

Motorola 52nd Street **EPA National Priorities List (NPL) Site**

Boundaries:

The [Motorola 52nd Street Superfund Site](#) (Site) is located in Phoenix, Arizona, and is divided into three [operable units](#) and the Honeywell 34th Street Facility. The Operable Unit 1 (OU1) is bounded by 52nd Street to the east, Palm Lane to the north, Roosevelt Street to the south, and 46th Street to the west. The approximate boundaries of Operable Unit 2 (OU2) are Roosevelt Street to the north, 46th Street to the east, Buckeye Road to the south and 18th Street to the west. Within OU2, the Honeywell 34th Street facility extends from approximately 36th Street to the east to approximately 29th Street to the west and is immediately north of the Sky Harbor Airport north runway. The Operable Unit 3 (OU3) Study Area is bounded by McDowell Road to the north, 20th Street to the east, Buckeye Road to the south, and 7th Avenue to the west. The plume boundary varies and may extend beyond the Site boundary but remains part of the Superfund site in its entirety.

Site Status Update:

Operable Unit 1 (OU1)

Once the proper information has been gathered, [Freescale Semiconductor, Inc.](#) (Freescale) will provide a final [feasibility study](#) (FS) that evaluates appropriate [remedial actions](#) to address contamination within OU1. Freescale currently submits semi-annual and quarterly reports regarding the treatment facility operation and groundwater monitoring. Freescale began conducting a [bedrock](#) extraction pilot test in September 2009 to gather more data to assist in determining the most appropriate final remedy. The Arizona Department of Environmental Quality (ADEQ) and the [U.S. Environmental Protection Agency](#) (EPA) will then select the final remedy. The public will have the opportunity to comment on the selected remedy prior to it becoming final.



**OU1 Treatment System
5005 E. McDowell Road**

In early 2009, [On Semiconductor](#) announced that the manufacturing operations at the 52nd Street Plant were going to be closed. The treated water from the OU1 Treatment Plant is used by On Semiconductor in the manufacturing operations. Freescale has been evaluating alternative end uses for the treated water. For the interim, ADEQ and EPA approved discharge to the City of Phoenix Sanitary Sewer and that connection was completed in December 2010. Freescale will submit a report to ADEQ and EPA outlining the preferred end use alternatives in 2011. The public will have an opportunity to review the alternatives report.

In early 2010, EPA announced that a [vapor intrusion](#) study will take place in the OU1 area. An Administrative Order of Consent was signed between EPA and Freescale, who will be responsible to perform the work, in August 2010 for the residential study. EPA will hold several community meetings to gather input and comments from the community regarding the study.



**OU2 Treatment System
20th Street & Washington Street**

In September 2010, ADEQ and EPA began the [Five Year Review](#) (FYR) process for the OU1 treatment system. This process requires the Agencies to critically evaluate the operation and protectiveness of the treatment system every five years. A draft report is expected by spring 2011 with the final report available in Fall 2011.

Operable Unit 2 (OU2)

Interim groundwater treatment system progress reports are submitted on a monthly basis and monitoring reports are submitted on a quarterly basis. ADEQ has negotiated agreements with three OU2 [potentially responsible parties](#) (PRPs) to conduct a focused [remedial investigation](#) (RI)/FS at their respective facilities: ITT Canon, the former Kachina Testing Facility, and Aviall Services. ADEQ continues to search for additional PRPs in OU2.

Freescale and [Honeywell](#) (collectively referred to as “the Companies”) will continue operations of the OU2 treatment system and provide progress reports and assessments of the effectiveness of the system. Additional [monitor wells](#) and/or adjustments to the operation of the system may be needed depending on the results of the previous data. ADEQ has negotiated a [Consent Decree](#) (CD) with the Companies for operation of the OU2 treatment system to take over oversight from EPA. ADEQ is also working with the Companies on the remedy selection process so that a final remedy may be selected for the OU2 area.

In September 2010, ADEQ and EPA began the 5YR process for the OU2 treatment system. The 5YR reports for OU1 and OU2 are being written concurrently. A draft report is expected in 2011 with the final report available soon after.

As of the end of September 2010, approximately 12,334 pounds of [volatile organic compounds](#) (VOCs) have been removed from the subsurface since startup of the OU2 treatment system.

Honeywell

Honeywell submits on-going progress reports, semiannual groundwater monitoring reports, and bi-monthly water level measurements. Honeywell has submitted a Human Health Risk Assessment (HHRA) and an HHRA Addendum for ADEQ review and approval. In March 2009, ADEQ approved the Focused Feasibility Work Plan, which included additional data gathering over the summer of 2009. ADEQ and EPA have been working closely with Honeywell on finalizing the HHRA and drafting the Focused Feasibility Study.

From May 2009 through November 2009, Honeywell performed the start-up and shakedown process for the biologically enhanced vapor extraction (BSVE) system located at the Honeywell 34th Street facility. The BSVE is part of a [leaking underground storage tank](#) cleanup at the southeast corner of the facility. As of the end of September 2010, approximately 1,771,000 pounds of VOCs are estimated to have been removed or [biodegraded](#) since the BSVE system started in May 2009. Additionally, as of the end of September 2010, the total amount of [free product](#) directly recovered from groundwater wells since manual recovery began in June 1999 is approximately 7,297 gallons.

Operable Unit 3 (OU3)

EPA has negotiated an Administrative Order on Consent (AOC) with the OU3 Working Group to conduct an OU3 sitewide RI/FS. The investigation will include installation of additional groundwater monitoring wells, installation of soil gas vapor monitoring wells and collection of soil gas and groundwater samples.

In addition to the OU3 sitewide investigation, EPA and ADEQ are conducting facility specific investigations, which are described in the individual facility histories below.

Community Involvement Activities:

A [Motorola 52nd Street Superfund Site-wide Fact Sheet](#) was mailed to the community involvement area in May 2007. More fact sheets can be found at the [EPA Web site](#).

The [community involvement plan](#) (CIP), which defines and describes the community outreach activities that ADEQ and the EPA use to identify and address community concerns and expectations, was updated and finalized in January 2009. In March 2010, EPA established a [community information group](#) (CIG) for the Site. The CIG served as a focal point for the exchange of information among the local community, ADEQ, EPA, and major PRPs. CIG meetings are being held at various locations throughout the Site in response to community interviews for the CIP. These CIG meetings are designed to better reach and inform more of the community on the status for the [remediation](#) of the Site. Details of [meeting agendas](#) and minutes can be viewed at the ADEQ Web site.

Site History:

Operable Unit 1

Site Discovery: The Motorola 52nd Street facility was originally constructed in 1956 and was in operation until the third quarter of 1999 when Motorola's Communications, Power and Signal Group was split off to become [ON Semiconductor](#). Motorola remains responsible for the remediation effort related to its former operations at the 52nd Street facility.

Until 1963, no municipal sewer was available thereby requiring on-site disposal of domestic and industrial waste in underground tanks, leaching fields, [drywells](#), pits, [sumps](#), and surface disposal areas. The types of wastes that were known to be released to the environment at the facility are: [solvents](#), acids, cyanides, and sanitary sewage. Solvents, such as [trichloroethene](#) (TCE); 1,1,1-[trichloroethane](#) (TCA); [freon](#); and [tetrachloroethene](#) (PCE), were dispensed to various Motorola operations at the facility.

Three primary source areas have been identified at the Motorola 52nd Street facility: the Courtyard, the Acid Treatment Plant (ATP), and the Southwest Parking Lot (SWPL):

- The Courtyard was the site of a 5,000 gallon TCA [underground storage tank](#) (UST) and a drywell that was approximately three feet in diameter and 15 feet deep. The drywell received solvents, mainly TCE and TCA, from 1963 to 1974. The solvents were used at the facility to remove greases, waxes, oils, and Photoresist. Soils and groundwater have been impacted

with [chlorinated solvents](#) in this area. Additionally, free product solvent has been found in the bedrock at the Courtyard.

- The ATP was built on a buried waste solvent line suspected of leaking and there were reports of solvent spills in the area.
- From 1974 to 1976, the SWPL area was used extensively as a main staging area of waste chemicals stored in 55-gallon drums that were suspected of leaking.

Site discovery occurred in November 1982 when Motorola reported that the 5,000 gallon UST located in the Courtyard area had leaked TCA. From January 1983 to December 1983, Motorola conducted a preliminary investigation which included the installation of 29 monitor wells (10 conventional wells and 19 multiport wells, with a total of 80 sampling ports). A report was submitted to ADEQ in December 1983. Analytical data indicated soil and groundwater contamination on the facility property, and groundwater contamination continuing to the west of the property. The highest concentrations of contaminants were found in the Courtyard area of the facility. TCE concentrations as high as 1,470,000 parts per billion (ppb) and TCA concentrations as high as 721,000 ppb were found in bedrock.

As a result, Motorola entered into a verbal agreement with ADEQ, EPA, [Arizona Department of Health Services](#) (ADHS), [Arizona Department of Water Resources](#) (ADWR), [Salt River Project](#) (SRP), and the Cities of [Phoenix](#) and [Scottsdale](#) (the oversight committee) to characterize the nature and extent of contamination and recommend remedial actions.

1984-1987: From October 1984 to June 1987, Motorola completed an RI/FS under the direction of the oversight committee. The RI report summarized the results of source characterization and Site investigation. The FS report established [remedial objectives](#) (ROs), identified alternative approaches, and evaluated alternative remedies. These draft documents were issued for public comment. Twenty eight potential sources were identified and investigated, such as: past surface discharges, spills, tank and pipe leaks, and discharges to leach fields and drywells. It was determined that the majority of the contamination came from sources in the Courtyard Area. A Pilot Treatment Plant (PTP) was constructed in the Courtyard Area which included two [extraction wells](#).

1988: A health assessment was completed by [Agency for Toxic Substances and Disease Registry](#) (ATSDR) that concluded that the Site is unlikely to pose any threats to human health. The report also stated that although on-site and off-site groundwater was contaminated, contaminant levels at the point of extraction were below the levels of concern. In June, Motorola submitted a Remedial Action Plan (RAP) to ADEQ that proposed a remedial alternative, and a public meeting was held in July. In September, ADEQ and EPA issued official approval to implement the recommendations in the draft RAP in a [Record of Decision](#) (ROD) for the OU (later designated as OU1) interim remedy. The OU remedy selected consists of the following components: 1) on-site extraction and treatment of groundwater from the Courtyard and 50th Street area, 2) on-site extraction and treatment of vapor phase organic contaminants from soils from the Courtyard, ATP, and SWPL areas, 3) off-site extraction of groundwater designed to contain contaminant migration at the Old Crosscut Canal, 4) on-site treatment of groundwater extracted from off-site wells, and 5) use of all treated groundwater at the Motorola 52nd Street facility. The OU interim remedy was designed to provide overall

protection of human health and the environment by containing migration of volatile organic compounds (VOCs) and to treat the extracted groundwater to a level which will meet State/Federal standards.

1989: In June, Motorola and ADEQ entered into a [Consent Order](#), lodged with the Arizona Superior Court, requiring Motorola to design and implement an interim groundwater remedy and soil remedies in the OU1 area, and to continue to work on a revised RI/FS Work Plan to define work components leading to a final remedy. The ROs as defined in this Consent Order are: to contain and control the migration and level of contaminants in the groundwater through implementation of the work by Motorola. On [October 4, 1989](#), the Site was placed on the U.S. EPA's [National Priorities List](#) (NPL). Although the Site was listed on the NPL, EPA delegated its authority to ADEQ to continue to be the lead agency.

1990: A sump located within a building near the Southwest Parking Lot (SWPL) was identified as another source of contamination, mainly TCA. Initial soil sample results under the sump were as high as 30,000 ppb of TCA. In 1990, ADHS completed a [health study](#) entitled: *Cancer Incidence and Mortality in an East Phoenix Area Overlying Groundwater Contaminated with Volatile Organic Compounds*. The study found no elevated rates of cancer as compared to the rest of Maricopa County.

1991-1992: ADHS completed a [Baseline Risk Assessment](#) that concluded: *The risk of public exposure to groundwater is limited, and therefore causes no imminent health hazard.* EPA completed an Ecological Risk Assessment that concluded: *. . . because of [the VOC's] high volatility and low toxicity relative to freshwater aquatic criteria, exposure of biota to acute or chronic levels of TCA and TCE may not be a concern. Inorganics (arsenic and lead) would be of most concern to biota because of their exceedance of the fresh water criteria, persistence in the environment, and their potential for bioaccumulation.* In May, a [soil vapor extraction](#) (SVE) system was constructed in the Courtyard and by June was operational. The SVE was shutdown in March 1993. Approximately 350 pounds (lbs) of VOCs were removed. In July, the Pre-Design RI Work Plan was submitted and the full scale groundwater treatment system was placed in operation. The treatment system is considered an interim remedy and the final remedy will be determined after the final OU1 FS and ROD are completed. The plant treats groundwater by running it through two [air strippers](#) connected in series, and is then run through four liquid phase [granular activated carbon](#) (GAC) vessels (two parallel sets of two vessels connected in series) for polishing. The treated water is then used by ON Semiconductor for their facility operations. The air emissions are treated by vapor phase GAC. Approximately 95% of the air is recycled through the air strippers and approximately 5% is treated and then released to the atmosphere.

1993-1994: ATSDR completed an update to the 1988 Health Assessment. In February, an [air sparging](#) (AS)/SVE pilot program was conducted in two locations within the SWPL area. Approximately 269 lbs of VOCs were removed.

1994: A program was initiated to periodically remove free product solvent from bedrock.

1995: In November, Motorola conducted a soil gas survey consisting of 25 sample locations of the off-site area immediately to the west of the Courtyard and the northern part of the 52nd Street

facility. In November, ADEQ completed the first [FYR](#) of OU1 which determined that the OU1 was operating effectively and meeting the ROs.

1996: ATSDR completed an update to the 1988 Health Assessment and the 1993 update to the [health consultation](#). In November, the SWPL SVE operations began and continued through April 1997. Approximately 170 lbs of VOCs were removed during the system operation in addition to the approximately 269 lbs that had been removed during the pilot AS/SVE test in February 1993.

2001: In September, ADEQ completed the second FYR of the OU1 remedy.

2002: In response to the FYR, Motorola conducted studies and evaluated the OU1 groundwater treatment remedy in an effort to optimize the system. In November, ADEQ determined that the soil cleanup was complete in the SWPL area. Another [health consultation](#) was completed by ATSDR.

2003: In April, Motorola shut down the groundwater treatment system upon discovering cracks in the carbon vessels that serve as air emission controls. The OU1 Effectiveness Report was submitted and ADEQ identified three areas of concern: 1) the stagnation area ([downgradient](#) of the off-site capture zone); 2) the area to the north around monitor Well EW-18; and 3) the capture of contaminants in bedrock. In October, Motorola submitted a Letter of Intent to conduct a FS to evaluate other remedial alternatives and/or optimize the current groundwater treatment system. Since the groundwater treatment system was off for approximately six months until the air emission controls were replaced, ADEQ required Motorola to conduct an evaluation of capture. Motorola determined that during the time the system was off, contaminated groundwater did not migrate past the capture zone.

2004: In April, Motorola spun off its semiconductor sector into a new company, Freescale Semiconductor, a wholly owned subsidiary of Motorola Inc. Freescale Semiconductor agreed to implement the requirements of the OU1 CD and the OU2 [Unilateral Order](#).

2005: In September and December, Freescale submitted a Groundwater Remedial Alternatives Analysis to evaluate other remedial alternatives and potential optimizations to the groundwater treatment system.

2007: Freescale installed three groundwater monitor wells at the Old Cross Cut Canal to better define the groundwater contamination and to evaluate the effectiveness of the treatment system. A FYR Addendum report was issued by ADEQ in October, which provides an update on the action items that were listed in the third FYR report dated September 2006.

2008: As of January, the OU1 groundwater treatment (located at 5005 E. McDowell Road) system treated approximately 2.8 billion gallons of groundwater. Since July 1992, 19,285 pounds of contaminants were removed.

In December, Freescale installed one bedrock extraction well and two bedrock monitor wells for a bedrock pilot study to collect additional bedrock permeability information and to evaluate bedrock groundwater extraction and its potential to remove mass and enhance the extent of vertical capture in the bedrock aquifer. Well installation included geophysical logging of the bore holes. Future work

includes short-term bedrock extraction well pumping tests, and extended extraction testing and water level and water quality monitoring.

2009: Freescale began conducting the bedrock extraction pilot test in September and researching alternative end uses for the treated water. As of December, the treatment plant has treated 1.2 million gallons of groundwater and an estimated 495 pounds of VOCs were recovered.

2010: Work was continued on the Bedrock and End Use Alternatives. Community interviews were held for the FYR and to update the CIP.

Operable Unit 2

Site Discovery: In 1983, ADEQ discovered groundwater contamination in the area known today as OU2. TCE was detected at the Desert Hills Well (Monroe and 27th Street) at 640 ppb, at the Security Center Well (Central Avenue and Van Buren) at 202 ppb, and at the Eastlake Park Well (Jefferson and 16th Street) at 44 ppb. At the time of discovery, it was not known that Motorola's contamination extended beyond the Old Cross Cut Canal. Therefore, the contamination discovered in this area was initially thought to be a separate contaminant plume known as the East Washington (EW) Area.

1985: From 1985 to 1989, ADEQ conducted an RI and initiated an investigation of PRPs. In 1987, the EW area was listed on ADEQ's [Water Quality Assurance Revolving Fund](#) (WQARF) Priority List. The study area boundaries were determined to be Thomas Road to the north, Lower Buckeye Road to the south, 48th Street to the east, and 7th Avenue to the west.

1988: In July, questionnaires were mailed to 995 facilities located in the EW area requesting information regarding their hazardous substance use, storage, and disposal practices. In August 1989, ADEQ completed the Phase I report for the EW area. Questionnaire responses were evaluated by ADEQ to determine which facilities warranted additional investigations. At the time, four companies were found to have potential sources of contamination that may have contributed to the groundwater plume: Tiernay Turbines (now [Walker Power Systems](#)), Arvin Industries, FMC Corporation, and AlliedSignal (now Honeywell).

1990: From 1990 to 1992, ADEQ and Motorola continued an area-wide groundwater investigation to define the extent of groundwater contamination in the OU2 area.

1992: Area-wide sampling events were coordinated to include Motorola wells and EW wells. The extent of groundwater contamination prompted ADEQ and EPA to develop a second OU to address groundwater contamination before a final remedy is selected. Motorola submitted the RI report to ADEQ which confirmed that contamination migrating from the Motorola facility had extended into the EW area. ADHS completed a Baseline Risk Assessment that concluded: *The risk of public exposure to groundwater is limited, and therefore causes no imminent health hazard.* EPA completed an Ecological Risk Assessment that concluded: *... because of [the VOC's] high volatility and low toxicity relative to freshwater aquatic criteria, exposure of biota to acute or chronic levels of TCA and TCE may not be a concern. Inorganics (arsenic and lead) would be of most concern to biota because of their exceedance of the fresh water criteria, persistence in the environment, and their potential for bioaccumulation.*

During this year EPA named additional PRPs: AlliedSignal (now Honeywell), ITT Cannon, and Tiernay Turbines (now Walker Power Systems). In 1993, EPA named the City of Phoenix a PRP as the landowner of a portion of the Honeywell and ITT Cannon properties.

1993: In August, Motorola submitted a draft Interim Remedy FS report which covers the same area as the final Remedy RI report. Sixty-seven remedial alternatives were evaluated in accordance with the criteria listed in the NCP, and ROs were proposed. The document was approved by ADEQ in January 1994. ATSDR completed an update to the 1988 Health Assessment.

1994: In July, ADEQ and EPA issued the ROD selecting the interim groundwater remedy. The purpose of the OU2 interim remedy is to provide additional containment of contaminated portions of the groundwater. The interim remedy included groundwater extraction near 20th and Washington Streets, treatment of the water by ultraviolet oxidation and granular activated carbon (GAC), and discharge of the treated water to the Grand Canal for irrigation use.

1995: ADEQ issued a closure letter to ITT Cannon.

1996: ATSDR completed an update to the 1988 Health Assessment and the 1993 update to the Health Assessment. In October, Motorola and the City of Phoenix signed a CD with ADEQ to implement the design of a groundwater containment and treatment system for OU2. Honeywell withdrew from the agreement and did not participate in the design.

1997: ADEQ and EPA determined that the investigation of groundwater contamination from 52nd Street to 7th Avenue would continue under the federal Superfund program. The EPA delegated its authority to ADEQ to continue to be the lead agency for the OU2 area.

1998: In November, EPA issued a Unilateral [Administrative Order](#) (UAO) to Motorola and Honeywell (the Companies) for construction, start up, and two years of operation and maintenance of the groundwater treatment system. EPA became the lead agency for the remedial action phase for OU2.

1999: In July 1999, Motorola submitted the OU2 final (100%) Design report. On December 28, ADEQ approved the final 100% Design report. In November, the Companies submitted the OU2 Remedial Action Work Plan to EPA.

2000-2001: In March 2000, under the oversight of EPA, construction of the treatment system began and was completed in September 2001. The OU2 groundwater treatment system became fully operational, designed to pump at a rate of approximately 5,000 gallons per minute (gpm). The treated water is discharged to the Salt River Project Grand Canal for irrigation use and has met all treatment standards.

2002: In November, Motorola submitted an evaluation of groundwater extraction rates by conducting a model. The results of the model indicated that the extraction rates of the OU2 system can be substantially reduced while still maintaining capture of the observed plume. The steadily declining regional groundwater levels have reduced the saturated thickness of the Salt River gravels

(the primary groundwater aquifer), thereby reducing the amount of groundwater available for pumping. The pumping rate was reduced to 2,650 gpm.

2003: In April, the Companies submitted the Remedial Action report. The report provided documentation to show that the OU2 groundwater treatment system has attained capture of the contaminant plume.

2005: ADEQ issued a UAO (a legal document which requires work be done) to Joray Corporation to conduct an investigation at its former facility, Kachina Testing Laboratories.

2006: As of January, the OU2 capture and treatment system treated over 4.5 billion gallons of water and removed over 6,000 pounds of contamination.

The second FYR was completed in September. In order to determine the protectiveness of the remedy, ADEQ conducted studies, perform inspections of the treatment systems, and review existing operation and maintenance information.

2007: The Companies installed four sets of groundwater monitor wells to the south and west of the southern most groundwater extraction well. Three additional locations were drilled during the month of November to evaluate groundwater elevations, contaminant concentrations, and bedrock.

2008: As of September 30, the OU2 groundwater treatment system treated over 7.6 billion gallons of groundwater and removed over 10,567 pounds of contamination since the system began operation in December 2001.

2009 - 2010: Freescale and [Honeywell](#) (collectively referred to as “the Companies”) negotiated a [CD](#) with ADEQ for operation of the OU2 treatment system and for ADEQ to take over oversight from EPA. In July 2010, the decree was approved by the Federal District Court in Phoenix

As of the end of September 2010, approximately 12,334 pounds of VOCs have been removed from the subsurface.

Operable Unit 3

Site Discovery: OU3 was formerly part of the East Washington (EW) Area which was listed on the WQARF Priority List in 1987. In 1997 the EW Site was not re-listed on the new WQARF Registry (See OU2 Site History). On November 26, 1997, EPA sent a letter to ADEQ creating a third OU and establishing the study area boundaries.

2000: In June, EPA completed its groundwater flow and transport model for the Site. One objective of the model was to assess the possibility of contaminants from the Companies’ source areas migrating beyond OU2. In February, EPA sent a letter to ADEQ which stated that after conducting its own modeling effort, EPA has concluded that the down gradient boundary (7th Avenue) for the study area is appropriate. EPA further stated that with the available information to date, it appears that Motorola’s releases are not likely to have migrated beyond 7th Avenue.

2001: In December, EPA completed a work plan to conduct a groundwater investigation. Drafts of this work plan were made available to the public for comment.

2002: EPA installed 15 groundwater monitor wells to investigate the nature and extent of groundwater contamination in the area. Monitor wells in clusters of up to three were installed to define the lateral and vertical extent of contamination.

2003: In January, EPA completed a supplement to the work plan to install additional monitor wells that are needed to complete the groundwater investigation. The EPA installed 16 new groundwater monitor wells as part of the on-going groundwater investigation. EPA identified eight facilities in 2003 and four facilities in 2005 that may be potential sources to soil and groundwater contamination. EPA initiated negotiations with PRPs for investigations of soil and groundwater conditions at the facilities identified in 2003. Six agreements have been reached and work has begun at those facilities.

2005: EPA issued the final March 2004 Groundwater Monitoring report in January. The final Groundwater Investigation report summarizing the finding of the Phase I and Phase II Groundwater Investigation in OU3 was submitted in January. It provided recommendations for completion of the RI. EPA also issued the final Groundwater Investigation report Phase I and II Well Installation in January. The RI/FS Draft Work Plan was submitted in April. In August, a groundwater monitoring report for the well network in the OU3 Study Area was submitted. Groundwater monitoring reports are prepared after each semi-annual sampling event.

2007: EPA completed the March 2007 Groundwater Monitoring report which was finalized in September 2007. Several sites within OU3 conducted investigations in 2007 which are described in the individual facility histories below.

2008: EPA completed the September 2007 and February, 2008 Groundwater Monitoring reports in February and July, 2008, respectively.

2009: On September 22, the EPA signed a Settlement Agreement and AOC with Honeywell and APS to complete an RI/FS for OU3.

2010: In October and November, EPA installed seven shallow and intermediate groundwater wells as part of the Phase III OU3 Groundwater Investigation to help delineate the extent of the groundwater plume. Soil vapor monitoring wells are to be installed in 2011. Semi-Annual sampling reports are submitted in March and September of each year.

Additional Facilities

Honeywell (OU2)

Site Discovery: The Honeywell 34th Street facility was constructed in 1951 and continues to operate today. Historically, the Honeywell facility has operated under the names of AiResearch Manufacturing Company of Arizona, Garrett Turbine Engine Company, and AlliedSignal Aerospace Company. The Honeywell 34th Street facility is approximately 118 acres and consists of more than 130 buildings. Honeywell and its predecessors have conducted jet engine design, assembly, testing, and repair facilities at the Site. Some of the chemicals that are known to have been used at the facility are: lubricating and cutting oils, paints and paint stripper, acids for etching, metal solutions for plating, various types of jet fuel, and solvents used for vapor degreasing, cleaning jet engines, and as a refrigerant.

Releases of contaminants to the environment have occurred in a number of different ways at the Honeywell facility. Degreasers, drywells, underground and above ground storage tanks, underground piping and trenches, chemical storage areas, solvent recycling areas, and areas of handling/transferring solvents are all considered potential sources of contamination at the Honeywell facility. The following are examples of how chemicals were used and the pathway for environmental contamination:

- The facility used about 65 vapor degreasers (used to clean engine parts) from 1955 through 1995 that contained a variety of different solvents including TCE, TCA, and freon. Spills occurred occasionally when handling parts, cleaning the degreasers, and replacing the solvent.
- TCE was also used as a refrigerant from 1955 to 1984 in two low temperature engine testing chambers located in Building 202. It's estimated that 18,000 gallons of TCE were contained in the system. Each chamber is located over a concrete pit that collected wastes from the operation of these chambers. In 1993, samples collected from these pits indicated high levels of TCE. These pits were not designed to contain liquid hazardous waste.
- Throughout the facility, there were approximately 50 drywells and approximately 165 sumps. The drywells were used for collecting storm water runoff and drainage from about 50 jet engine test cells where solvents (TCE, TCA, and freon) were used. A system of trenches and pipes inside the test cells was used to route the waste water, oils, solvents, and spilled jet fuel to a series of drywells. Eventually the drywells were replaced with concrete sumps. Samples collected from the test cell wastes indicated very high levels of jet fuel components and solvents.
- Beginning in 1951, the oil chip yard (located west of Building 102) was the main chip, oil, and acid storage area for the facility. There was a trench and sump system that was designed to catch runoff from the metal chips that were coated with cutting oils and solvents from machining. This area also housed an oil reclamation facility, a solvent distilling machine, and 2 underground and above ground storage tanks. The oil chip yard also became the main area for TCE and TCA handling, dispensing, storage, and recycling. The highest concentrations of TCA in groundwater (40,000 ppb) found at the facility were collected from a monitor well in this area.
- In Area 4 (the western area of the facility) it is known that workers disposed of solvent wastes on the ground. Also, there are records of solvent spills in some of the buildings and photographs of soil staining in the area. This area was a large waste storage area for drums

of chemicals plus the oil and solvent coated chips. Spills from this area were directed to a trench and sump system that was not designed to hold liquid hazardous waste.

1983: In June, a preliminary assessment (PA) was completed by EPA. The purpose of the PA was to review existing information regarding the facility and assess the threat, if any, posed to public health, welfare, or the environment, and to determine if future action under the [Comprehensive Environmental Response, Compensation, and Liability Act](#) (CERCLA)/[Superfund Amendments and Reauthorization Act](#)/SARA may be warranted. EPA determined that further investigation of the Site would be necessary. In 1983, the Honeywell 34th Street facility was identified as a potential hazardous waste site and entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).

1985: From 1985 to 1986, Honeywell implemented a UST Replacement Program of tanks that were installed in the mid-1950s. A total of 15 tanks were removed and 20 new tanks were installed. Honeywell stated that these 30-year-old USTs were in good working condition when they were removed and there was no evidence of leaks.

1988-2000: In May 1988, Honeywell submitted a Sump Removal Proposal to remove 25 sumps. Honeywell proposed to collect soil samples only if there was visual evidence of soil staining. Approximately one year earlier, in 1987, Honeywell collected liquid samples from these sumps that indicated the presence of solvents, such as: TCA at 8,900,000 ppb, TCE at 5,300,000 ppb, PCE at 26,200 ppb, and Freon at 380,000,000 ppb. In 1998, ADEQ requested all data associated with the sump removal project pursuant to A.R.S. §49-288. The 1987 VOC data was submitted to ADEQ for the first time in October 2000 pursuant to a second request. ADEQ requested Honeywell to submit a proposal for site characterization.

1989: In January, Honeywell submitted a letter to ADEQ with a sump removal report and plans to proceed with remedial action alternatives. In February, ADEQ issued a letter to Honeywell indicating that the extent of contamination associated with the removed sumps was not defined.

1992: Groundwater quality data from newly installed groundwater monitor wells indicated elevated concentrations of: TCE, TCA, [dichloroethene](#) (DCE), [dichloroethane](#) (DCA), [vinyl chloride](#), and other VOCs. In November, the EPA issued a [General Notice Letter](#) identifying Honeywell as a PRP in the Site.

1993: In February, ADEQ issued an Opportunity Letter to Honeywell for additional groundwater and soil investigations.

1995: Honeywell installed additional groundwater monitor wells and conducted a seismic refraction investigation to characterize the subsurface bedrock ridge. Honeywell discontinued use of TCA at the facility.

1997: A second phase of the seismic refraction investigation was conducted to characterize the subsurface bedrock ridge. In June, an SVE pilot test was conducted based on the soil gas data collected in the Old Oil Chip Yard, around Building 140. From August 1997 through November 1999, a full scale SVE system was voluntarily operated in the Old Oil Chip Yard. The SVE system

removed approximately 2,600 lbs of solvents and about 207,000 lbs of jet fuel from the soil. The SVE system is no longer in operation.

1998: In 1998, ADEQ issued an Information Request pursuant to A.R.S. §49-288 to Honeywell. ADEQ specifically requested documentation and data associated with the 1988 sump removal project.

1999-2005: In April 1999, Honeywell detected floating free product of jet fuel in several on-site groundwater monitor wells. Fingerprinting analyses indicated that the floating free product was a mixture of [JP-4](#), Jet A, and JP-10. The maximum VOC concentrations reported were: TCE at 99,000 parts per billion (ppb); Freon 113 at 23,000 ppb; Freon 11 at 11,000 ppb; 1,1-DCA at 24,000 ppb; cis-1,2-DCE at 190,000 ppb; and vinyl chloride at 80,000 ppb.

On September 19, 1999, Honeywell entered into an [AOC](#) with ADEQ to conduct a Focused RI. In December, pursuant to the AOC, Honeywell submitted a research report which detailed the facility's historical chemical uses, handling practices, and known or suspected releases. Honeywell submitted its draft Focused RI report in September 2004. After addressing ADEQ comments, Honeywell submitted its Revised Focused RI report on December 30, 2005.

In March 2000, ADEQ approved Honeywell's proposal to begin the removal of the floating free product. In August 2000, Honeywell submitted a Conceptual Site Model to ADEQ.

In February 2001, ADEQ issued a Notice of Violation (NOV) to Honeywell and to the disposal facility for the illegal transport of hazardous waste. In March 2001, Honeywell discovered a small amount of pure [mercury](#) in the storm drain outside Building 301. The storm drain was removed and the soils around the pipe were excavated. Samples were collected throughout the trench and analyzed for mercury. Concentrations of mercury were as high as 2,600,000 ppb.

In February 2003, Honeywell conducted a [bioventing](#) pilot study to collect information to assess if this technology is appropriate to remove the floating free product jet fuel/solvent mixture. In July 2003, Honeywell submitted to ADEQ a Corrective Action Plan (CAP) that evaluated three remedial action alternatives for the [jet fuel contamination](#).

In July 2004, Honeywell submitted the Revised CAP that responds to ADEQ comments and provides replacement pages to insert into the Corrective Action Plan. In December 2004, ADEQ issued an Notice of Violation and Demand for Stipulated Penalties to Honeywell for failing to provide ADEQ notice that a sump near Building 401 (an identified potential source) was going to be removed and did not provide ADEQ the opportunity to split sample.

On December 31, 2004, Honeywell reported a jet fuel spill to ADEQ's Spill Response Hotline. In response to a request from the Superfund Program, Honeywell submitted its design of the Biologically Enhanced [Soil Vapor](#) Extraction (BSVE) system that is being implemented pursuant to the CAP under the UST Division of ADEQ. For more information on the jet fuel cleanup, contact the UST project manager below under "Contacts".

In April 2005, Honeywell submitted a summary of potential sources, characterization and remedial efforts at the Honeywell 34th Street facility.

2008: In September, ADEQ approved the final Focused RI for the Honeywell 34th Street Facility.

2009: From May through November, Honeywell performed the start-up and shakedown process for the BSVE system located at the Honeywell 34th Street facility.

2010: As of the end of September, approximately 1,771,000 pounds of VOCs are estimated to have been removed or biodegraded since May, 2009, and approximately 7,297 gallons of free product were directly recovered from groundwater wells since June 1999.

Honeywell Areas 9, 13, and 21 (OU2)

2004: In December, ADEQ and EPA sent a joint 288/104(e) Request for Information to Honeywell. In reviewing Honeywell's original responses to the August 20, 2002 104(e) Information Request (submitted October 31, 2002 and June 13, 2003), ADEQ determined that Honeywell's responses were incomplete and unresponsive to certain questions. Honeywell submitted partial responses to the Information Request in February 2005.

2010: ADEQ is working with Honeywell to enter into AOCs, legal documents which outline how work will be conducted at each of the Sites.

ITT Industries (OU2)

2007-2008: ADEQ entered into an AOC with ITT to conduct additional soil gas sampling and groundwater sampling on the property. ITT submitted a work plan for ADEQ review to conduct remedial investigative work.

2010: ITT completed all work required by the AOC and the Agencies have not asked for any additional investigation on the property at this time.

Aviall Inc. (OU2)

2009: ADEQ entered into an AOC with Aviall to conduct soil gas sampling and groundwater sampling on the property.

2010: Aviall completed all work required by the AOC and the Agencies have not asked for any additional investigation on the property at this time.

D-Velco Manufacturing of Arizona (OU2)

2004: On November 12, D-Velco notified ADEQ that it intended to conduct its own soil gas survey and forwarded a work plan to ADEQ. ADEQ will not review the work plan outside of the Administrative Order process.

2005: Responses to a Supplemental Request for Information pursuant to Section 104 of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and 288 of WQARF were submitted in June and October.

Kachina/Joray Corporation (OU2)

2005: The draft Research report was submitted in June. ADEQ issued a Unilateral Administrative Order (a legal document which requires work be done) to Joray Corporation to conduct an

investigation at its former facility, Kachina Testing Laboratories. Confidential settlement negotiations are on-going.

2007: A Conceptual Site Model (CSM) was submitted by Kachina/Joray in March. After ADEQ's initial review and comments, a revised CSM was submitted in September. Kachina/Joray addressed ADEQ's comments and submitted the final CSM in November.

2008: Kachina/Joray submitted, and ADEQ has approved, a RI/FS study work plan. Work began late in the year once all access issues were resolved.

2009: Kachina/Joray completed Phase I of the RI. ADEQ approved the work that was completed and required Kachina/Joray to draft a work plan for Phase II.

2010: ADEQ approved the work plan for additional investigative activities. A draft report summarizing the work was submitted to ADEQ in September. The Agencies are currently working on comments to this draft report.

Arvin Meritor/ AdobeAir / Cooper Industries (OU3)

2004: EPA, Arvin Meritor, AdobeAir, and Cooper Industries entered into an AOC in September to conduct a Focused RI/FS at the 500 S. 15th Street facility. The draft Quality Management Plan was submitted in November, and the final Quality Management Plan that addresses EPA comments was submitted in January 2005. The draft RAO Technical Memorandum was submitted in December, and the revised RAO Memo that addresses EPA comments were submitted in January 2005. The draft Research report was submitted by Arvin Meritor/ AdobeAir/Cooper Industries in November, and the final report was submitted in June 2005.

2005: In January, the revised draft Remedial Action Technical Objectives Memorandum was submitted by Arvin/AdobeAir. Arvin/AdobeAir submitted its Quality Management Plan on January 12. Arvin/Adobe Air/Cooper Industries submitted the revised Draft RI/FS Work Plan on November 1. The final work plan was due on December 21. Sampling will begin after the work plan is approved.

2007: Arvin Meritor/Adobe Air/Cooper Industries submits monthly progress reports and quarterly tracking logs in a timely manner. Reports generated for 2007 included the draft Final Soil Gas Investigation and the draft Indoor Air Sampling Work Plan. Groundwater sampling was conducted in March and September. The March groundwater sampling results detected TCE at 13 µg/L in monitor Well 4 (MW-4). The September groundwater sampling results were expected to be submitted by the end of 2007.

2008: Arvin Meritor/Adobe Air/Cooper Industries continued to submit monthly progress reports and quarterly tracking logs in a timely manner. A Phase II Soil Gas / Groundwater Investigation Technical Memorandum - Focused RI was conducted by Adobe Air and has been approved by the Department and the Agency. Groundwater sampling was conducted at this facility in March 2008 in conjunction with the Focused RI. The March 2008 groundwater sampling results indicated that with the exception of 1,4 dioxane, COCs were detected at concentrations below laboratory method detection limits.

2009: Arvin Meritor/Adobe Air/Cooper Industries continued to submit monthly progress reports and quarterly tracking logs in a timely manner. Groundwater sampling was conducted at this facility in March and September in conjunction with the Focused RI. Adobe continues to evaluate indoor air at the facility. A Soil Vapor Extraction Pilot Test report was completed in 2009.

2010: Arvin Meritor/Adobe Air/Cooper Industries submitted the final Soil Vapor Extraction Design and construction was to begin in December.

Arizona Public Service (APS) (OU3)

2004: In July, EPA and APS entered into an AOC to conduct a Focused RI/FS at the APS facilities located at 505 S. 2nd Avenue, 502 S. 2nd Avenue, and 501 S. 2nd Avenue. APS submitted the Remedial Action Objectives Technical Memorandum in September and the revised RAO Memo in November that addressed EPA comments. In September, APS submitted the draft Research report. The Research report describes the historical operations including the uses and disposal of chlorinated solvents, a summary of environmental investigations conducted to date, and identifies potential source areas that warrant further investigation. APS submitted the Draft RI/FS Work Plan in November. In December, APS submitted the draft Health and Safety Plan and the draft Sampling and Analysis Plan.

2005: EPA issued comments to the work plan in January, and the final work plan was submitted in April. Sampling is on-going, and the RI report will be drafted 60 days after completion of the field work. APS submitted a Revised Research report in January, and the report was finalized in April.

2007: APS submits daily, weekly and monthly reports and the quarterly tracking logs in a timely manner. APS has submitted several reports including, the 501 and 505 Properties Completeness Review, the Final Quality Assurance Project Plan, the APS Western Boundary Investigation, the Regional Groundwater Flow Parameters Model, and the Soil Vapor Monitoring Well Installation report.

Two soil vapor monitor wells have been installed at the facility in 2006 and 2007 (SVMW-5 and SVMW-6). The facility has conducted extensive soil vapor monitoring and continues to sample groundwater beneath the Site.

2008: APS continues to submit daily, weekly and monthly reports and the quarterly tracking logs in a timely manner. APS collected groundwater samples from groundwater monitor wells in May. APS completed a draft *Technical Memorandum 502 Property Completeness Review*. This report has been approved and will be incorporated into APS' Site-Wide RI report, which will be submitted by early 2009.

2009: APS has submitted its sitewide focused RI report. The agencies are working with APS to finalize this report.

2010: The Final focused RI report was submitted to the agencies for review in May.

Baker Metal Products (OU3)

2003: A report entitled *Historical Environmental Data at Former WAMCO and Opinion Regarding Listing as a PRP in the Motorola 52nd Street Superfund Site* was submitted in December.

2004: In February, the draft Quality Management Plan was revised to address the January 20, EPA comments. The draft Research report was submitted in April by Smith Consultants, and the revised Research report that addresses EPA comments was submitted in June. The draft Remedial Action Objectives (RAO) Technical Memorandum was submitted in April, and the revised RAO Memo that addresses EPA comments was submitted in July. A draft RI/FS Work Plan (Includes FSP, QAPP, and HSP) that incorporated EPA comments was submitted in September with the final RI/FS Work Plan (Includes FSP, QAPP, and HSP) submitted in November.

2005: The draft Soil Gas Sampling Technical Memorandum was submitted in January. EPA provided comments in February. Additional drilling and sampling that was recommended in the draft Soil Gas Sampling Technical Memorandum was completed in 2005.

2007: Baker Metals submitted the draft Focused RI report in February. Comments were submitted by EPA and ADEQ. The report is expected to be finalized by the end of 2007. All monthly reports and quarterly tracking logs were submitted in a timely manner.

2008: EPA approved the RI report in March. All monthly reports and quarterly tracking logs were submitted in a timely manner.

2009: EPA issued a Notice of Completion of Work on September 9 agreeing with the recommendation of the Focused Remedial Investigation.

Fruehauf (OU3)

2004: In February, the report entitled Evaluation of Environmental Conditions was submitted by [Wabash National Corporation](#). The Historical Research report was submitted in May. The Site Investigation Sampling and Analysis Work Plan was also submitted in May. A Focused Site Investigation report was submitted in June. The Revised Focused Site Investigation report addressing EPA comments was submitted in August.

Paul McCoy's Laundry and Cleaners Supply (OU3)

2004: ADEQ issued an Opportunity to Conduct Work letter to install monitor wells to investigate the potential of free product [tetrachloroethene](#) (PCE) at the bottom of the aquifer. In December, ADEQ sent a Statement of Work to Laundry and Cleaners Supply to drill a boring to bedrock and collect groundwater samples at discrete intervals. If groundwater samples are non-detect, a monitor well will not need to be installed.

2007: The facility submitted the RI/FS Work Plan in March. EPA and ADEQ submitted comments to the facility and the report was approved in June. All monthly reports have been submitted on time.

2008: Paul McCoy's company submitted an Ability to Pay Agreement.



2009: EPA and Paul McCoy's company reached a settlement on the company's ability to pay.

Salt River Project (SRP) (OU3)

**Active Soil Gas Sampling at
SRP 16th Street Facility**

2004: EPA and SRP signed a Consent Order to conduct a focused RI/FS at the 16th Street Facility. SRP submitted the Quality Management Plan in July and the final Quality Management Plan which addresses EPA comments in December. SRP submitted the RI/FS Remedial Action Objectives Technical Memorandum in August. Also in August, SRP submitted a draft Research report, and they submitted a revised Research report in December to address EPA comments. In September, the draft Focused RI/FS Work Plan was submitted by SRP and the final work plan was submitted in January 2005. In December, SRP submitted its Quality Management Plan and the Revised Research report.

2005: In January, SRP submitted the revised Technical Memorandum for Remedial Action Objectives. SRP submitted the final RI/FS Work Plan in September. Sampling is on-going and the RI Report will be drafted 60 days after completion of the field work.

2007: SRP conducted extensive field activities including groundwater and soil vapor sampling as well as the removal of a sump near the southwest corner of the facility. SRP has submitted several reports including the Sump Removal report, the Soil Vapor Monitoring report, the Indoor Air Quality Monitoring report and updates to the Site Safety Plan. All daily, weekly and monthly reports and quarterly tracking logs have been received on time.

2008: SRP has submitted its Focused RI report, which is under review by the Agencies. All daily, weekly and monthly reports and quarterly tracking logs have been received on time.

2009: The agencies approved SRP's Focused RI report and determined that at this time, SRP would not need to conduct a Feasibility Study at the Site.

Union Pacific Railroad (OU3)

2004: Union Pacific Railroad (UPRR) submitted a draft Site Inspection Work Plan in February and the final work plan in April. UPRR submitted a draft Field Sampling Plan in May, and the final Field Sampling Plan was submitted in June. In July, UPRR submitted the Preliminary Soil Gas Results and the final soil gas survey analytical data was submitted in October. UPRR submitted the Soil Gas Inspection report in November.

2010: EPA is planning to conduct additional work at UPRR in the future.

Walker Power Systems (OU3)

2004: In November, Walker Power submitted its Research report.

2007: EPA and ADEQ approved the final Research report in June. A UAO was also issued to the facility in June which requires the facility to conduct a focused RI/FS at this Site. The RI/FS must include a RI/FS Work Plan, a Health and Safety Plan, and a Sampling and Analysis Plan. The RI/FS must also describe how the facility will collect data to characterize this Site, determine the nature

and extent of contamination assess risks to human health and the environment, and conduct treatability testing.

2008: Walker Power conducted a portion of their RI.

2009: Walker Power worked on site access agreements with an adjacent land owner before proceeding with the remaining field work portion of its RI. The Phase I RI was approved by EPA on December 17.

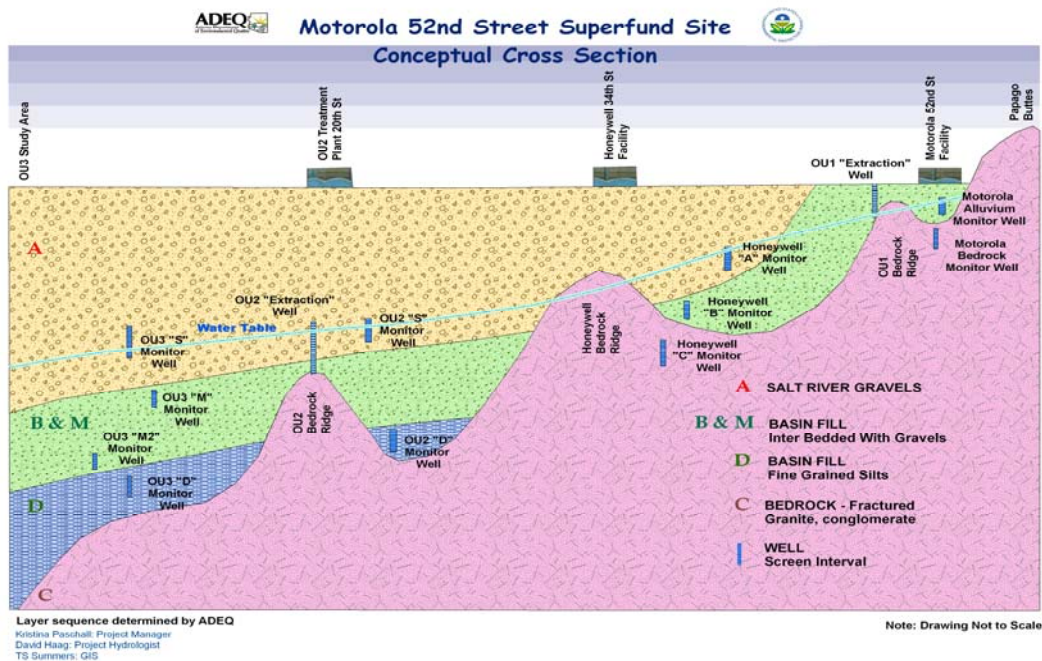
2010: Semi-Annual groundwater sampling is ongoing.

Site [Hydrogeology](#):

Operable Unit 1

Two distinct geologic units have been described as the primary water-bearing formations in the OU1 area of the Site. These include the unconsolidated alluvium and bedrock consisting of Precambrian metarhyolite and granite as well as Tertiary volcanics and indurated sediments. Early investigations for Motorola demonstrated that groundwater and contaminants move between the alluvium and bedrock. Because these geologic units interact hydraulically and chemically, they have been classified as the [alluvial](#)-bedrock aquifer system.

Recent additional analysis conducted of well boring logs, cores and cuttings in the Site area have shown that there are actually three kinds of unconsolidated sediments in the OU1/OU2 area: basin fill, Salt River gravels, and uppermost alluvium (Reynolds and Bartlett 2002). Only the basin fill and the upper alluvium units underlie the OU1 area and only the basin fill is saturated in the OU1 area. The basin fill, the lowest and oldest unit, consists of slightly to moderately consolidated sandy and silty sediments and was deposited on top of the Tertiary and Precambrian bedrock units. In the western portion of the Site area, but absent from the actual OU1 area, the basin fill is overlain by very coarse, unconsolidated gravel, consisting of pebbles, cobbles, and boulders in a sandy matrix. This unit represents older channel deposits of the Salt River and is, therefore, named the Salt River gravels. The youngest unit in the Site area is the uppermost alluvium and consists of silt, sand, and minor amounts of gravel. The three units together fill the Phoenix basin extending west from the Papago Park area, immediately to the east of the 52nd Street facility, deepening toward the west. The term alluvium has been used to describe both shallow alluvium and basin fill.



Combined, alluvium and basin fill vary in thickness from less than 20 feet at the 52nd Street facility to approximately 150 feet at 40th Street. The unit generally becomes thicker to the west. Cross-sectional views of the alluvial-bedrock aquifer system show the alluvium and basin fill are unconfined. The hydraulic conductivity of the basin fill in the OU1 area varies from 2 feet/day (0.0007 cm/sec) to approximately 50 feet/day (0.071 cm/sec).

Bedrock underlying the basin fill has undergone several deformational events resulting in faulting, fracturing, rotation, and vertical and horizontal displacement. Two dominant fracture, fault, and lineament trends may be observed: a northwest-southeast trend, and a northeast-southwest trend. Hydraulic conductivity in the bedrock is strongly influenced by the presence and frequency of fractures. Measurements of hydraulic conductivity in bedrock vary from 1.4×10^{-3} feet/day (4.9×10^{-7} cm/sec) to 2.1 feet/day (7.5×10^{-4} cm/sec). Fracture densities measured in rock core samples range from 1 to more than 15 fractures per foot. The double porosity model best describes bedrock in the OU1 area. The double porosity model describes bedrock aquifer characteristics with hydraulic conductivity controlled by secondary porosity (fractures) and storage capacity determined by primary matrix porosity.

Operable Unit 2

The OU2 Area hydrogeology consists of two primary alluvial units: the Salt River gravels and the basin fill. Both of these units are geologically distinct but hydraulically connected. The Salt River gravels are a coarse grained deposit, with a higher permeability, whereas the basin fill deposits are a finer grained deposit and less permeable than the Salt River gravels. These alluvial units are underlain by a buried bedrock pediment consisting of tilted and faulted mid-Tertiary (sedimentary breccias, conglomerates, and sandstones; fine-grained clastics; and volcanics) and Proterozoic (metarhyolite and granites) rocks. This pediment is exposed at Papago Park, but becomes buried to the west toward Sky Harbor Airport. This buried pediment has a very gentle slope to the west, but contains at least two broad, low-relief features: a broad trough cut into Tertiary sedimentary deposits

and a northwest-trending bedrock ridge located to the north of Sky Harbor Airport and under the Honeywell 34th Street facility.

The OU2 system extraction wells are installed into Late Tertiary and Quaternary alluvial sediments. These deposits comprise approximately the upper 240 feet of geologic material above the sedimentary/igneous bedrock in this area of the Salt River Valley. Over the years, the unconsolidated deposits of the Salt River Valley have been defined as part of various geologic and hydrogeologic investigations and refined as more subsurface information became available. Reeter and Remick (1986) subdivided the unconsolidated deposits into three stratigraphic units (from oldest to youngest): the lower conglomerate unit, the middle alluvial unit, and the upper alluvial unit. Anderson, Freethey and Tucci (1990) informally redefined these deposits from a hydrostratigraphic basis (from oldest to youngest): pre-Basin and Range sediments, lower basin fill, upper basin fill, and stream alluvium. Hammett and Herther (1995) further refined the classification of these deposits into three stratigraphic units (from oldest to youngest): lower basin fill, upper basin fill, and alluvium. Most recently, the deposits in the vicinity of OU2 were subdivided into three stratigraphic units (from oldest to youngest): basin fill, Salt River gravels, and uppermost alluvium (Reynolds and Bartlett, 2002). From a hydrogeologic standpoint, the most important distinction between these units relates to their respective permeabilities. The basin fill has a hydraulic conductivity of from 1 to 60 feet/day. The Salt River gravels have a considerably higher hydraulic conductivity of between 200 and 450 feet/day (Reynolds and Bartlett, 2002).

The oldest unconsolidated sedimentary deposit in the OU2 area is the basin fill unit. The basin fill is characterized by the presence of abundant silt and sand with lesser amounts of clay and gravel. These deposits are more compacted than the overlying Salt River gravels (Hammett and Herther, 1995). In the vicinity of the OU2 treatment plant, the basin fill ranges in thickness from 50 to 140 feet.

The Salt River gravels are described as well rounded gravel, cobbles, and boulders in a sandy matrix. The Salt River gravels are considered fluvial deposits associated with the ancient Salt River (Reynolds and Bartlett, 2002). In the vicinity of the OU2 treatment system, the Salt River gravels range in thickness from 110 to 170 feet.

The uppermost unit is the Quaternary alluvium. This unit is a mixture of sand, silt, and clay with varying amounts of gravels. Locally, above this unit is artificial fill material. Overall this material ranges in thickness from 2 to 20 feet and does not affect the hydraulic characteristics of the OU2 area groundwater since this unit is well above the groundwater table.

In September 2001, groundwater was encountered in the Salt River gravels at a depth of about 80 feet below ground surface (bgs) at the OU2 treatment plant and extraction well system. By September 2002, groundwater levels were at a depth of 92 feet bgs in the Salt River gravels. Because of the extended drought conditions in the Phoenix area, groundwater levels have declined about 10 to 12 feet in wells throughout the monitoring well network.

Operable Unit 3

EPA, with support from ADEQ, is currently investigating the hydrogeology of the OU3 area. At the OU2/OU3 boundary, weathered bedrock extends from about 158 to 240 feet bgs. Crystalline bedrock was identified at about 240 feet bgs on the east side of OU3 and dips towards the west where it is encountered at 400 feet bgs. Groundwater within the OU3 study area is primarily found within unconsolidated alluvium (the alluvial aquifer). The top of the groundwater table has been measured at 50 feet bgs to 85 feet bgs, with an average depth of 65 feet bgs. It is estimated that the alluvial aquifer is at least 160 feet thick. Groundwater generally flows west and southwest with a horizontal gradient of 0.003 to 0.005. The hydraulic conductivity of the alluvial aquifer ranges from 5.6 feet/day to 450 feet/day.

Honeywell

The lithology within the vicinity of the Honeywell facility is subdivided into three units: Salt River gravel, basin fill, and bedrock. The bedrock units underlying the facility include Tertiary Camels Head Formation and the Tempe Beds Formation. The Zoo Breccia member of the Camels Head Formation is a well-cemented, massive, poorly stratified breccia consisting of a fine-grained sand to silt matrix with gravel to boulder size clasts of granite and meta-rhyolite. Numerous high angle faults were observed in outcrop, which, together with the indurated nature of the rock, suggest that the fractures are the primary source of permeability.

There is an underground bedrock rise near the Honeywell facility that has been identified through bore hole drilling, as a low ridge trending northwest approximately 6,000 feet from near the southern facility property line in the central portion of the facility to north of Van Buren Street and 28th Street. The bedrock rise is a series of low hills (maximum relief of approximately 90 feet) separated by saddles. There are two saddles in the bedrock ridge near Honeywell: (1) the central saddle, located just north of the facility under East Madison and 32nd Streets, and (2) the southern saddle, located under the southeastern portion of the facility property. The bedrock ridge is important because of its impact on groundwater flow and solute transport directions near the Honeywell facility.

Salt River gravel is composed predominantly of unconsolidated sands, gravels, and cobbles, with minor amounts of silt and fine-grained sand. The presence of exotic clasts, comprised of lithologies foreign to the underlying bedrock units, as well as the mountains surrounding the basin, indicates that at least a portion is derived from river deposits transported from outside of the basin. The Salt River gravel appears to pinch out approximately 1 mile east of the facility and the upper portion of the alluvium becomes more fine-grained. These finer grained soils appear to have originated as locally-derived, coalescing alluvial fan deposits shed from bedrock areas to the east. Some of the sediment within the upper portion of the alluvium near the facility may also be locally derived alluvial fan sediments interbedded with the Salt River gravel.

The basin fill is a finer grained section of sediment that is frequently found underlying the Salt River gravel in the vicinity of the facility. The basin fill are generally comprised of silts and silty sands, with some clayey silts and clay stringers; approximately 40% to 60% silt and the remaining fraction is fine-grained sand. Where the bedrock is deep enough, a coarser-grained section of the basin fill is encountered. This lowermost portion of the basin fill consists of interbedded gravel, medium to coarse sand, silty-sandy gravel, and silty-gravelly sand. Some of the gravel clasts are exotic, which

suggest a foreign source. However, interbedding of the cleaner gravel with silty-sand and gravel suggests that the depositional environment consists of coalescing alluvial fans with concurrent deposition by a river system with its headwaters derived from outside the local basin.

In September 2002, the general direction of groundwater flow beneath the facility in the Salt River gravel and basin fill is to the southwest and west. Depth to groundwater in September 2002 ranged from 66 to 90 feet bgs at and in the vicinity of the Honeywell facility. Groundwater in recent years has been declining as much as 10 feet/year. Over the years, surface water releases to the Salt River during flow events impact water levels and flow directions in the vicinity of the Honeywell facility.

In January 2004, ADEQ produced a Top of Bedrock Contour Map of the Area Surrounding the Honeywell 34th Street and the OU2 Treatment System. ADEQ held Technical Work Group meetings throughout 2004 to discuss updating the stratigraphic conceptual model. ADEQ produced a Site-wide Lithology Table and cross sections. ADEQ conducted extensive analyses throughout 2004 and 2005 that resulted in a change of how the geology, and thus the groundwater contamination, is defined.

PRP Search:

On September 3, 2003, EPA issued General Notice Letters to the following companies in OU2:

- D-Velco Manufacturing of Arizona: 401 S. 36th Street
- Honeywell International, Inc./City of Phoenix/U.S. Air Force: 111 S. 34th Street
- Honeywell International, Inc.: “Honeywell Area 13”, 2739 E. Washington Street, 149 S. 27th Street, 202 S. 27th Street
- Honeywell International, Inc.: “Honeywell Area 9”, 3145 E. Washington Street
- Honeywell International, Inc./City of Phoenix: “Honeywell Area 21”, 1944 E. Sky Harbor Circle
- ITT Industries/City of Phoenix: 2801 E. Air Lane
- Kachina Technical Services and Processes, Inc./Phoenix Industrial Properties, Ltd. / Joray Corporation: 3027 E. Washington Street
- Laundry and Cleaners Supply, Inc.: 4120 E. Madison Street
- Papago Plating Company, Inc./B and G Investments/Thomas and Nancy Stonebraker: 2312 and 2326 E. Washington Street

On September 3, 2003, EPA issued General Notice Letters to the following companies in OU3:

- AdobeAir/Arvin Meritor/Cooper Industries: 500 S 15th Street
- Arizona Public Service/Pinnacle West Capital Corp: 505 S. 2nd Avenue, 502 S. 2nd Avenue, 501 S. 2nd Avenue
- Baker Metal Products/Estate of Basil David Russell/Phoenix Automatic Machine Company/Phoenix Manufacturing, Inc.: 1601 E. Madison
- Fruehauf Trailer Sales/Wabash National Trailer Centers/Wabash National Corporation: 902 S. 7th Street
- Paul McCoy’s Laundry and Dry Cleaners: 1624 E. Washington Street
- Phoenix Newspapers: 120 E. Van Buren Street
- Salt River Project: 1616 E. Lincoln Street

- Walker Power Systems/Tiernay Properties/Union Pacific Railroad Company/Federal Compress and Warehouse: 1301 E. Jackson Street

On March 26, 2004, EPA issued [Special Notice Letters](#) to the following companies in OU3:

- Arizona Public Service/Pinnacle West Capital Corp: 505 S. 2nd Avenue, 502 S. 2nd Avenue, 501 S. 2nd Avenue
- Phoenix Manufacturing, Inc.: 1601 E. Madison Street
- Paul McCoy's Laundry and Dry Cleaners: 1624 E. Washington Street
- Phoenix Newspapers: 120 E. Van Buren Street
- Walker Power Systems/Tiernay Properties/Union Pacific Railroad Company/Federal Compress and Warehouse: 1301 E. Jackson Street

On March 26, 2004, EPA issued Waivers of Special Notice to the following companies in OU3:

- AdobeAir/Arvin Meritor/Cooper Industries: 500 S. 15th Street
- Baker Metal Products/Estate of Basil David Russell/Phoenix Automatic Machine Company/Phoenix Manufacturing, Inc.: 1601 E. Madison
- Fruehauf Trailer Sales/Wabash National Trailer Centers/Wabash National Corporation: 902 S. 7th Street
- Salt River Project: 1616 E. Lincoln Street

On July 2, 2004, EPA issued Special Notice Letters and on July 6, 2004, ADEQ issued Consent Orders to the following companies in OU2:

- D-Velco Manufacturing of Arizona: 401 S. 36th Street
- ITT Industries/City of Phoenix: 2801 E. Air Lane
- Kachina Technical Services and Processes, Inc./Phoenix Industrial Properties, Ltd./Joray Corporation: 3027 E. Washington Street

EPA and ADEQ have not completed the PRP Search and, therefore, additional PRPs may be General Noticed. In December 2004, ADEQ issued a Scope of Work to Laundry and Cleaners Supply to install a monitor well to investigate the potential of free product PCE in the deep portion of the aquifer.

On September 1, 2004, EPA issued Special Notice Letters and in December 2004, ADEQ issued Consent Orders to the following companies in OU2:

- Honeywell International, Inc.: "Honeywell Area 13", 2739 E. Washington Street, 149 S. 27th Street, 202 S. 27th Street
- Honeywell International, Inc / Motorola, Inc.: "Honeywell Area 9", 3145 E. Washington Street
- Honeywell International, Inc.: "Honeywell Area 21", 1944 E. Sky Harbor Circle

Contaminants:

The current contaminants of concern in groundwater include [trichloroethene](#) (TCE); [trichloroethane](#) (TCA); [dichloroethene](#) (DCE), [dichloroethane](#) (DCA), [vinyl chloride](#), and [tetrachloroethene](#) (PCE). Contaminants of concern at the Site may change as new data become available.

Public Health Impact:

Currently, there are no drinking water supply wells impacted by the Site. Drinking water is supplied by the [City of Phoenix](#) distribution system from surface water located outside of the Site. The drinking water supplied to homes in the Site area is regularly tested by the City of Phoenix. If anyone has any knowledge of private wells located within the Site, please contact the ADEQ Project Manager.

Contacts:

Name	Phone/Fax	E-mail
Wendy Flood, ADEQ OU1 Project Manager	(602) 771-4410*/ (602) 771-4138 fax	Flood.wendy@azdeq.gov
Brian Stonebrink, ADEQ OU2 Project Manager	(602) 771-4197*/ (602) 771-4138 fax	Stonebrink.brian@azdeq.gov
André Chiaradia, ADEQ OU3 Project Manager	(602) 771-2296*/ (602) 771-4138 fax	Chiaradia.andre@azdeq.gov
Martin Zeleznik, EPA OU1&OU2 Project Manager	(415) 972-3543**/ (415) 947-3526 fax	zeleznik.martin@epamail.epa.gov
Janet Rosati, EPA OU3 Project Manager	(415) 972-3165**/ (415) 947-3526 fax	rosati.janet@epa.gov
Leana Rosetti, EPA Community Involvement Coordinator	(415) 972-3070**/ (415) 947-3528 fax	rosetti.leana@epa.gov

*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 Phoenix Public Library, [Saguaro Branch](#) located at 2808 N. 46th Street in Phoenix, (602) 262-6801, and the [Burton Barr Central Branch](#) (Reference Section) located at 1221 N. Central Avenue in Phoenix; (602) 262-4636.

Site files are also located 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.