

Explanation of Significant Differences

North Indian Bend Wash Superfund Site
Remedy Well PCX-1,
Scottsdale, Maricopa County, Arizona

Prepared by:



United States Environmental Protection Agency

Region 9

75 Hawthorne Street

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March 2012

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LIST OF ACRONYMS

| | |
|-----------|--|
| 1,1-DCE | 1,1-dichloroethene |
| 1,1,1-TCA | 1,1,1-trichloroethane |
| µg/L | micrograms per liter |
| AAW | Arizona American Water Company |
| ADEQ | Arizona Department of Environmental Quality |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| AROD | Record of Decision Amendment |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CGTF | Central Groundwater Treatment Facility |
| COC | contaminant of concern |
| EPA | U.S. Environmental Protection Agency |
| FYR | Five Year Review |
| HBGL | Human Health-Based Guidance Level |
| IBW | Indian Bend Wash |
| ITSI | Innovative Technical Solutions, Inc. |
| LAU | lower alluvial unit |
| LGAC | liquid phase granular activated carbon |
| MAU | middle alluvial unit |
| MCL | maximum contaminant level |
| MRTF | Miller Road Treatment Facility |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NIBW | North Indian Bend Wash |
| O&M | operation and maintenance |
| OU | Operable Unit |
| PCs | Participating Companies |
| PCE | tetrachloroethene |
| PVARF | Paradise Valley Arsenic Removal Facility |
| ROD | Record of Decision |
| SIBW | South Indian Bend Wash |
| SRP | Salt River Project |
| SVE | soil vapor extraction |
| TCE | trichloroethene |
| UAU | upper alluvial unit |
| VOCs | volatile organic compounds |

Explanation of Significant Differences

*For the Record of Decision Amendment, Dated September 2001
Miller Road Treatment Facility, Indian Bend Wash Superfund Site*

Site Name: Indian Bend Wash, Operable Unit 8 – Final Soil and Groundwater Remedy
Location: Scottsdale, AZ
Lead Agency: U.S. Environmental Protection Agency (EPA)
State Agency: Arizona Department of Environmental Quality (ADEQ)
Citation: CERCLA Section 117(c) and NCP Section 300.43five(c)(2)(i).

1.0 Introduction and Statement of Purpose

In September 2001, the U.S. EPA Region 9 signed a Final Record of Decision Amendment ("2001 AROD") addressing the vadose zone and groundwater contaminated with volatile organic compounds (VOCs), specifically trichloroethene (TCE) and tetrachloroethene (PCE), in the North Indian Bend Wash (NIBW) area in Scottsdale, Arizona.

The remedy selected in the 2001 AROD includes the addition of the Miller Road Treatment Facility, Area 12, and Area 7 groundwater extraction and treatment systems to the existing Central Groundwater Treatment Facility (CGTF) which was selected in the 1988 Record of Decision (ROD). Additional remedial actions were selected to address soil and the vadose zone in the 1991 ROD.

This Explanation of Significant Differences (ESD) pertains to a change in the treatment technology and end-use for one remedy well only, PCX-1, which is part of the selected groundwater remedy for the Miller Road Treatment Facility (MRTF) in the 2001 AROD. The MRTF groundwater remedy selected in the 2001 AROD is comprised of three extraction wells, PV-14, PV-15 and PCX-1, utilizing air stripper technology. Arizona American Water (AAW) owns wells PV-14 and PV-15 and associated water rights. The Salt River Project (SRP) owns well PCX-1 and associated water rights. Between 2006 and January 2008, the treated groundwater from all three extraction wells was conveyed to AAW's Paradise Valley Arsenic Removal Facility (PVARF), a privately owned potable supply system. Arsenic occurs naturally in the Phoenix metropolitan area and is not related to or a part of the Superfund remedy.

The 2001 AROD establishes the maximum contaminant levels (MCLs) for TCE (5 µg/L), PCE (5 µg/L), 1,1-DCE (7 µg/L), and 1,1,1-TCA (200 µg/L) as the cleanup levels for the treated groundwater and aquifer restoration. The chloroform Arizona Health Based Guidance Level of 6 µg/L is also established as the cleanup level in the 2001 AROD.

In October 2007, a release of extracted groundwater from well PCX-1 containing TCE above the MCL at concentrations of 9.7 µg/L and 14.0 µg/L was delivered to the PVARF, where according to AAW it was blended with water from clean sources at a ratio of 1 to 3 (blended to TCE levels below the MCL) before entering AAW's delivery system. In January 2008, a more serious release occurred during which extracted groundwater from remedy well PCX-1 containing TCE concentrations ranging from 11.0 µg/L to 23.0 µg/L was delivered to the PVARF and entered AAW's delivery system. The residents in Paradise Valley and portions of Scottsdale that are served by the PVARF system were provided alternate water. The remedy was quickly repaired, however, following these incidents EPA and ADEQ recommended a physical secondary fail-safe for PCX-1.

Immediately following the 2008 incident, Arizona American Water (AAW) indicated it was no longer willing to accept the treated water from PCX-1. Because of this, as an interim approach, PCX-1 was removed from conveyance to Arizona American Water's drinking water system and reconfigured to convey the treated water to the adjacent Arizona Canal which serves potable supply to downstream users. Well PCX-1 has operated under this interim plan since April 2008. Also since April 2008, several long-term options for PCX-1 were developed, evaluated, reviewed with the public and considered, but did not achieve consensus among the required entities. Groundwater in the NIBW area is governed by complex water rights and groundwater apportionment among various private and governmental parties, and utilities entities. Therefore, the long-term solution for PCX-1 required the consensus of the water rights holders and the parties involved in the implementation of this remedy.

EPA worked with the NIBW Participating Companies (NIBW PCs), the ADEQ, City of Scottsdale, Salt River Project, Arizona American Water, and members of the public to examine a range of groundwater end use and treatment options for well PCX-1. As a result, in October 2011, all parties involved in the implementation of the long-term solution agreed to replace the treatment technology for PCX-1 to a liquid-phase granular activated carbon (LGAC) system to be operated in a lead/lag configuration. The treated water will be delivered to the City of Scottsdale's Chaparral Water Treatment Plant for use in its potable supply system, or delivered to the Salt River Project (SRP) when needed by SRP as is currently the case. The drinking water end-use of this remedy supports sustainable groundwater use and provides optimal local beneficial use of the treated groundwater. Air stripping was selected in the previous RODs because it was the best application for the site conditions at the time. The LGAC treatment technology was not reflected in the 2001 AROD and is described in sections below in greater detail.

2.0 Site History, Contamination, and Selected Remedy

The Indian Bend Wash (IBW) Superfund Site encompasses approximately thirteen square miles of the Paradise Valley Groundwater Basin, an important source of drinking water for the Phoenix metropolitan area. In 1981, TCE and PCE were discovered in the groundwater at several municipal wells in Scottsdale and Tempe at concentrations exceeding the Arizona Department of Health Services action levels and federal MCLs in effect at that time. In 1982, the IBW Site was placed on the EPA National Priorities List.

The highest levels of VOCs were found in groundwater in Scottsdale and in 1987, EPA divided the IBW Site into two areas: North IBW, located north of the Salt River within the City of Scottsdale; and South IBW (SIBW), located south of the Salt River within the City of Tempe. The NIBW and SIBW areas have different sources of contamination, the NIBW groundwater plumes are not contiguous with the SIBW groundwater plumes, and the Salt River is considered a hydrologic divide for groundwater flow.

Groundwater at the IBW Site is present in three distinct aquifers (saturated layers): the upper alluvial unit, middle alluvial unit, and lower alluvial unit. The lower alluvial unit and to a lesser extent, the middle alluvial unit are used for potable supply. The upper alluvial unit is not used for potable supply. In NIBW, VOCs are present in all three alluvial units. Groundwater is primarily used for municipal drinking water and irrigation purposes. Large drinking water production wellfields located north of the NIBW groundwater plume draw groundwater primarily from the lower alluvial unit.

The NIBW selected remedy is documented in the 1988 Scottsdale Groundwater ROD, 1991 Shallow Soils and Groundwater ROD, and the 2001 Final ROD Amendment. The remedy selected in the 1988 ROD consists of the Central Groundwater Treatment Facility, a groundwater pump and treat remedy located in the core of the NIBW groundwater plume. After the CGTF was constructed and operated, data indicated that additional remedial action was needed because the lower alluvial unit groundwater plume was migrating toward production wells. Today, the NIBW remedy consists of four groundwater extraction and treatment systems constructed between 1992 and 1999 (Central Groundwater Treatment Facility, Miller Road Treatment Facility, Area 7, and Area 12), and four soil vapor extraction (SVE) systems (Area 6, Area 7, Area 8, and Area 12). The Area 6, 8 and 12 SVE systems were operated and decommissioned based on performance data; the Area 6 SVE system was implemented as a voluntary action not required by EPA. The Area 7 SVE system was operated intermittently from July 1994 to December 2009 when it was shut down for long-term rebound testing. This SVE system remains in place. The four groundwater extraction and treatment systems continue to operate as part of the long term remedial efforts for NIBW.

The selected remedy in the 2001 AROD includes actions taken by the NIBW PCs proactively to achieve capture of the groundwater VOCs plume, including construction of the Miller Road Treatment Facility, and the Area 7 and Area 12 groundwater extraction and treatment systems. The NIBW PCs also expanded source control remedial actions for the vadose zone.

The following remedial actions which had been previously or voluntarily completed were adopted as part of the selected remedy in the 2001 AROD:

- Installation of 24 additional monitoring wells.
- Installation of two new extraction wells to improve capture in the lower alluvial unit.
- Connection of one of the two new extraction wells to the Central Groundwater Treatment Facility.
- Construction of the Miller Road Treatment Facility (groundwater extraction and treatment) to protect the AAW water supply provided to the Town of Paradise Valley and portions of the City of Scottsdale.
- Construction of groundwater extraction and treatment systems for the middle alluvial unit at Area 7 and Area 12.
- Upgrades to the Central Groundwater Treatment Facility columns to enhance performance and reliability of the air stripping treatment system.

The established cleanup levels for treated groundwater and aquifer restoration as listed in the 2001 AROD are shown in Table 2-1.

**Table 2-1:
2001 ROD-Specified Cleanup Criteria: North Indian Bend Wash**

| Chemical | MCL / Cleanup Level for Treated Water (µg/L) |
|-------------|--|
| TCE | 5 |
| PCE | 5 |
| 1,1-DCE | 7 |
| 1,1,1-TCA | 200 |
| Chloroform* | 6* |

Note: µg/L = micrograms per liter

*Not a byproduct of municipal water supply chlorination; AZ HBGL.

The Miller Road Treatment Facility was constructed between 1996 and 1997 and is designed to treat groundwater extracted from wells PCX-1, PV-14, and PV-15. The MRTF consists of three air stripper towers (a dedicated tower for each well) followed by vapor-phase granular activated carbon to reduce the VOC concentration in the air stripper off-gas before discharge to the atmosphere. The MRTF remedy was installed to remove VOCs from the lower alluvial unit and

prevent the TCE plume at the northern portion of the NIBW area from migrating toward the pumping center associated with Arizona American Water's production wellfield. Wells PV-14 and PV-15 consistently detect low TCE concentrations at or below the MCL, but are treated nonetheless. The treated groundwater from PV-14 and PV-15 is typically discharged to an on-site clear well then delivered to the PVARF after which it enters Arizona American's potable supply system. Treated water from PCX-1 was originally delivered to the Arizona Canal adjacent to the MRTF for SRP use, and later provided to AAW pursuant to an SRP/AAW water exchange agreement. In 2011 (through November), the highest pre-treatment TCE concentration observed at a well tied into treatment at the MRTF occurred at well PCX-1 with a TCE concentration of 81 µg/L. The average pre-treatment TCE concentration at PCX-1 in 2011 was 71.6 µg/l, with the overall pre-treatment TCE concentrations at MRTF ranging from 64 to 81 µg/L. The post-treatment TCE concentrations at MRTF are consistently less than 1.0 µg/L.

An incident occurred 2008 in which partially treated water from MRTF well PCX-1 containing VOC concentrations above the MCL was introduced into Arizona American Water's potable supply. Shortly after the 2008 incident, a third-party conducted a thorough engineering evaluation. Recommendations implemented from 2008 through 2010 included installing new redundant system instrumentation for critical processes, correcting wiring and system calibrations, and adding control logic and set points to prevent well startup if the system is in manual mode. Interim changes were made immediately following the 2008 instance. This includes physically separating well PCX-1 from the potable water system and conveying PCX-1 treated groundwater to the SRP Arizona Canal rather than to AAW's potable system. These interim changes are consistent with the 2001 AROD and the way the MRTF was originally operated.

3.0 Basis for the Document

This Explanation of Significant Differences for the Indian Bend Wash Superfund site provides information regarding a change in the groundwater remedy performed at the Miller Road Treatment Facility. The remedy change includes removing the treatment of well PCX-1 utilizing air stripping technology from the Miller Road Treatment Facility because AAW does not own PCX-1 and was no longer willing to accept the treated water from this well; physically locating new treatment units for well PCX-1 on adjacent property because of space limitations within the footprint of the MRTF which is located on AAW property; leaving the air stripper tower which was used for well PCX-1 onsite at the MRTF as a contingency treatment system for wells PV-14, PV-15 or another AAW well if VOC concentrations indicate treatment is appropriate; replacing the treatment technology for PCX-1 from air stripping to LGAC in series (lead/lag) mode for community acceptance; and delivery of the PCX-1 treated groundwater to the nearby City of Scottsdale's Chaparral Water Treatment Plant for potable supply rather than delivery to Arizona

American Water. Consistent with the existing remedy and agreements, the treated water from PCX-1 will still be delivered to the SRP when it needs the treated water.

Groundwater treatment using air stripping was originally adopted in the 1988 Scottsdale Groundwater ROD and carried forward in the 2001 AROD. Although air stripping was selected as a lower cost alternative to the use of liquid-phase granular activated carbon, the 1988 ROD and Feasibility Study Addendum of 2000 reported that groundwater treatment either by air stripping or granular activated carbon adsorption has been shown to be very effective and would achieve the desired treatment goals. The 2001 AROD selected remedy did not include liquid-phase granular activated carbon as a treatment technology. Liquid-phase granular activated carbon was selected for this ESD because it is very effective in the removal of TCE and PCE at the concentrations currently observed in PCX-1; a LGAC facility will meet the aesthetic needs of the neighborhood because portions of the infrastructure can be installed below grade; and operation in lead/lag mode fulfills the recommendation for a secondary, physical fail-safe. Along with air stripping, LGAC is a recognized Best Available Treatment Technology and was evaluated as a treatment alternative during the 1988 ROD and 2000 Feasibility Study Addendum for the site. This ESD replaces air stripping with liquid-phase granular activated carbon as the treatment technology for well PCX-1. The drinking water end-use for the treated groundwater was selected in the 1991 Shallow Soils and Groundwater ROD which was consolidated into the 2001 AROD.

The clean-up goals specified in the 2001 AROD have not changed as a result of this ESD. The long-term solution for well PCX-1 meets the needs of the remedy by using a treatment technique that is effective at the removal of TCE and PCE at the current concentrations observed at PCX-1, provides a sustainable and locally beneficial use of the water, meets the needs of the community by having a facility that is aesthetically acceptable without producing noise or odors, and fulfills the recommendation that redundant treatment be utilized.

There are no additional Applicable or Relevant and Appropriate Requirements (ARARs) for this ESD.

4.0 Description of Significant Differences

The selected remedy change in this ESD replaces the current air stripping treatment for PCX-1 with a LGAC system to be operated in a lead/lag configuration. This means that the extracted groundwater will be treated through one LGAC unit, and immediately treated through a second LGAC unit. Previously, the treated groundwater from well PCX-1 was delivered to the nearby PVARF and used for potable supply. This ESD also reflects a change in the delivery of the treated groundwater from well PCX-1 to the nearby City of Scottsdale's Chaparral Water Treatment Plant, which is part of the municipal potable water supply system. The Chaparral Water Treatment Plant is not a part of the Superfund NIBW remedy. However, it is located near

the MRTF making it possible to install the infrastructure (i.e., pipelines) to convey water to this location with minimum disruptions for construction. The compliance point for the treated groundwater from the LGAC treatment units will be established just after the lag contactor at the LGAC facility. At times when the SRP needs the water, the treated groundwater will be conveyed to the Arizona Canal where it is used for potable supply by downstream users, as is currently the case. When the treated groundwater is conveyed to the Arizona Canal, the compliance point for the treated groundwater from the LGAC treatment units will be located at a point after the LGAC treatment and before the treated groundwater enters the Arizona Canal.

The change in remedy technology from air stripping to LGAC will result in clean up of TCE and PCE in the treated groundwater to concentrations significantly below the MCL of 5.0 µg/L, as is presently the case. Conveyance of the treated groundwater to a non-Superfund groundwater treatment plant for potable use, and delivery to the SRP when needed, results in the drinking water use adopted by the 2001 AROD.

The 2001 Remedial Action Objectives (RAO) and cleanup levels specified in the 2001 AROD have not changed as a result of this ESD.

The remedial action objectives are:

- Restore the Upper, Middle and Lower Aquifers to drinking water quality by decreasing the concentrations of the contaminants of concern to below the cleanup standards.
- Protect human health and the environment by eliminating exposure to contaminated groundwater.
- Provide the City of Scottsdale with a water source that meets MCLs for NIBW contaminants of concern (VOCs).
- Achieve containment of the groundwater contamination plume by preventing any further lateral migration of contaminants in groundwater.
- Reuse of the water treated at the Site to the extent possible in accordance with Arizona's Groundwater Management Act.
- Mitigate any soil contamination that continues to impact groundwater.
- Provide long-term management of contaminated groundwater to improve the regional aquifer's suitability for potable use.

The cleanup levels for aquifer restoration and the treated groundwater are:

| Chemical | MCL / Cleanup Level for Treated Water (µg/L) |
|-------------|--|
| TCE | 5 |
| PCE | 5 |
| 1,1-DCE | 7 |
| 1,1,1-TCA | 200 |
| Chloroform* | 6* |

*AZ Health Based Groundwater Level

The long-term solution for well PCX-1 meets the needs of the remedy by using a treatment technique that is effective at the removal of TCE and PCE at the current concentrations observed at PCX-1. In addition to being protective under CERCLA, the selected remedy also provides for a local beneficial use for the water, and minimizes odor and sound.

This ESD does not change any of the Applicable or Relevant and Appropriate Requirements (ARARs) previously identified for these areas.

5.0 Support Agency Comments

The ADEQ has indicated its concurrence with EPA's evaluation that there are no additional ARARs for this remedy change in a letter to EPA dated December 14, 2011. In March 2012, ADEQ also indicated support for these remedy changes.

6.0 Statutory Determinations

The selected remedy meets the requirements of Section 121 of CERCLA, 42 U. S. C. Section 9621, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), to the extent practicable. Specifically, the remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and resource recovery technologies to the maximum extent practicable.

The remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). At this time, the VOCs in groundwater in the aquifer remain above levels that would allow for unrestricted use. As a result, this remedy change will be incorporated in the next site-wide Five-Year Review to ensure that the remedy remains protective of human health and the environment. The first Five-Year Review for the IBW site was conducted in 2011. Based on the Five-Year Review, the existing remedy remains protective and continues to meet the ARARs.

7.0 Public Participation

Annual meetings with the Community Involvement Group (CIG) have been held since 2002. In 2008, after the incident in which partially treated water was delivered to AAW's drinking water system, more frequent community meetings were held. During the CIG meetings from 2008 to 2011, various workplans for a long-term solution for well PCX-1 were presented along with supporting groundwater analyses. Community members have sent letters to EPA outlining support for the long-term solution and a desire for the remedy change to be implemented as soon as possible.

Meetings have also been held with the Paradise Valley Town Council because the Town is within AAW's service area. On October 11, 2011, the City of Scottsdale's City Council voted unanimously to allow staff to work with the Participating Companies and SRP to develop the necessary third-party agreements to implement this long-term solution. During the City Council meeting, residents provided public testimony in support of this long-term solution. Updates have been provided to the community in fact sheets and email notices on a regular basis. On November 16, 2011, the NIBW PCs and City of Scottsdale held an Open House for the rezoning of the property on which the new treatment system will be constructed; over 800 notification letters were mailed to residents and businesses in the neighborhood. Residents noted preferences for minimal visible infrastructure, and minimal additional air odors or noise in the community.

This ESD will become part of the administrative record for the site (NCP, 40 CFR Section 300.825 (a)(2)). A notice of public availability and a brief description of the ESD will be published in a major local newspaper and disseminated by email to the CIG. The ESD will be available for public review at the following locations:

Scottsdale Civic Center Library
3839 N. Drinkwater Blvd.
Scottsdale, AZ 85251
(480) 312-2320

U.S. EPA Superfund Records Center, Region 9
95 Hawthorne St., Suite 403S
San Francisco, CA 94105
(415) 820-4700

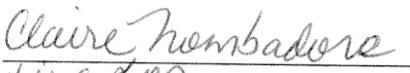
ADEQ Records Center
1110 West Washington Ave
Phoenix AZ 85007
(602) 771-2300 (800) 234-5677

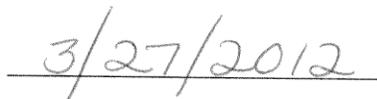
8.0 Conclusions and Approval

This ESD selects liquid-phase granular activated carbon treatment as the long-term solution for well PCX-1 which is part of the groundwater extraction and treatment remedy for the North Indian Bend Wash Superfund area. With the approving official's signature below, this ESD is hereby APPROVED as of the signature date.

Approved by:

Date:


acting for
Clancy Tenley



Assistant Director
Partnerships, Land Revitalization & Cleanup Branch
U.S. Environmental Protection Agency, Region 9

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APPENDIX A



Janice K. Brewer
Governor

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Henry R. Darwin
Director

December 14, 2011
FPU# 12-109

Rachel Loftin
Remedial Project Manager
US Environmental Protection Agency
75 Hawthorne Street (SFD-8-2)
San Francisco, CA 94105

Re: North Indian Bend Wash Superfund Site (NIBW), Applicable or Relevant and Appropriate Requirements (ARARs) review, Maricopa

Ms. Loftin,

The Arizona Department of Environmental Quality (ADEQ) was requested by The Environmental Protection Agency (EPA) on November 7, 2011 to review the ARARs for the NIBW site. This request is due to a new long-term remedy option proposed for well PCX-1 that changes the current use of air stripper technology to liquid phase granular activated carbon. Since this new remedy differs from the decision document for the site, an explanation of significant differences (ESD) is needed.

ADEQ has reviewed the ARARs as related to the proposed remedy change at PCX-1 and concurs that no new ARAR's are need and the current list of ARAR apply to the proposed remedy change only. At a later point in time ADEQ may readdress site wide ARAR's when applicable remedy changes permit.

Please contact me if there are questions regarding the correspondence.

Sincerely,

A handwritten signature in black ink, appearing to read "Wendy Flood".

Wendy Flood
ADEQ Project Manager
Federal Projects Unit

Cc: Don Atkinson, ADEQ (electronic)
Nicole Coronado, (electronic)

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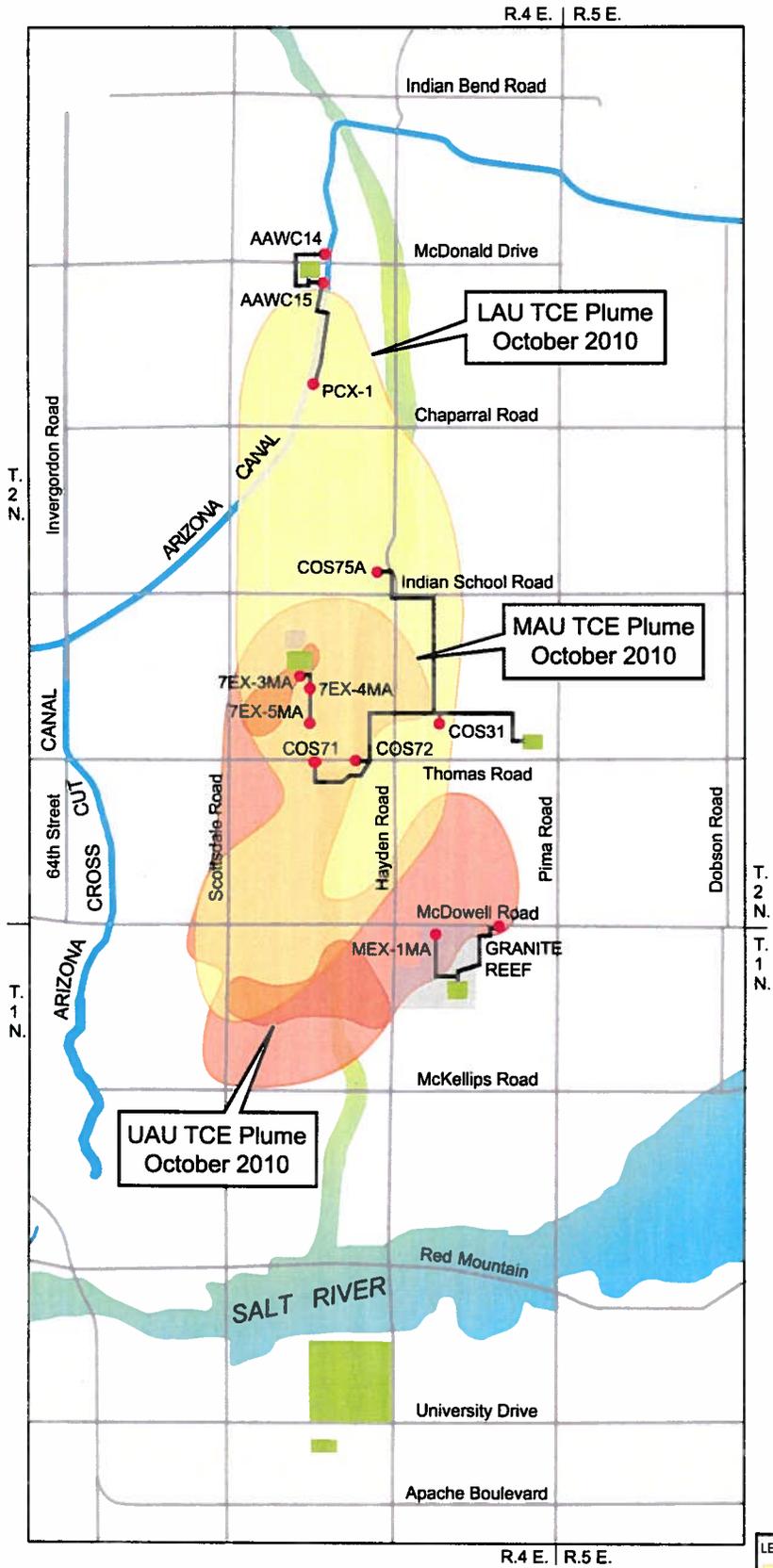


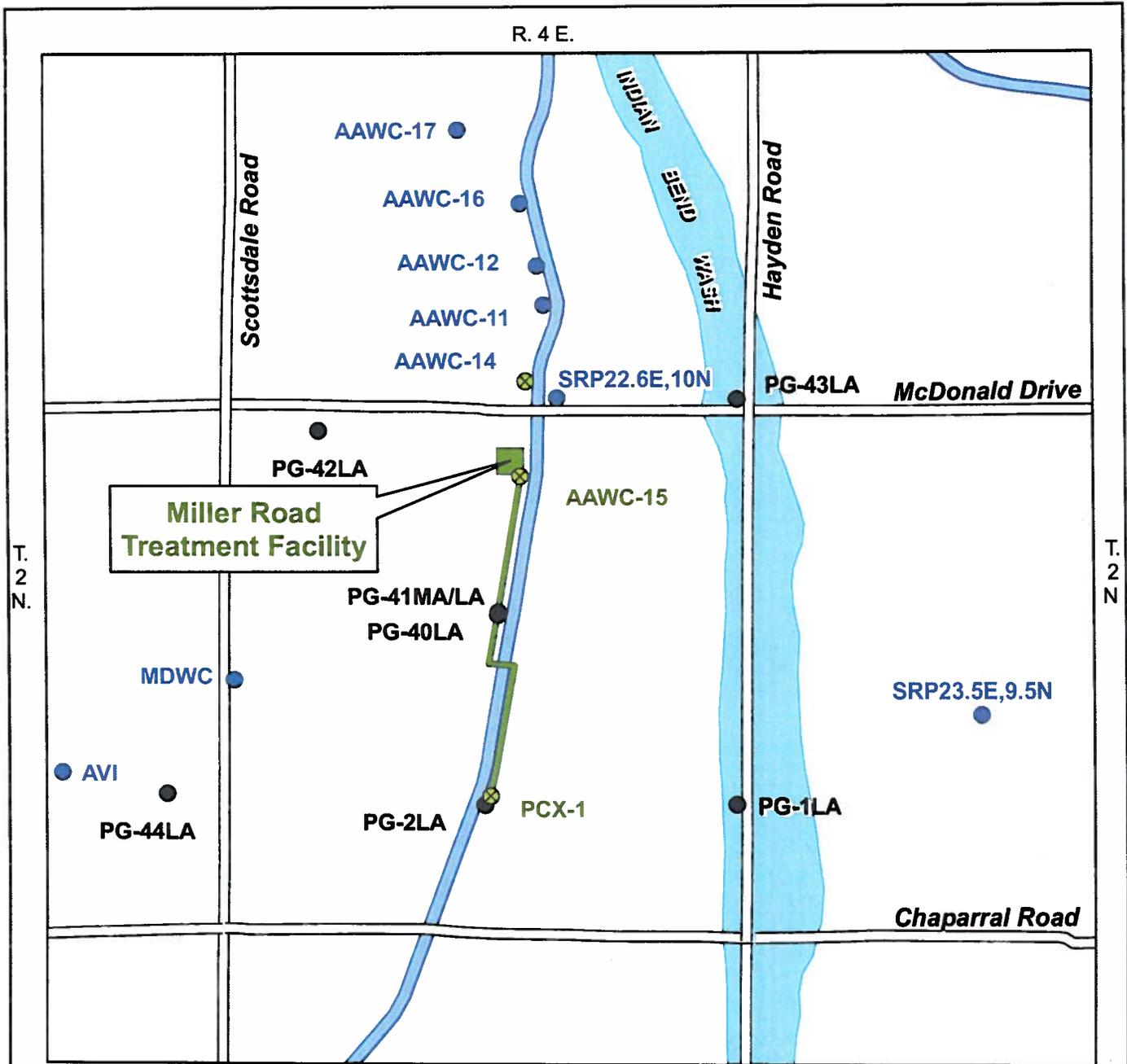
Figure 1
North Indian Bend Wash Superfund Area
Groundwater Plume Map

R.4 E. | R.5 E.



| LEGEND | |
|---|----------------------------------|
| | LAU TCE Plume (contour at 5 ppb) |
| | MAU TCE Plume (contour at 5 ppb) |
| | UAU TCE Plume (contour at 5 ppb) |
| LAU | lower alluvial unit |
| MAU | middle alluvial unit |
| ppb | parts per billion |
| UAU | upper alluvial unit |





R. 4 E.



EXPLANATION

- PA-13LA Monitor Well Location and Identifier
- PCX-1 Extraction Well Location and Identifier
- AWC-8A Production Water Well Location and Identifier
- MRTF Pipelines



Figure 2
North Indian Bend Wash
Miller Road Treatment Facility and
Extraction Wells

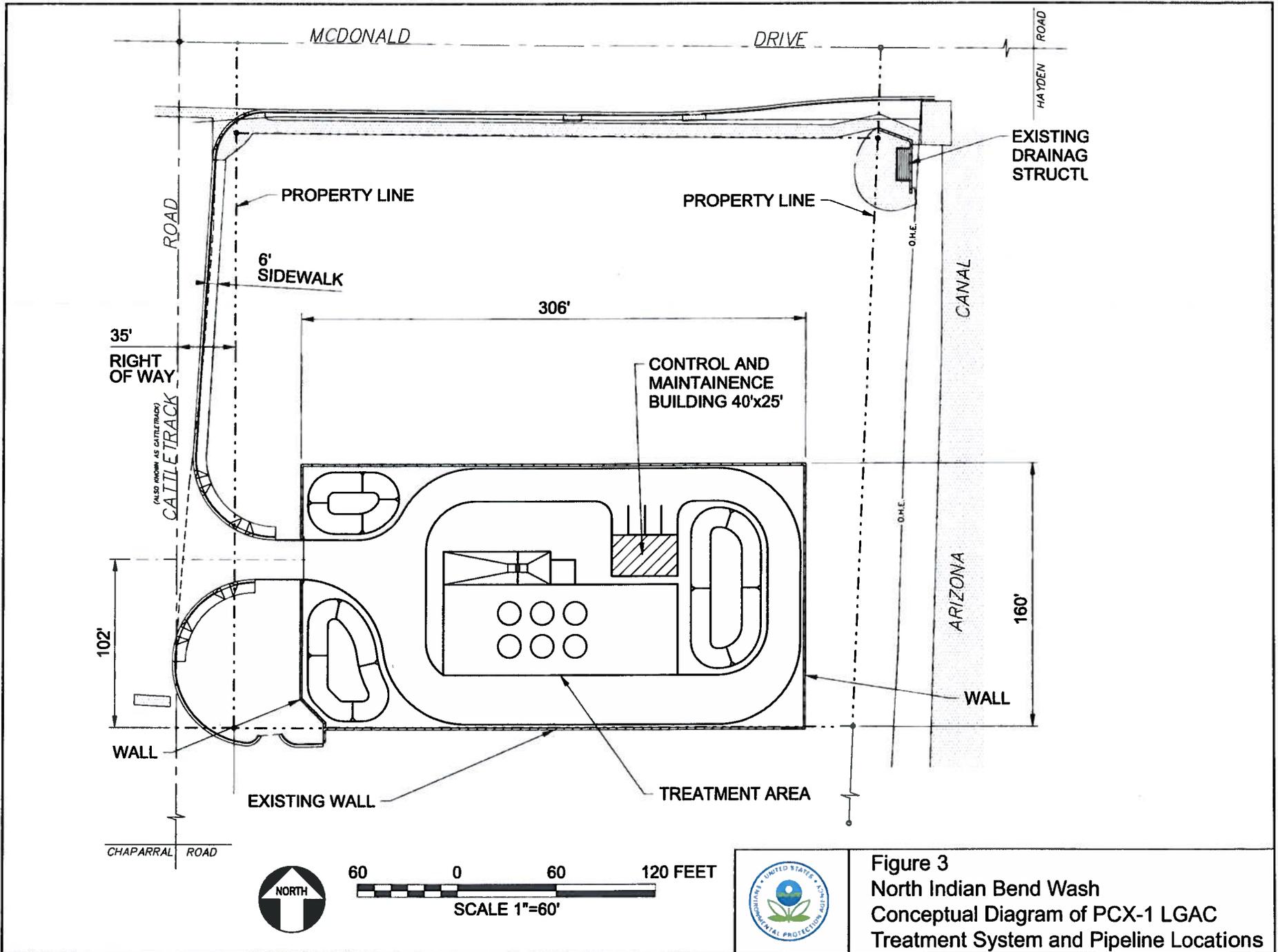


Figure 3
 North Indian Bend Wash
 Conceptual Diagram of PCX-1 LGAC
 Treatment System and Pipeline Locations