, or Volume of Waste

Alternative 2 would use carbon adsorption and air stripping treatment systems to remove contaminants at an efficiency of 95 percent or greater. Migration of VOCs to the northwest would be eliminated by establishment of a hydraulic capture zone by the extraction wells. Currently being implemented at the Arizona Air National Guard, Alternative 2 would continue to decrease TCE concentrations at the Site, as well as prevent offsite migration. Alternative 2 would contain, but not treat, the residual VOCs at the West-Cap and Texas Instruments sites because of the slow rate of diffusion of VOCs out of the clay before they can be removed by the extraction system.

Because the existing containment system south of Valencia Road would not be in use under Alternatives 3 and 4, offsite migration of VOCs onto the downgradient West Plume B area would be prevented by the injection of permanganate at the leading edge of the TCE plume (Alternative 3) or through the use of a permeable reactive barrier (Alternative 4).

Alternative 5 would also treat the residual VOCs quickly with permanganate injections at West Cap and Texas Instruments. However, the mobility of VOCs in groundwater would increase because the containment system at Valencia Road would be turned off and would not be replaced with another treatment or containment system.

None of the alternatives generate hazardous waste.

Evaluation Criteria for Superfund Remedial Alternatives

Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with ARARs 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.

Long-Term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-Term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State/Support Agency Acceptance considers whether the State agrees with EPA's analyses and recommendations, as described in the Remedial Investigation/Feasibility Study and Proposed Plan.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

5. Short-Term Effectiveness

For Alternatives 2 and 3, treatment has been at least partially implemented at the Arizona Air National Guard, West-Cap and Texas Instruments sites. All three sites have had groundwater extraction and treatment systems in place, and all three had permanganate injections in 2009. It is anticipated that either of these alternatives could be implemented throughout Area B within 6 months to 1 year. Hydraulic containment would be achieved shortly after implementation of Alternative 2, and treatment of the residual VOCs at West-Cap and Texas Instruments would be achieved within 3 years under Alternatives 3 and 4.

Alternative 4 would be effective in the short term if the groundwater extraction and treatment system continued to operate during design and construction of the permeable reactive barrier, which would take about 1 year.

Alternative 5 would be effective in the short term at all sites except the Arizona Air National Guard site, because there would be no active treatment or prevention of plume migration at this site. At West-Cap and Texas Instruments, the residual VOCs would be treated rapidly by the permanganate. At West Plume B, attenuation of VOCs would continue.

There is a potential for exposure to Site workers by the permanganate during implementation of Alternatives 3, 4 and 5. This potential would be of limited duration and extent and would not affect the public. The permanganate used in these alternatives is anticipated to completely degrade and/or dilute before it reaches groundwater underneath residential properties within the West Plume B area.

Short-term risks to workers associated with normal construction hazards and potential contact with contaminated water would be eliminated through appropriate controls and adherence to proper health and safety protocols. Due to the limited potential for exposure to contaminated groundwater, no risk to residents is expected during implementation of any of the alternatives.

6. Implementability

Alternatives 2 and 3 are common remediation methods and have been implemented previously at Area B as either a remedy or pilot test. Both alternatives are expected to be readily constructed and operated using reliable technologies. For Alternative 3, installation of new wells would need to be coordinated with operational personnel to minimize interference with the airport, Arizona Air National Guard base, and industrial properties operations.

Alternative 2 at West-Cap would require design and construction work for installation of conveyance piping and the treatment system. Alternative 2 is currently in operation at the Arizona Air National Guard, and was used until 2009 at Texas Instruments. All necessary equipment and personnel for continued operation is readily available at these sites.

Alternative 3 would require minimal additional design and would use temporary extraction and injection systems. Multiple injection wells would be installed at the West-Cap and Arizona Air National Guard properties. Infrastructure for implementing Alternative 3 at Texas Instruments is in place, and minor additions to the pilot test currently underway would be the only requirements to implement this alternative as a remedy.

In Alternative 4, construction of the permeable reactive barrier at the Arizona Air National Guard would involve coordination with Arizona Air National Guard operations personnel. The implementability of this alternative at West-Cap and Texas Instruments is similar to that of Alternative 3.

Construction associated with Alternative 5 at the Arizona Air National Guard would involve the installation of several monitoring wells, but no other infrastructure. Accepted natural attenuation parameters and analytical procedures for groundwater samples are well developed and widely available. The implementability of this alternative at West-Cap and Texas Instruments is similar to that of Alternative 3.

7. Cost

Alternative 5 is the most cost-effective alternative as it relies heavily on natural processes. The estimated cost of Alternative 5 is $5,900,000. The estimated cost of Alternative 3 is approximately $7,400,000. Alternatives 2 and 4 are the least cost effective, with estimated costs of approximately $19,000,000.

8. State/Support Agency Acceptance

The State of Arizona supports the Preferred Alternative (Alternative 3).

9. Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Record of Decision for the Site.

Summary of the Preferred Alternative

Alternative 3, permanganate injection at the Arizona Air National Guard, West-Cap, and Texas Instruments sites and monitored natural attenuation at West Plume B, is the Preferred Alternative. This alternative is recommended because it is expected to achieve substantial environmental and human health risk reduction by both treating the residual VOCs at the Site and by providing safe management of remaining offsite material using cost-effective natural attenuation. This combination reduces environmental and human health risk sooner than the other alternatives at a reasonable cost.

Based on information currently available, EPA believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. EPA expects the Preferred Alternative would be protective of human health and the environment, comply with applicable or relevant and appropriate requirements, be cost effective, and use permanent solutions and alternative treatment technologies to the maximum extent practicable. Because it would treat the residual VOCs present in the clay zones, the remedy also would meet the statutory preference for the selection of a remedy that involves treatment as a principal element. ADEQ concurs with the Preferred Alternative. The Preferred Alternative can change in response to public comment or new information.

Community Participation

EPA and ADEQ provide information regarding the cleanup of the TIAA Superfund Site to the public through public meetings, the Administrative Record file for the Site, EPA Fact Sheets, and announcements published in the Tucson, Arizona newspaper. The public may also visit the EPA website at **www.epa.gov/region09/tucsonairport** or the ADEQ website at **www.azdeq.gov/environ/waste/sps/tucsites.html#tiaa.** EPA and the State encourage the public to gain a more-comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site.

The dates for the public comment period, the date, location, and time of the public meeting, and the locations of the Administrative Record files, are provided on the front page of this Proposed Plan.

Use This Space to Write Your Comments

Your input on the Proposed Plan for Area B of the Tucson International Airport Area Superfund Site is important to EPA. Comments provided by the public are valuable in helping EPA select a final cleanup remedy for the Site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by November 23, 2011. If you have any questions about the comment period, please contact Leana Rosetti at (415) 972-3070 or through EPA's toll-free number at (800) 231-3075. Comments may also be submitted via e-mail at the following email address: *rosetti.leana@epa.gov*, or verbally at the Proposed Plan Public Meeting on November 9, 2011.

Name_____

Address _____

City_____

State _____ ZIP_____

PROPOSED PLAN
Tucson International Airport Area Superfund Site, Area B

For further information on the TIAA Superfund Site, please contact:

Martin Zeleznik
Remedial Project Manager
(415) 972-3543
zeleznik.martin@epa.gov

Leana Rosetti
Community Involvement Coordinator
(415) 972-3070
Toll Free: 1-800-231-3075
rosetti.leana@epa.gov

U.S. EPA
75 Hawthorne Street
San Francisco, CA 94105

Web site:
www.epa.gov/region09/tucsonairport

You are also invited to attend the Unified Community Advisory Board (UCAB) meetings, which are held quarterly to discuss the site cleanup with the community. The next meeting will be January 18, 2012 at the El Pueblo Activity Center, 101 West Irvington Road, Tucson.

Public Meeting on November 16, 2011

Versión en español adentro

United States Environmental Protection Agency, Region 9
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
Attn: Leana Rosetti (TIAA 10/11)

FIRST-CLASS MAIL
POSTAGE & FEES
PAID
U.S. EPA
Permit No. G-35

Official Business
Penalty for Private Use, $300

Address Service Requested