

Former Williams Air Force Base [EPA](#) National Priorities List (NPL) Site

Boundaries:

The former [Williams Air Force Base](#) (WAFB) is located in Mesa, Arizona, approximately 30 miles southeast of central Phoenix. It is approximately 4,127 acres in size and the study area includes the entire Base.

WAFB began as a flight training school to prepare pilots for World War II. The base was operated continuously as an Air Force Training school until 1993 when its military mission was discontinued under the Base Realignment and Closure, (BRAC) program in the effort to realign the military's asset inventory and reduce expenditures of operation. The base was conveyed and converted into the civilian Williams Gateway Airport which was later renamed [Phoenix-Mesa Gateway Airport](#).



Williams Air Force Base 1997

The Air Force has transferred 96% of the former base to public and private ownership. The largest landowners of the former WAFB land are Phoenix-Mesa Gateway Airport, [Gila River Indian Community](#), [Arizona State University \(ASU\) East](#), and [Maricopa Community College](#). The Department of Defense has retained 10.74 acres for the U.S. Army Reserves and 8 acres for continued military use by the U.S. Air Force.

The WAFB Site (Site) boundaries are Power Road to the west, Ray Road to the north, Pecos Road to the south, and Ellsworth Road to the east. The plume boundary varies and extends beyond the Site boundary but remains part of the Superfund Site in its entirety.

Site Status Update:

There are many sites within the WAFB study area. An update on active Sites in 2010 includes: Landfill No. 4 (Site LF004); Liquid Fuel Storage Facility (Site ST012); and the former base automobile fueling station, (ST035).

Landfill No. 4 (Site LF004) A Supplemental [remedial investigation](#) (RI) was completed to evaluate the extent of [volatile organic compounds](#) (VOCs) in the groundwater emanating from Landfill No. 4 in 2010. The investigation continues on the extent and impact of contamination from the landfill on groundwater.

Included within the Site LF004 is the [Parcel N Debris Area](#). This area is suspected to have been used as an auxiliary disposal site. Because of the discovery of discarded military munitions, the area was investigated per the Military Munitions Response Program (MMRP). This entails an extensive search for unexploded ordnance (UXO), discarded military munitions (DMM), and

munitions constituents (MC). As the investigation continues at the Site, which is surrounded by a fence, warning signs have been posted and a second fence isolating an area of greatest concern with additional warning signs has been constructed. The intended outcome of this investigation is to identify any MCs as well as any possible releases of hazardous materials.

Liquid Fuel Storage Facility (Site ST012) is the location of the former fuel storage depot for Air Force operations. Estimates of jet petroleum grade 4 (JP-4, jet fuel) and aviation gas (AVGAS) that may have been released into the environment at Site ST012 range from 640,000 to 12 million gallons. However, the actual quantity of material is unknown.

The Air Force commenced a pilot project utilizing Thermal Enhanced Extraction (TEE) to address the contamination in 2009. TEE utilizes steam to mobilize petroleum to remove it from soils and groundwater. A report cataloguing the performance of the pilot project was presented for evaluation in 2010. Discussions on capture effectiveness and possible expansion of the technology have been ongoing. Remediation of contamination in the soil continues to be addressed at the Site using a [soil vapor extraction](#) (SVE) system. Post-test sampling/testing continues to be conducted to monitor contaminants at the Site. The Air Force has proposed to operate a [pump and treat](#) system for groundwater until a more site-wide remedial system can be implemented.



SVE System at ST035

Site ST035 (also known as Building 760) is the site of the former base gas station. The station was in operation for 20 years from the mid-1960s until 1986. The Site now forms part of Arizona State University's (ASU) Polytechnic campus. The release was discovered when the tanks, dispensers and piping were removed from the Site in 1993, following the base closure. Soil and groundwater at the Site is contaminated with benzene, ethylene di-bromide (EDB), methyl- tertiary butyl ether (MTBE) and dichloroethane (1,2 -DCA). The Air Force installed 15 SVE extraction wells (in five locations) and 21 soil vapor monitoring points (in seven locations) at the Site. The

SVE system is currently undergoing pilot tests to evaluate its operation. The SVE pilot test was initiated in October 2010.

Community Involvement Activities:

A [Restoration Advisory Board](#) (RAB) has been formed and meets on a quarterly basis. The RAB meeting [agendas](#) and minutes for 2010 and 2011 can be viewed at the Arizona Department of Environmental Quality (ADEQ) Web site. A draft [community involvement plan](#) was distributed to RAB members in November 2008.

EPA is responsible for reviewing Superfund remedial actions at least every five years where hazardous substances, pollutants, or contaminants will remain onsite above levels that allow for unlimited use and unrestricted exposure. Five-Year Reviews (FYR) provide an opportunity to evaluate the implementation and performance of a remedy to determine whether it remains protective of human health and the environment. The Air Force will conduct the FYR for WAFB, but EPA retains responsibility for determining the protectiveness of the remedy. EPA is also responsible for preparing an annual report to Congress on the findings of these reviews. The FYR for WAFB will be conducted in 2011.

Site History:

1941-1948: The base was constructed in 1941 and served as a training facility, primarily pilot training. At the time the base was constructed, the Site was surrounded by irrigated farmland and desert. Industrial activities at [WAFB](#) included heavy maintenance of aircraft and ground equipment in support of pilot training.

The former WAFB played a strategic role in America's aviation history. Over a span of 52 years, more than 26,500 men and women earned their wings at Williams. Gearing up for the combat pilot demands of World War II, the Army Air Corps broke ground in southeast Mesa for its Advanced Flying School on July 16, 1941. In February 1942, the growing military base's name was changed to Williams Field to honor Charles Linton Williams, an Arizona-born pilot. The facility was re-designated as WAFB in January 1948. WAFB was the U.S. Army Corp's foremost pilot training facility, graduating more student pilots and instructors than any other base in the country and supplying 25 percent of the Air Force's pilots annually. Contaminants from base activities included organic [solvents](#) and paint strippers, petroleum spills and leaks, metal plating wastes, hydraulic fluids, pesticides, and radiological wastes. Discharges and disposals at WAFB have resulted in soil and groundwater contamination.

1983: Site investigations initiated in 1983 under the auspices of the Department of Defense [Installation Restoration Program](#) identified thirteen potentially contaminated areas including: two fire training areas, a fuel storage area, two surface storm drainage areas, a hazardous material storage area, a landfill, a pesticide burial pit, a radiological disposal area, and four underground storage tanks.

1989: WAFB was placed on the [National Priorities List](#) (NPL) on [November 21, 1989](#). RIs initiated under the Comprehensive Environmental Response Compensation and Liability Act ([CERCLA](#)) in 1989 discovered several new areas of contamination that were added to the existing list of Sites.

1991-1993: WAFB was closed in 1993, resulting in a loss of more than 3,800 jobs and \$300 million in annual economic activity. After the announcement of closure in 1991, the community immediately began work to redevelop the base. Upon closing, WAFB was transferred to the [Air Force Base Conversion Agency](#) (AFBCA). AFBCA assumed responsibilities for the restoration and reuse of the base and worked with the RAB and Williams Redevelopment Partnership to maximize reuse of the land.

For cleanup purposes, the former base was divided into six [operable units](#), OU-1 through OU-6. Each OU consists of many sites of potential concern; the following lists only the sites of primary interest for each OU:

- OU-1 contains the main Base landfill for which a ROD was signed in 1994. The remedy specified a permeable cap (soil) and [monitor wells](#). At the time of the ROD, only low levels of contaminants were present in the wells. In 1997, higher levels of contamination were discovered in the landfill monitor wells and a follow-on RI was conducted in 2000. Concentrations of contaminants in some of the monitor wells installed during the follow-on RI are the highest ever seen at the Site and indicate that contamination is migrating off of the former base.
- OU-2 addresses the groundwater and soil contamination at the Liquid Fuels Storage Area (ST-12). The results of the RI at ST-12 have confirmed that the primary contaminant is jet petroleum grade 4 (JP-4, jet fuel) and aviation gas (AVGAS). There is a groundwater plume at ST-12 which resulted from the leakage of an unknown quantity of JP-4 and AVGAS. It is estimated that the groundwater contains 640,000 to 1.4 million gallons of JP-4 and AVGAS. The EPA believes as much as 12 million gallons may be in the soil and groundwater. Rising groundwater in the area, 40 feet over the last ten years, has covered the fuel and smeared it across many feet of deep soil making access to the plume (for remediation) increasingly difficult. The ROD for OU-2 was signed in December 1992. The Air Force has yet to implement a groundwater remedy at the Site.
- OU-3 formerly addressed the [vadose](#) zone beginning 25 feet below land surface down to the water table at ST-12 which is now a part of OU-2. The primary site of concern at OU-3 now is the Fire Training Area Number 2 (FT-02). The 25,000 cubic yards of contaminated deep soils at the Site were treated in place by enhancing natural bacterial breakdown of contaminants with [bioventing](#). The ROD for OU-3 was signed in late June 1996. The standards agreed to in the ROD have not been achieved. However, the US Air Force (USAF), in accordance with new state rules has conducted a risk assessment which determined that the cleanup levels attained do not pose a risk to human health or environment.
- OU-4 includes South Desert Village (SDV) which is currently serving as student housing for ASU East. Beneath SDV is a former six-station skeet range which was demolished and graded in 1950, prior to construction of the SDV. Contamination in the form of lead pellets in soil associated with the former skeet range underlies 85 housing units in the SDV. Since complete removal of contaminated soils would have required demolition of this valuable housing, a compromise solution involved removal of the top six inches of contaminated soil and installation of six inches of clean soil. The replacement soil is considered a protective cap over the remaining contamination, and will be subject to repair and maintenance, as well as land use restrictions in the form of a [voluntary environmental mitigation and use restriction](#) (VEMUR). The VEMUR defines the affected area as non-residential, and places deed restrictions to bind occupants to maintain the protective cap.

- OU-5 was set up to address nine soil sites which were closed out through expedited removal fill actions. No groundwater contamination is known to exist at any of the OU-5 sites. The OU-5 ROD was signed in February 1998.
- OU-6 was established to address three sites requiring additional investigation. The site of primary concern (Site SS-17 Old Pesticide/Paint Shop) at OU-6 revealed soil contamination ([dieldrin](#) and VOCs). A removal action of dieldrin contaminated soil was completed and backfilled with clean soil following verification of clean up goals. The dieldrin contaminated soil was transported to a temporary treatment facility constructed near the former base landfill to undergo [bioremediation](#).

1998-2004: OU-3 primary concern was the Fire Training Area Number 2 (FT-02). Bioventing utilized at the Site did not attain residential cleanup levels. The Air Force disagreed with the regulatory agencies' (ADEQ and EPA) determination that a [Declaration of Environmental Use Restrictions](#) (DEUR) was required for the Site. Changes (November 2004) in the Air Force's policy regarding acceptable risk and reliance on a 1998 Air Force "receptor evaluation" ([risk assessment](#)) led to an Air Force's decision that the Site was suitable for unrestricted use.

2004-2005: OU-2 addressed groundwater and soil contamination at Site ST-12. The Air Force and subcontractors completed design of the groundwater and vadose zone remedies. The vadose zone remedy consisted of a full-scale SVE system. The SVE system began operation in April 2005. The groundwater remedy consisted of a process called TEE. As of December 2004 the construction was 90% complete. However, the Air Force decided to withdraw the funding for completion of construction and operation of the TEE system. The Air Force notified the regulators of the funding withdrawal in February 2005. At that time the Air Force had already spent approximately \$3,000,000 in the design and construction of the TEE system. EPA and ADEQ issued a Formal Letter of Dispute regarding the Air Force's failure to implement the [remedial action](#) at Site ST-12.

2005: OU-6 includes the Temporary Treatment Facility (TTF), which is an area that has received soil contaminated with dieldrin from the cleanup of the Old Pesticide/Paint Shop (SS-17). An attempt to utilize bioremediation to clean the contaminated soil failed to achieve the desired cleanup levels.

As of June 2005, approximately 3,960 acres (96%) of the former base was transferred to public or private ownership. The largest landowners of former WAFB land are: Phoenix-Mesa Gateway Airport, Gila River Indian Community, ASU East, and Maricopa Community College. The Department of Defense retained 10.74 acres for the U.S. Army Reserves, and eight acres for continued military use by the U.S. Air Force. [At that time the base's Armstrong Laboratory Aircrew Training Research Facility was to remain at the former WAFB.]

2006: OU-1 contains Landfill 4 (LF-04). Over the past two years numerous monitor wells had shown a marked increase in [trichloroethene](#) (TCE) and [tetrachloroethene](#) (PCE). Contaminants appeared to be moving off-site.

2007: The first phase (soil vapor investigation) of the RI to find the source and extent of VOCs in the groundwater at Landfill No. 4 (Site LF004) was begun. Additionally, three off-site [borings](#)

were drilled and groundwater samples collected to determine where off-site groundwater monitor wells may be needed.

In November, the dieldrin-contaminated soil from the Old Pesticide/Paint Shop (SS-17) was removed from the TTF northeast of the base landfill (Site LF004) following an unsuccessful attempt at bioremediation. A total of approximately 6,000 cubic yards of contaminated soil and amendments were removed from the Site and disposed of under an approved work plan. Following removal of the contaminated soil and amendments, confirmation sampling of the underlying soil indicated five “hot spots” where additional soil removal is required.

SVE to remove jet petroleum grade 4 (JP-4) from the vadose zone continued at the Liquid Fuel Storage Facility (Site ST012). Construction continued on the TEE pilot project, which was designed to remove the fuel from the groundwater.

The Building 760 Site, the site of gasoline releases from the former base service station, was being redeveloped by ASU East. Five groundwater monitor wells were abandoned to make way for building construction. The Air Force proposed replacement of the monitor wells, as well as installation of SVE wells and construction of a soil vapor treatment system. [Note: ADEQ’s [Underground Storage Tank Program](#) assumed oversight of this project.] DEURs were completed for Site SS021, Facility 1013 (a [leaking underground storage tank](#) site).

2008: The schedule for the RI to find the source and extent of VOCs in the groundwater at Landfill No. 4 (Site LF004) was extended. The Air Force completed the soil vapor investigation fieldwork. TCE found in soil gas samples and increasing concentrations of TCE in one groundwater monitor well caused the Air Force to expand the investigation in the area northeast of the landfill and delay submittal of the RI report. Additional borings to sample deep soil and groundwater were planned. A peer review committee was assembled by the Air Force to review the work to date and plans for additional investigation of the Site, and to advise the Air Force and its contractor regarding data gaps, locations for additional groundwater monitor wells, and potential remedial technologies. Four new monitor wells were installed at the Site.

SVE to remove jet petroleum grade 4 (JP-4) from the vadose zone continued at the Liquid Fuel Storage Facility (Site ST012). The TEE pilot project, designed to remove the fuel and fuel components from the groundwater, began operation. Steam injection into the lower saturated zone (the deeper of two water bearing units that are to undergo treatment) began on October 28, 2008 (with steam injection into the upper water bearing zone scheduled to occur approximately two weeks later). The project is scheduled to last approximately one year. Six new groundwater monitor wells were installed at the Site.

The DEURS were completed for sites FT002, ST012, and SS020 to facilitate dispersal of the property to the Gateway Airport.

2009: Base-wide activities included publishing an update to the Base-wide Sampling and Analysis Plan and a Base-wide Waste Management Plan, and recording a DEUR on Site SS016 (Bldg 1085) to complete the ROD requirements. The transfer of SS016 to the Phoenix-Mesa Gateway Airport was then completed.

The U.S. Air Force performed the following activities:

- conducted and reported semi-annual groundwater monitoring in accordance with the ROD
- conducted significant landfill maintenance
- conducted a final field effort to supplement the RI in which one area was found where there was a surface soil to groundwater contamination connection
- installed 31 new groundwater monitoring wells at Site LF004
- produced a Site LF004 Groundwater Monitoring Work Plan
- conducted a bench scale ozone [sparging](#) test
- conducted operations at Site ST012 performing Steps 2 through 5 of the TEE Work Plan
- collected post TEE application samples following test operations
- conducted and reported four quarters of groundwater monitoring
- produced a Site ST012 Groundwater Monitoring Work Plan
- conducted and reported annual groundwater monitoring at Site SS017
- produced a Site SS017 Groundwater Monitoring Work Plan
- finalized a work plan to conduct step-out excavations at the TTF and awarded a contract to conduct the step-out excavations
- published the Parcel N Debris Area preliminary assessment/site inspection (PA/SI) Work Plan and initiated work on it
- completed installation of a fence around Parcel N
- published a final Interim Parcel N PA Report
- awarded a contract to complete the Parcel N Debris Area PA/SI
- conducted and reported four quarters of groundwater monitoring at Site ST035
- produced a Site ST035 Groundwater Monitoring Work Plan
- installed five new groundwater monitoring wells
- completed installation of a SVE system

2010: Efforts at the former Williams Air Force Base progressed on many fronts in 2010:

- The completion of a Supplemental [Remedial Investigation](#) (RI) report for LF004 that included a draft Focused Feasibility Study;
- Parcel N underwent an investigation searching for munitions constituents (MC) as well as sampling and testing at selected locations for CERCLA contaminants. A more detailed investigation is planned for a section of Parcel N that has been identified as one of great concern and is scheduled for 2011;
- A report evaluating the pilot test of the TEE system at ST012 was submitted for review. The SVE system continues to remove contaminants from soils below the former fuel storage area;
- A pilot SVE system was constructed at the site of the former automobile gas station. The system was constructed and designed to blend into the surround ASU campus and its operation to be non obtrusive;
- The Air Force completed a program to replace groundwater monitoring wells that have become submerged by rising groundwater. Additional



Discarded Military Munitions

wells to monitor the different groundwater formations at the Site were also sited in the various hydrographic layers at the Site. New wells were also installed to delineate groundwater contamination on the project Site;

- Groundwater monitoring at the Site continues to be conducted to evaluate the remedial effort.

Contaminants:

The contaminants of concern include organic solvents and paint strippers, petroleum, metal plating wastes, hydraulic fluids, pesticides, and radiological wastes. Discharges and disposal at WAFB resulted in soil and groundwater contamination. The remaining groundwater contaminant issue is a plume of jet fuel and aviation gas contamination at ST-12. Contaminants of concern at the Site may change as new data become available.

Public Health Impact:

There is no known risk to human health at this time. All exposure pathways have been eliminated through remediation or restricted access/use. No groundwater wells are known to be impacted.

Site Hydrogeology:

WAFB is located within the Salt River Valley in the Basin and Range province. The Site is underlain by [alluvial](#) sediments comprising the upper, middle and lower [aquifer](#) units.

The two uppermost aquifers beneath the former Base are separated by silty and/or clayey sediment. Aquifer interconnection has been identified on a localized, site-by-site basis. In the immediate vicinity of ST-12, it has been determined that the two aquifers are separated by a competent aquitard. The two aquifers will be referred to as the upper aquifer and deep aquifer. Both aquifers consist of interbedded, fine- and coarse-grained strata.

The upper aquifer extends from the water table (currently between 140 and 180 feet bgs) to approximately 245 feet bgs. The upper aquifer has excellent water-bearing characteristics, but has a reduced ability to supply water because of over-drafting. Much of the water found in the upper aquifer, some of which is perched on low permeability strata, is of poor quality due to its origin as infiltration of irrigation water. Localized studies at the former base show groundwater flows to the east-southeast in the upper aquifer.

Locally (at ST-12, SS-17, and LF-04) groundwater in the upper aquifer flows to the east-southeast. The flow direction of the upper aquifer has not changed even though groundwater elevations have increased more than 50 feet since 1989. Similarly, the hydraulic gradient has remained relatively stable throughout activities at the Site. An average value for the hydraulic gradient across the entire Site is 0.0055.

The deep aquifer unit has historically been a major source of groundwater in the general vicinity of the former Base. Although it is classified as a fine-grained unit, local sand and gravel units greatly increase its water-producing capability. Deep-screened monitor wells at the former Base have shown a general northward trend for groundwater flow.

Water levels in the vicinity of the former Base have been depressed as a result of nearby groundwater supply demands. Measurement records from Base production wells show that water levels in the deep aquifer decreased approximately 30 feet between 1953 and 1961, and remained depressed until 1981 when water levels began to increase gradually. From 1989 through 1991, water levels increased 2.5 feet in the shallow wells, an average of 1.25 ft/yr. Since 1992, water levels have raised an average of 4.0 ft/yr.

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*In Arizona, but outside the Phoenix area, call toll-free at (800) 234-5677.

**Call EPA’s toll-free message line at (800) 231-3075.

Information Repository:

Interested parties can review select Site documents at the [Arizona State University East Library](#), 7001 E. Williams Field Road, Bldg. 20; (480) 727-1157 (contact: Ellen Welty). The Air Force maintains the administrative record for the Site. Documents are available via the [Air Force Real Property Agency \(AFRPA\) Web Site](#).

Site files can also be viewed at the ADEQ Main Office located at 1110 W. Washington Street in Phoenix. Please contact (602) 771-4380 or (800) 234-5677 to schedule an appointment with 24-hour notice to review these documents. Once all documents requested have been collected, you will be contacted for a review Monday through Friday from 8:30 a.m. to 4:30 p.m. at the ADEQ Records Management Center, 1110 W. Washington Street in Phoenix, AZ.

The complete official Site file can be reviewed at the EPA Region IX, [Records Center](#), Mail Stop SFD-7C, 95 Hawthorne Street, Room 403, San Francisco, CA 94105; (415) 536-2000.