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Final

Five-Year Review Report
for
Phoenix-Goodyear Airport (North and South Areas) Superfund Site
Goodyear, Arizona

September 2010

Prepared By:
U.S. Environmental Protection Agency
Region IX
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and

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REPORT APPROVALS

Report Title: Five-Year Review Report
for
Phoenix-Goodyear Airport (North and South Areas)
Superfund Site
Goodyear, Arizona

Report Date: September 29, 2010

Approved by:

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Acronyms & Abbreviations

ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ARAR	Applicable or Relevant and Appropriate Requirements
CD	Consent Decree
COG	City of Goodyear
COC	contaminants of concern
DEUR	Declaration of Environmental Use restriction
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
GAC	granular activated carbon
GTRC	Goodyear Tire and Rubber Company

GTS	groundwater treatment systems
IC	institutional controls
LAU	lower alluvial unit
LGAC	liquid-phase granulated activated carbon
Loral	Loral Defense Systems – Arizona
MAU	Middle Alluvial Unit
MCL	maximum contaminant level
MEK	methyl ethyl ketone
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MTS	Main Treatment System
NPL	National Priorities List
O&M	operation and maintenance
OU	Operable Unit
PCE	tetrachloroethene
PGA	Phoenix-Goodyear Airport
PGAN	Phoenix-Goodyear Airport-North Superfund Site
PGAS	Phoenix-Goodyear Airport-South Superfund Site
ppb	parts per billion
RAO	remedial action objectives
RI	remedial investigation
RID	Roosevelt Irrigation District
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
Site	PGA Superfund Site
SOW	Scope of Work
SVE	soil vapor extraction
TBC	to be considered
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
UAU	Upper Alluvial Unit
UPI	Unidynamics Phoenix, Inc.
UST	underground storage tank
VOC	volatile organic compound
WQARF	Water Quality Assurance Revolving Fund

Executive Summary

The United States Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality (ADEQ) have completed the Second Five-Year Review of the remedial actions implemented at the Phoenix-Goodyear Airport (PGA) (North and South Areas) Superfund Site, located approximately 17 miles west of downtown Phoenix, Arizona. The Five-Year Review is required by statute because hazardous substances, pollutants, or contaminants remain and will remain on the property above levels that allow for unlimited use and unrestricted exposure. The purpose of the Five-Year Review process is to evaluate whether the remedial measures implemented at the PGA Site are protective of human health and the environment. This is the second Five-Year Review for both PGA North Area (PGAN) and PGA South Area (PGAS). The first Five-Year Reviews for PGAN and PGAS were conducted separately; however, for this Five-Year Review, PGAN and PGAS are assessed jointly.

Land uses in the vicinity of the PGA site are a mix of residential, agricultural, commercial, and industrial. At PGAN, commercial and industrial properties lie to the north and south of the former Unidynamics Phoenix, Inc. (UPI) facility, agricultural land and a growing population of commercial and light industrial facilities are to the west, and residential and commercial property are across Litchfield Road to the east. At PGAS, commercial, industrial and some residential properties lie to the east of the airport and agricultural land is to the south and west. The nearest residences are approximately one-half mile west and northwest of the Site and less than one-quarter mile northeast and east of the Site.

PGAN

Since the previous Five-Year Review report for PGAN, steps have been taken to address some of the deficiencies relating to the capture and containment of the current groundwater trichloroethene (TCE) plume and the characterization of perchlorate at the Site. Namely, forty-eight wells have been added in the northern area of Subunit A in an attempt to facilitate plume capture and delineate plume boundaries. Two additional treatment systems, EA-05 groundwater treatment system (GTS) and EA-06 GTS, were constructed since the previous Five-Year Review to help contain the northern Subunit A plume boundary, and a third, EA-07 GTS is under construction for the same purposes. However, current data indicates that the TCE plume in both Subunit A and Subunit C (the drinking water aquifer) are still not fully captured or contained.

Since the previous Five-Year Review, all of the UPI structures and buildings on site have been demolished and the waste generated was properly removed and disposed of from the UPI property.

The following issues have been identified for PGAN:

- Groundwater quality monitoring trends indicate the TCE plume is expanding to the northeast and the north. In the southeast (near EPA MW-10A), it is uncertain if the Subunit A TCE plume is within the capture zones of Main Treatment System (MTS) Subunit A extraction well system.

- Recently increased detections of TCE at MW-29, located south of I-10 in Subunit C, indicate an unknown potential migration route from Subunit A to Subunit C.

- Recent data indicates that the soil vapor extraction (SVE) system has been less effective in removing mass from the dry well source area than in previous years.

- Institutional controls (ICs) or Declaration of Environmental Use Restriction (DEUR) for Arizona were required in the 2006 Partial Consent Decree; restrictive covenants required on portions of the UPI property have not been implemented.

- Extracted groundwater with perchlorate at PGAN is being addressed through the 2008 Perchlorate Removal Action. However, no restoration remedy for perchlorate contamination in the aquifer has been selected.

PGAS

At PGAS, groundwater quality data are historically consistent and indicate that the concentration trends for the two primary contaminants of concern (COCs), TCE and chromium, are relatively stable and primarily decreasing in concentration in both Subunit A and Subunit C. There are, however, two areas of potential concern within Subunit C: the occurrence of TCE within and around well GAC–04, and the delineation of the most northern boundary of the PGAS plume. The remedial effort has been shown to be successful in Subunit A and in the southern plume within Subunit C. TCE contours show that the existing system has been effective in containing the plume and treating contamination. The continued occurrence of chromium in the northern Subunit C plume indicates that the current remedy has not been entirely effective. The southern plume in Subunit C has continued to meet the cleanup standards for TCE. A new pulsed pumping protocol to reduce the remaining low-level TCE contamination was implemented in 2009 at the southern plume in Subunit C.

The following issues have been identified for PGAS:

- Monitoring data indicate that an uncharacterized source may be resulting in contaminant migration at well GAC-04.

- ICs (e.g., DEURs) were recommended in the previous Five-Year Review for the residual chromium contamination; however, no chromium related ICs have been implemented at PGAS to date.

- The northern TCE plume in Subunit C is not fully defined.

- The chromium concentrations in the northern plume in Subunit A have not shown improvement in response to the remedial actions taken.

- Although the use of vapor granular activated carbon (GAC) air emission controls is part of the remedy for this site, air emission controls were removed at PGAS in 1995 with concurrence of Maricopa Air Quality Department. A 2007 letter to ADEQ from Maricopa Air Quality Department indicates that the Department has a different current interpretation of its Rule 330 that may require air emissions controls at sites where they were previously not required.

SITEWIDE

There is an area between PGAS and PGAN where the respective TCE plumes in Subunit C co-exist. This area, between Yuma Road to the south and Van Buren Street to the north, is where several City Of Goodyear production wells obtain their water. One production well, COG-5, used for fire protection already exceeds the MCL for TCE. COG-2 has been taken out of service for TCE exceedances, and COG-3 and, possibly, COG-11 are threatened. This is also where the PGAS northern plume is ill-defined, and the PGAN Well MW-29 has had increasing concentrations of TCE, indicating potential migration from Subunit A to Subunit C. Based on the data review from both PGAS and PGAN, the following issues have been identified:

- The separate evaluation of the PGAN and PGAS data may not be providing a complete picture of possible threats to the City of Goodyear wells.
- At PGAN, PGAS and the Western Avenue WQARF site, ground water sampling and water level measurement events are not conducted on a coordinated schedule. There is also a question about whether the water level data between the PGAN, PGAS and Western Avenue WQARF site are comparable.

Conclusion

PGAN

The remedy at PGAN is not protective of human health and the environment. In Subunit A, the TCE plume is expanding to the northeast and the north. It is still uncertain if the Subunit A TCE plume is within the capture zones of MTS Subunit A extraction well system in the southeast. In Subunit C, recent detections in MW-29 indicate an unknown potential migration route from Subunit A to the drinking water aquifer, Subunit C. In addition, several issues that affect long term protectiveness have also been identified: the SVE remedy for soil gas has had diminished recovery over the past five years; and all of the institutional controls have yet to be implemented.

PGAS

A protectiveness determination of the remedy at PGAS cannot be made until further information is obtained. While the TCE plume at PGAS has been mostly delineated with COC concentrations in the plume being stable or decreasing over the last five years, the northwestern edge of the northern plume is not completely defined. Vapor GAC air emission controls are not in use and may be required. Further information will be obtained by conducting a groundwater investigation of northern TCE plume in Subunit C and evaluating requirements for air emissions controls at PGAS. It is expected that these actions will take approximately four years to complete, at which time a protectiveness determination will be made for PGAS. In addition, several issues that affect long term protectiveness have also been identified: The source and extent of the TCE contamination in and around GAC-04 has not been determined. The continued occurrence of elevated chromium in the northern Subunit A plume has not been fully understood.

SITEWIDE

The remedy at PGAN and PGAS is not protective. At PGAN, the contaminant plume is expanding along several of its boundaries. There is an unknown conduit of TCE contamination from the Subunit A to the Subunit C. At PGAS, the extent of contamination is not fully defined in the northern plume. There is also an undefined source of TCE contamination at GAC-04 in the Subunit C zone. Production wells tap into the Subunit C zone in the area known to have PGAN and PGAS contamination.

The next review will be conducted within five years of the completion of this second Five-Year Review Report.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name : Phoenix-Goodyear Airport (North) Superfund Site and Phoenix-Goodyear Airport (South) Superfund Site

EPA ID: AZD980695902 **CERCLIS ID :** AZD980695902

Region: IX **State:** AZ **City/County:** Goodyear/Maricopa

SITE STATUS

NPL status: X Final ☐Deleted ☐ Other (specify) ____

Remediation status (choose all that apply): X Operating ☐ Complete

Multiple OUs? X YES ☐ NO **Construction completion date:** N/A
OU 00 Sitewide; OU 01 Overall Site; OU 02 Airport Treatment Plant; OU 03 North Groundwater
OU 04 North Soil Gas; OU 05 North Soils; OU 06 South Groundwater

Has site been put into reuse? X YES NO (some non-manufacturing portions of Site redeveloped)

REVIEW STATUS

Reviewing agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency ____________________

Author name: Catherine Brown

Author title: Remedial Project Manager **Author affiliation:** EPA Region IX

Review period: March – August 2010

Date(s) of Site inspection: Multiple

Type of review: X Statutory

☐ Policy ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only

☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐ Regional Discretion

Review number: ☐ 1 (first) X 2 (second) ☐ 3 (third) ☐ Other (specify)

Triggering action:

☐ Actual RA Onsite Construction at OU

X Actual RA

☐ Previous Five-year Review Report

☐ Construction Completion

☐ Other (specify) ____

Triggering action date: 1990 (start of groundwater remediation at PGA-South [PGAS]). PGA-North (PGAN) remediation began in 1994 (full-scale operation of soil vapor extraction [SVE] system, and start of Phase I groundwater pump-and-treat system)

Due date (five years after triggering action date): 2010. This five-year review was triggered by the completion date of the first Five-Year Reviews at PGAN and PGAS.

ISSUES AND RECOMMENDATIONS

PGAN:

1. Groundwater quality monitoring trends indicate the TCE plume is expanding to the northeast and the north. In the southeast (near EPA MW-10A), it is uncertain if the Subunit A TCE plume is within the capture zones of MTS Subunit A extraction well system.
2. Recently increased detections of TCE at MW-29, located south of I-10 in Subunit C, indicate an unknown potential migration route from Subunit A to Subunit C.
3. Recent data indicates that the SVE system has been less effective in removing mass from the dry well source area than in previous years.
4. Institutional controls (ICs) were required in the 2006 Partial Consent Decree; restrictive covenants required on portions of the UPI property have not been implemented.
5. Extracted groundwater with perchlorate at PGAN is being addressed through the 2008 Perchlorate Removal Action. However, no restoration remedy for perchlorate contamination in the aquifer has been selected.

PGAS:

1. Monitoring data indicate that an uncharacterized source may be resulting in contaminant migration at well GAC-04.
2. ICs were recommended in the previous Five-Year Review for the residual chromium contamination; however, no chromium related ICs have been implemented at PGAS to date.
3. The northern TCE plume in Subunit C is not fully defined.
4. The chromium concentrations in the northern plume in Subunit A have not shown improvement in response to the remedial actions taken.
5. Although the use of vapor GAC air emission controls is part of the remedy for this site, air emission controls were removed at PGAS in 1995 with concurrence of Maricopa Air Quality Department. A 2007 letter to ADEQ from Maricopa Air Quality Department indicates that the Department has a different current interpretation of its Rule 330 that may require air emissions controls at sites where they were previously not required.

SITEWIDE:

1. The separate evaluation of the PGAN and PGAS data may not be providing a complete picture of possible threats to the City of Goodyear wells.
2. At PGAN, PGAS and Western Avenue WQARF site, ground water sampling and water level measurement events are not conducted on a coordinated schedule. There is also a question about whether the water level data between the PGAN, PGAS and Western Avenue WQARF site are comparable.

RECOMMENDATIONS

PGAN:

1. Ensure capture of plume at all boundaries; including evaluating all northern area extraction/injection systems (EA05,EA06,33a,EA07) optimizing injection/extraction of all systems, developing all injection/extraction systems necessary to fully contain in N,NE and NW; and expanding capacity of MTS.
2. Investigate Subunit C contamination near MW29C to determine source of Subunit A to Subunit C migration.
3. Optimization of the SVE system should be evaluated.
4. Implement ICs as required in the 2006 Partial Consent Decree.
5. Remedial action to address perchlorate in the aquifer needs to be selected and documented in a decision document

PGAS:

1. Continue to monitor ground water in vicinity of GAC-04; investigate source of recently detected contaminants.
2. Implement ICs as required.
3. Conduct GW investigation of area to gain more definitive understanding of northern Subunit C plume.
4. Evaluate the ground water monitoring data to gain better understanding of chromium levels over time.
5. Evaluate requirements for air emissions controls at PGAS in light of the 2007 Maricopa Air Quality Department letter.

SITEWIDE:

1. Conduct groundwater investigation of area between PGAN and PGAS to gain understanding of groundwater sitewide.
2. Twice per year, parties conduct GW gauging and sampling at same time for wells at all three sites.

Protectiveness Statement:

PGAN: The remedy at PGAN is not protective of human health and the environment. In Subunit A, the TCE plume is expanding to the northeast and the north. It is still uncertain if the Subunit A TCE plume is within the capture zones of MTS Subunit A extraction well system in the southeast. In Subunit C, recent detections in MW-29 indicate an unknown potential migration route from Subunit A to the drinking water aquifer, Subunit C. In addition, several issues that affect long term protectiveness have also been identified: the SVE remedy for soil gas has had diminished recovery over the past five years; and all of the institutional controls have yet to be implemented.

PGAS: A protectiveness determination of the remedy at PGAS cannot be made until further information is obtained. While the TCE plume at PGAS has been mostly delineated with COC concentrations in the plume being stable or decreasing over the last five years, the northwestern edge of the northern plume is not completely defined. Vapor GAC air emission controls are not in use and may be required. Further information will be obtained by conducting a groundwater investigation of northern TCE plume in Subunit C and evaluating requirements for air emissions controls at PGAS It is expected that these actions will take approximately four years to complete, at which time a protectiveness determination will be made for PGAS. In addition, several issues that affect long term protectiveness have also been identified: The source and extent of the TCE contamination in and around GAC-04 has not been determined. The continued occurrence of elevated chromium in the northern Subunit A plume has not been fully understood.

SITEWIDE: The remedy at PGAN and PGAS is not protective. At PGAN, the contaminant plume is expanding along several of its boundaries. There is an unknown conduit of TCE contamination from the Subunit A to the Subunit C. At PGAS, the extent of contamination is not fully defined in the northern plume. There is also an undefined source of TCE contamination at GAC-04 in the Subunit C zone. Production wells tap into the Subunit C zone in the area known to have PGAN and PGAS contamination.

Section 1
Introduction

The United States Environmental Protection Agency (EPA) has conducted a Five-Year Review of the remedial actions implemented at the Phoenix-Goodyear Airport (PGA) North and South Areas Superfund Site in the City of Goodyear (COG), Arizona (Figure 1-1). By statute, EPA is preparing this five-year review consistent with the Comprehensive Environmental Response, Compensation, and Liability Act and the National Oil and Hazardous Substances Pollution Contingency Plan. Comprehensive Environmental Response, Compensation, and Liability Act Section 121(c), as amended, states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The National Oil and Hazardous Substances Pollution Contingency Plan part 300.430(f)(4)(ii) of the Code of Federal Regulations states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every 5 years after the initiation of the selected remedial action.*

Consequently, this statutory five-year review was performed because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unrestricted use and unlimited exposure.

The PGA (North and South Areas) Superfund Site was originally listed on the National Priorities List (NPL) in September 1983 as the Litchfield Airport Area Superfund Site. After the airport property was transferred to the City of Phoenix, the Site was renamed the PGA Area Superfund Site. Later, the Site was divided into two areass: PGA North (PGAN) and PGA South (PGAS). The first Five-Year Reviews for PGAN and PGAS were conducted separately; however, in this Five-Year Review the Areas are assessed jointly.

This is the second Five-Year Review for both PGAN and PGAS. The triggering action for the Five-Year Review report is the groundwater remedial action start date of 1990. This report evaluates the PGA remedial action objectives as stated in both Records of Decision (RODs), Explanation of Significant Differences (ESD) #1, #2, #3, #4, and #5, the 1991 Action Memorandum and the 2008 perchlorate Removal Action Memorandum.

Section 2
Site Chronology

PGAN

Table 2-1 provides a site chronology of the events at PGAN.

Table 2-1
Chronology of Events
Phoenix-Goodyear Airport (North) Superfund Site
Goodyear, AZ

Event	Date
Research, development and manufacturing plant for defense and aerospace equipment established at the PGAN property (Unidynamics Phoenix, Inc. [UPI]).	1963
Arizona Department of Health Services (ADHS) discovered that groundwater in the Goodyear area was contaminated with solvents and chromium.	1981
EPA added the PGA Site (originally listed as the "Litchfield Airport Area Superfund Site") to the NPL.	September 1983
EPA issued first of several orders to UPI "to conduct a comprehensive sampling and analysis program to support subsequent remedial actions." (Resource Conservation and Recovery Act Administrative Order (Docket No. 84-03).	April 1984
Phase I Remedial Investigations began on the entire PGA area.	October 1984
Phase II Remedial Investigations on the PGAN property.	1986
EPA published a Remedial Investigation/Feasibility Study (RI/FS) that identified two areas of noncontiguous contamination (PGAN and PGAS).	June 1989
EPA issued a ROD that applied to both the PGAN and PGAS Sites. For PGAN, the main ROD requirements were groundwater remediation of Subunits A and B/C using extraction and treatment, and soil remediation using soil vapor extraction (SVE) with granular activated carbon (GAC).	September 1989
Groundwater extraction and treatment system for Subunit A groundwater implemented at PGAS (trigger for five-year review for PGAS and PGAN).	1990
EPA issued an Amended Administrative Order (Docket No. 90-20) to UPI for Remedial Design and Remedial Action to implement the PGAN ROD remedy.	October 1990
EPA issued ESD #1 to the 1989 ROD to (1) revise the cleanup level for methyl ethyl ketone (MEK) in groundwater from 170 parts to billion (ppb) to 350 ppb; (2) set a cleanup level for acetone in groundwater at 700 ppb; (3) clarify the target area and criteria for establishing cleanup goals for soil at PGAN; (4) clarify the role of soil excavation as an option should the selected remedy be ineffective.	January 1991
EPA issued ESD #2 to (1) change the emission control technology for the SVE system from vapor-phase GAC to treatment by thermal oxidation with wet scrubbing; (2) change the designated end use for water treated by the Subunit C groundwater remedy from incorporation into the community potable water supply to reinjection back into the Subunit C section of the aquifer with an option for municipal use after 1994; (3) suspend the remedial design and construction of the liquid-phase GAC (LGAC) treatment requirement from the Subunit A groundwater remedy because ketones were no longer present in groundwater above remediation levels; (4) add the requirement that wellhead treatment be implemented at any private or municipal drinking water well in the vicinity of the PGA site that has an occurrence of Site contaminants at levels in excess of the groundwater cleanup standards; and (5) establish four additional groundwater cleanup standards: benzene (5 ppb), ethylbenzene (700 ppb), 1,1,2,2-tetrachlorethane (0.18 ppb) and tetrachlorethene (5 ppb).	May 1993

Table 2-1 (Continued)

Event	Date
UPI facility manufacturing operations ceased.	1994
Full-scale SVE operations with thermal oxidation began at PGAN.	June 1994
Phase I groundwater treatment system for volatile organic compounds (VOCs), with onsite reinjection back into the Subunit A aquifer, began at PGAN.	September 1994
Phase II / III groundwater treatment system began operation at PGAN.	October 1996
Perchlorate first detected in area monitoring wells.	August 1998
UPI shut down SVE system due to operational difficulties.	October 1998
Trichloroethene (TCE) and perchlorate were detected in several domestic supply wells southeast of the UPI facility.	2001
TCE is detected above the maximum contaminant level (MCL) for the first time in Subunit C monitor well MW-20 (located north of the main manufacturing area), and concentrations continue to increase over time.	May 2001
Reinjection stopped at the Main Treatment System (MTS) due to lack of perchlorate treatment. TCE-treated water sent to COG Waste Water Treatment Plant for perchlorate treatability study.	October 2001
Effluent from the MTS continued to be sent to the COG Wastewater Treatment Plant for perchlorate treatment.	January 2002 through April 25, 2005
MW-20 converted to a temporary extraction well connected to the Phase II / III groundwater treatment system for Subunit C groundwater treatment.	March 2002
EPA issued ESD #5, requiring the restart of the SVE system. Because there was no longer MEK or acetone in the influent, the air emissions control technology was changed to GAC from thermal oxidation with wet scrubbing, as had been required by ESD #2.	September 2002
EPA issued a Unilateral Administrative Order (Docket No. 9-2003-0001) to restart the SVE system with a GAC treatment unit.	January 2003
TCE concentrations in COG production well COG-02, located about ¼ mile east of the UPI facility, increase above MCL and forced closure of that well.	May 2003
In response to elevated soil gas and groundwater concentrations in boring B-4 located north of the UPI manufacturing buildings, indoor air samples are collected and analyzed in buildings in vicinity of these elevated levels.	September 2003
EPA conducts Phase II Source Area Groundwater Investigation that identified TCE and perchlorate levels in Subunits B and C in source area).	2003
SVE system restarted using GAC treatment.	April 2004
Development of Scope of Work (SOW) to comprehensively address the soil, soil gas and groundwater impacts attributed to PGAN, and completion of SOW activities such as main dry wells investigation.	2005
A second round of indoor air samples was collected and analyzed in buildings located north of the UPI manufacturing buildings.	February 2005
Perchlorate treatment using ion exchange unit was added to the MTS. Treated effluent reinjected into Subunit A groundwater.	April 2005
Implementation of Year 1 Groundwater Investigation Work Plan initiated.	March 2006
Partial consent decree (CD) between the United States and Crane/UPI entered by United States District Court of the District of Arizona. CD requires Crane/UPI to implement SOW.	June 2006
First Five-Year Review Report complete.	September 2006

Table 2-1 (Continued)

Event	Date
Municipal drinking water supply well COG-02 abandoned due to TCE levels.	December 2006
Expanded treatment capacity of MTS by installing extraction well EC-01 and injection well IA-06 in 2006.	2007
Phase I Sources Areas, Soils and Facility Structures Investigation Completed.	2007
Municipal drinking water supply well COG-10 abandoned.	May 2007
Completion of Year 1 Groundwater Investigation Activities: Two middle alluvial unit (MAU) monitoring wells, five subunit C wells, and eight Subunit A wells were installed to define the contaminant plumes.	October 2007
To address the Subunit A TCE impacts in groundwater located north-northeast of the site, two new groundwater treatment systems were installed (EA-06 groundwater treatment system [GTS] and EA-05 GTS).	2008
Monitor well PZ-01 converted to an extraction well to increase treatment capacity of the MTS. Removal Action Memorandum issued for perchlorate at PGAN	October 2008
Completion of Year 2 Groundwater Investigation: ten Subunit A monitoring wells and four Subunit C monitoring wells were installed to further delineate the groundwater contamination plume.	April 2009
Final Year 3 Groundwater Investigation Work Plan approved.	April 2009
Remaining UPI facility buildings and bunkers demolished.	2009

PGAS

Table 2-2 provides a site chronology of the events at PGAS.

Table 2-2
Chronology of Events
Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, AZ

Event	Date
Goodyear Aerospace Corporation (later Goodyear Aircraft Corporation and the Goodyear Tire and Rubber Company [GTRC]), Arizona Division, began operations.	1942
The United States Navy established the Litchfield Naval Air Facility in Goodyear, Arizona as an Auxiliary Acceptance Unit.	1943
Oily and chrome-colored contamination detected in drainage ditch on airport.	1951
Wastewater treatment plant upgraded to reduce the emissions observed in 1951.	1952
Ownership of the airport property transferred to the City of Phoenix.	1968
ADHS discovered that groundwater in the Goodyear area was contaminated with solvents and chromium.	1981
EPA added the PGA Site (originally listed as the “Litchfield Airport Area Superfund Site”) to the NPL.	September 1983
Phase I Remedial Investigations began on the entire PGA area.	October 1984
Evaluations of Soils and Shallow Groundwater Contamination (1991 Consent Order).	1985
ROD issued for Subunit A groundwater (Section 16 Operable Unit [OU]) at PGAS.	September 1987
CD with GTRC to begin treating contaminated groundwater in Subunit A.	1988

Table 2-2 (Continued)

Event	Date
Leaking Underground Storage Tank found to have leaked aviation gasoline at PGAS.	1988
EPA published a RI/FS that identified two areas of noncontiguous contamination (PGAN and PGAS).	June 1989
ROD issued for Subunit B/C groundwater and soil (except for the sludge drying beds).	September 1989
Groundwater extraction and treatment system for Subunit A Groundwater implemented by GTRC.	1990
EPA issued ESD #1 to revise cleanup levels for acetone and MEK.	January 1991
EPA enters CD with GTRC and Loral Defense Systems (Loral) to (1) construct a treatment system to hydraulically contain the contaminants in Subunits B and C and reduce the contaminant concentrations to meet the cleanup standards stated in the ROD; (2) to construct an SVE system to remove VOCs in the vadose zone; and (3) to continue operation of the Section 16 OU treatment system set forth in the 1988 CD.	1991
Action Memorandum issued for excavation, stabilization and monitoring of soil at former chromium sludge drying bed #2.	October 1991
Consent Order with GTRC to excavate and stabilize soil at former sludge drying beds.	January 1992
Conduit well investigation conducted.	1992
Removal of sludge drying beds and stabilization of contaminated soil.	June 1992 through January 1993
EPA issued ESD #2 to (1) change the remedy for Subunit B/C from a centralized to a decentralized system; (2) change the designated end use from municipal use to reinjection; add wellhead treatment to any domestic wells showing contamination from site contaminations; and (2) establish treatment standards for benzene, ethylbenzene, 1,1,2,2-tetrachloroethane, and tetrachlorethene.	May 1993
SVE implemented in Polygon 79.	September 1993 through January 1994
Northern Subunit B/C groundwater extraction and treatment system began operation.	February 1994
Southern Subunit B/C groundwater extraction and treatment system began operation.	September 1994
SVE implemented in Polygon 84.	September 1994 through January 1995
Air sparging pilot test conducted for Subunit A groundwater.	1995
Installation of chromium treatment system at Well E-17.	1995
EPA issued ESD #3 to (1) allow air sparging in Subunit A groundwater and to (2) require the use of wellhead treatment for certain wells contaminated with chromium.	December 1995
SVE implemented in Polygons 96, 27a, and 92.	March 1996 through April 1998
Air sparging implemented in Polygons 96, 27a, 92, 81, and 100.	December 1996 through April 1998
EPA issued ESD #4 to provide updated groundwater cleanup standards for toluene, barium, beryllium, cadmium, chromium, lead, nickel, and selenium.	March 1998
Chromium treatment system at E-17 shut down due to operational problems.	2001
Air sparging in airport infield implemented for Subunit A groundwater.	November 2001 through January 2003
New North Subunit C extraction well E-102 installed north of Yuma Road and connected to treatment system.	2004
First Five-Year Review Report completed.	September 2005
Plans approved for installation of new extraction well E-18.	2006

Table 2-2 (Continued)

Event	Date
System upgrades performed on treatment systems due to aging.	2007
Data associated with TCE rebound at well GAC-4 re-examined and determined to indicate an isolated source within the wellbore resulting from operational activities near the well head.	October 2008
Three additional monitoring wells (GMW-18UC, GMW-19LC, and GMW-20LC) installed to better delineate 5 micrograms per liter (µg/L) TCE plume boundary in Subunit C.	December 2008 – March 2009
GTRC recommended pulsed pumping to overcome hydraulic stagnation and to address the residual contaminant mass in Southern Subunit C groundwater.	May 2009
Work plan submitted to install two additional wells (GMW-21UC and GMW-22UC) to monitor TCE concentration in production well GAC-04.	August 2009

Section 3
Site Background

3.1 Physical Characteristics

The PGA Superfund Site (Site) has been subdivided into two areas: PGAN defined by an area of VOC-contaminated groundwater that encompasses approximately three square miles, and PGAS defined by an area of VOC- contaminated groundwater that encompasses less than one square mile (Figures 3-1 and 3-2). Both areas within the Superfund Site share the same stratigraphy. The Site is located 17 miles west of downtown Phoenix, Arizona.

Major surface drainages in the area are the Gila River, located two to three miles south of the Site, and the Agua Fria River, located one to two miles east of the Site. The Agua Fria River is dry most of the year, and flows south into the Gila River, where flow is largely dominated by effluent from the 91st Avenue Wastewater Treatment Plant.

The Site lies within the western Salt River Valley portion of the Basin and Range physiographic province, which generally consists of alluvial basins or plains separated by north-to-northwest-trending mountain ranges (ADWR, 1994). The western portion of the Salt River Valley is bordered on the south by the Estrella Mountains and to the west by the White Tank Mountains. The basin-wide, alluvial deposits have been subdivided into three hydrogeologic units, in descending order, the Upper Alluvial Unit (UAU), the Middle Alluvial Unit (MAU), and the Lower Alluvial Unit (LAU). The UAU is approximately 350 feet thick and is composed of three Subunits (A, B, and C), where the contamination is currently confined. An east-west hydrologic groundwater divide for Subunit A reportedly exists along Yuma Road, which divides the Site into North and South Areas (EPA, 1989b). South of the divide, groundwater flow in Subunit A is generally to the southwest and west, while north of the divide, groundwater flow is generally to the north. Currently, dynamic pumping regimes in the area may affect the presence or characteristics of the groundwater divide. There is generally a slight downward vertical hydraulic head gradient across the Site.

At PGAN, Subunit A extends from the surface to about 160 feet below land surface and is composed primarily of silty sands. Groundwater occurs under unconfined conditions at about 90 feet below land surface. At PGAS, Subunit A, composed of silty sand and gravel, is approximately 110 feet thick. Depth to water is generally 70 to 80 feet below land surface. The water in the UAU is generally of poor quality due to high salt and nitrate content. At PGAN, Subunit B extends from about 160 feet to 230 feet below land surface and is composed primarily of sandy silt with clay. At PGAS, Subunit B extends from approximately 110 to 160 feet below land surface and is composed of sandy silt with clay.

At PGAN, Subunit C extends from about 230 to 360 feet below land surface and is composed primarily of silt, sand and gravel. While at PGAS, Subunit C extends from approximately 160 to 310 feet below land surface and is composed of silt, sand, and gravel. Subunit C, beneath the entire site, is used for the agricultural, domestic and municipal water supply in the area.

The principal aquifers of the western Salt River Valley are the UAU, MAU, and LAU. Many production wells in the area are screened at least partially in Subunit C and the MAU. The UAU aquifer is generally hydraulically unconfined, while the MAU ranges from an unconfined to a semi-confined aquifer. The LAU aquifer ranges from a semi-confined to confined conditions, but may be unconfined in areas where the MAU is not present. Natural recharge to the basin-fill aquifer occurs as mountain front recharge, along perennial and ephemeral streams, and as agricultural and urban irrigation (ADWR, 1994).

3.2 Land and Resource Use

Land uses in the vicinity of the Site are s a mix of residential, agricultural, commercial, and industrial.

Groundwater is the primary source of water for all domestic, industrial and irrigation water in the area. Numerous production wells and irrigation wells are located within one-half mile of the Site. These wells are used for municipal purposes by the COG, City of Avondale, City of Litchfield Park, as well as agricultural uses by various property owners.

PGAN

At PGAN, commercial and industrial properties lie to the north and south of the former UPI facility, agricultural land is to the west, and residential and commercial property is across Litchfield Road to the east. The groundwater contaminant plume at PGAN extends approximately 3 miles northward of the UPI facility, and beneath agricultural fields, a farm, housing developments with golf courses, and the Roosevelt Irrigation District (RID) Canal.

According to the 1989 ROD, groundwater in Subunit A is not a potential source of drinking water due to high levels of total dissolved solids and nitrates. However, drinking water wells and irrigation wells in the area draw water from Subunit C. Irrigation and supply wells located within or near the footprint of the PGAN TCE plume of Subunit A have mostly been abandoned (COG-04, COG-02, and COG-10) or are inactive (Suncor-27A, Suncor-27C, and Suncor-34B). COG-04, COG-2, and COG-10 were abandoned in 1987, December 2006, and May 2007, respectively, due to TCE exceedances. Suncor-27A and Suncor-27C were initially shut down due to TCE detections, but may be brought back online after modifications are made. Suncor-34B is being modified as a Subunit A monitoring well.

Suncor-3B on the edge of the plume is still an active irrigation well used for irrigation of the golf course in a residential development. COG-3 is an active production well located between PGAN and PGAS. Although it is not within the plume footprint, it is nearby the plume and has had low detections of TCE (below MCLs) during the past five-year period.

PGAS

At PGAS, commercial and industrial properties lie to the east of the airport and agricultural land is to the north, south, and west. The nearest residences are approximately one-half mile west of the Site and less than one-quarter mile northeast of the Site and generally upgradient or cross-gradient of the contaminant plumes. Commercial and industrial buildings are located above portions of the Subunit A groundwater plume.

A small portion of the area east of the PGAS is categorized as commercial. In this area, service-oriented businesses serve the surrounding area; typical users include convenience stores/gas stations, fast food chains, restaurants/cafes, and other personal convenience services.

The airport encompasses approximately 793 acres of land. In addition to the general aviation runway, the property accommodates smaller general aviation aircraft storage along with several airport businesses including two commercial flight schools and a dormitory which houses trainees. The north side of the runway is currently used for temporary storage of large aircraft. A runway safety area extends approximately 300 beyond airport property to the east of the runway (Coffman Associates, Inc. 2007).

Production wells located within or near the footprint of the PGAS TCE plume in Subunit C include active wells GAC-02 and GAC-04, and inactive wells COG-05 and GAC-03. Although COG-05 and GAC-03 are inactive, they are regularly monitored for TCE, and there are currently no plans for abandonment of these wells. Modifications were made to GAC-03, and TCE is no longer detected at this well. No production wells are located within the footprint of the PGAS TCE plume in Subunit A.

3.3 History of Contamination

PGAN

The former UPI facility was established in 1963 as a research, design, development, testing, assembly and manufacturing plant for ordinance components and other related electromechanical devices. The products (fuses, switches, detonators, etc.) created at this facility were shipped off-site for integration into larger defense systems. Typically, these products contained small quantities of explosive or reactive chemicals. A variety of chemicals such as acids, explosives, tear gas, propellants, paints, glues, oils, solvents, and radioactive materials were used and tested at the facility. Additionally, UPI stored reactive chemicals and products, processed powder, and blended and processed propellants. More than 180 different chemicals and chemical mixtures were used over the course of the facility's operation. Several different chemicals, including solvents used for manufacturing electromagnetic devices, were reportedly disposed in the four dry wells located west of the main building. In particular, TCE and perchlorate were known to have been disposed on the UPI facility (ARCADIS, 2007).

Historically, the former UPI property contained 24 fixed buildings, each of which housed a specific manufacturing process or research operation, and eight bunkers. The majority of the manufacturing equipment was removed when UPI ceased operations in 1994, leaving the buildings and bunkers vacant until their demolition was completed in 2009 (Matrix, 2010a).

PGAS

Historical data indicate two primary contributors to contamination on the southern portion of the PGA site as the Goodyear Aerospace Corporation site, owned at that time by Loral Corporation, and activities carried out by the Navy at the Litchfield Park Naval Air Facility (EPA, 1987a).

Goodyear Aerospace Corporation purchased the facility located at 101 South Litchfield Road in 1949 and operated on the airport property until 1968, and adjacent to (east of) the airport property until 1987. The facility adjacent to (east of) the airport was originally occupied by the Loral Corporation and remains in use by Lockheed Martin. The plant was involved in the development and manufacturing of aerospace related products including electronics equipment such as radar; transparent products such as aircraft and automobile windshields; and structural components such as MX missile transporter and aluminum-skinned shelters. Operations at the facility which have generated hazardous waste are primarily metal treatment processes such as plating, degreasing and etching.

Up until 1952, effluent from the preservation and activation process, waste streams from routine aircraft maintenance, cleaning, and degreasing were discharged into the main drainage ditch. This effluent may have contained oil, grease, battery acids, and miscellaneous degreasing solvents. The sewer system eventually discharged into a marsh area south of the airport. These discharges continued until the on-site sewage treatment plant, which was constructed in 1951 to treat domestic sewage, was upgraded to receive and treat industrial waste (LATA ,2010).

There was a chromate treatment plant for rinse water in the 1970s (Ecology and Environment, 1983). The manufacturing facility used solvents and acids and generated metal sludges, waste solvents and waste acids from the metal treatment operations. Prior to 1980, most of these wastes were disposed on-site in sludge drying beds. There were one large and two small drying beds located at the southern portion of the facility. The contents of the beds, along with soil and rubberized fabric liner, were removed in 1980; further remediation of one of the beds was completed in 1993. TCE was used at the Site prior to 1974 (Ecology and Environment, 1983).

In 1988, a 25,000 gallon underground storage tank (UST) was removed from the airport property and found to have released aviation gasoline. The total volume released was estimated to be 57,000 gallons. The UST was located in the infield area south of the main runway. Corrective actions conducted by the City of Phoenix under a 1993 Administrative Consent Agreement with EPA included drilling of eight exploratory borings, installation of ten groundwater monitoring wells, free product removal, and installation of an SVE system. The leaking tank site is being managed by EPA's UST section. The SVE system is no longer in operation and regularly scheduled groundwater monitoring is ongoing (ADEQ, 2005). Because the spill is not related to the VOC and chromium contamination being addressed as part of PGAS remedial actions, it is not discussed further in this report.

3.4 Initial Response

PGAN

In 1984, a subsurface investigation at the former UPI facility revealed the primary source of contamination to be four dry wells located west of UPI's main building. The dry wells were used for disposal of solvents from the former UPI facility from 1963 through 1980. A more thorough Remedial Investigation from 1985 through 1987 revealed that the groundwater plume extended more than one mile north of the former UPI facility. Additional investigation was conducted by EPA to complete the RI/FS for the Site, as described in the RI/FS Phoenix Goodyear Airport, Goodyear, Arizona. Volumes I, III, and XII (CH2M HILL, 1989).

PGAS

A preliminary investigation was conducted by Ecology and Environment on behalf of EPA in September 1982. After sampling of wells in the area confirmed TCE contamination, the Site was listed on the final NPL on September 8, 1983. A RI was conducted in 1984 and 1985. The RI consisted of sampling sewers and outfalls on the former Goodyear Aerospace Corporation facility, installation of monitoring wells, completion of soil borings as piezometers, sampling of community wells, and collection of samples from surface soils and soil borings (EPA, 1989a). Results from the RI showed that there was a small area within one-half mile of the Goodyear Aerospace Corporation facility in which production wells had TCE contamination in the range of 30 to 600 ppb (EPA, 1989a). The COG shut down municipal production wells with VOC concentrations greater than respective MCLs (EPA, 1989b). Soil at the Site was found to be contaminated with pesticides, chromium and other metals, and VOCs. Pesticides were present at levels that were considered consistent with background levels, while additional investigation and treatment was recommended for areas of metal and VOC contamination (EPA, 1989a).

3.5 Initial Basis for Taking Action

PGAN

As described in the 1989 RI/FS (EPA, 1989a), TCE was detected in soil at levels greater than the ADHS-suggested soil cleanup level of 0.26 milligrams per kilogram (mg/kg), and was detected in groundwater at levels greater than the MCL of 5 µg/L. In sampling conducted in 1984, the maximum concentration of TCE in soil was 5,586 mg/kg, and the maximum concentration in groundwater was 86,000 µg/L. Other contaminants identified as specific targets for remediation include MEK and acetone. Cleanup levels were established in the 1989 ROD (EPA, 1989b) for 1,1-dichloroethene, 1,2-dichloropropane, chloroform, toluene, trichloroethene, trichlorofluoromethane, carbon tetrachloride, methylene chloride, xylenes, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, and zinc. The cleanup criteria were selected to reduce contaminant exposure risk from groundwater extracted by the various production wells in the Site's vicinity.

PGAS

Chromium was detected in soil at concentrations greater than the ADHS-suggested health-based cleanup level of 1,500 mg/kg. Other metals were also detected above regulatory levels, including aluminum, cadmium and copper. TCE was detected in soil at levels greater than the ADHS-suggested soil cleanup level of 0.26 mg/kg. The highest health risks were determined to be from potential incidental ingestion of arsenic, chromium, cadmium and nickel in surface soils associated with the sludge drying beds (EPA, 1989a).

TCE was discovered in the groundwater at PGAS at concentrations greater than the MCL of 5 µg/L. In addition, chromium was detected in several wells at levels above the MCL of 100 µg/L. At the time of the RI, the COG operated eight wells for its municipal water supply, seven of which were located within the PGA Superfund Site boundary (EPA, 1989a). Numerous other domestic and irrigation supply wells were also operating in this area. As a result, the primary human health risk posed was the potential for direct ingestion of contaminated groundwater.

Section 4
Remedial Actions

4.1 Remedy Selection

Decision documents for selection of the remedy are: the initial ROD, known as the Section 16 OU ROD signed in 1987; the Site ROD signed in 1989; an Action Memorandum in 1991; five ESDs making changes to the remedy selected in the ROD; and a Perchlorate Removal Action Memorandum in 2008. The initial ROD addressed chromium and VOCs in Subunit A groundwater within the PGAS site. The Site ROD in 1989 addressed the vadose zone and groundwater in Subunits B and C for both the PGAS and PGAN sites, as well as Subunit A groundwater at PGAN. The Amended Administrative Order, Docket No. 90-20 issued to UPI required them to implement the remedy specified in the ROD. The Chromium Action Memorandum addressed chromium in soil at PGAS and set forth requirements for the excavation of the former sludge drying beds. The Perchlorate Action Memorandum for PGAN addressed perchlorate extracted from wells that are part of the treatment system and any drinking water wells impacted until a final perchlorate remedy is selected. These documents are discussed below as they pertain to each site as well as a presentation of the Site's remedial action objectives and major system components of the selected remedy.

Records of Decision (RODs)

PGAN

The 1989 ROD addressed TCE, MEK, and acetone contamination in soil and groundwater in Subunits B and C of the UAU and the Subunit A groundwater. The selected remedy for treatment of groundwater at the Site included an extraction and treatment system using air stripping, vapor phase carbon, and GAC polishing to remove acetone and MEK. The objective of groundwater treatment was to reduce VOCs to levels equal or less than the Applicable or Relevant and Appropriate Requirements (ARARs) in order to protect the current and future uses of area Subunit B/C groundwater. The treated water was to be either reinjected or incorporated into the potable water supply. SVE with vapor phase carbon was the selected remedy for treatment of soil at PGAN. The objective of soil treatment was to prevent migration of TCE into Subunit A groundwater.

PGAS

The 1987 ROD addressed only contaminated groundwater in Subunit A, the upper portion of the UAU, at the PGAS site. Remedial determinations for Subunits B and C, and for contaminated soil at the Site, were not made at this time because investigations were still taking place. In addition to TCE and chromium, tetrachloroethene (PCE), 1,1-dichloroethene, chloroform, carbon tetrachloride, and arsenic were identified in groundwater. The highest concentrations of these contaminants were found in Subunit A.

The selected remedy was to install an extraction and treatment system to remove contaminated groundwater from the aquifer. Contaminants were to be removed from the extracted water by an air stripping tower with treatment of the off-gas by a vapor-phase GAC system. Treated groundwater was then to be re-injected into the aquifer through a network of Subunit A injection wells.

The objective of the Section 16 OU was to stop lateral migration of contaminants beyond Section 16 in Subunit A, to stop contaminants from migrating vertically into Subunits B and C, and to reduce the volume and toxicity of the contamination in Subunit A. The extent of chromium in Subunit A groundwater, as well as VOCs and chromium in Subunits B and C, was not precisely known at the time of the 1987 ROD, and treatment of these contaminants was to be addressed in the final remedy.

The 1989 ROD addressed groundwater at the PGAS site in Subunits B and C of the UAU and VOC contamination of soil for the entire site (PGAS and PGAN). A pump and treat system using air stripping was the selected remedy for treatment of groundwater at the Site. The goal of groundwater treatment was to reduce VOCs to levels equal or less than the ARARs in order to protect the current and future uses of area Subunit B/C groundwater. Treated water would then be provided to current users of the extraction wells. An SVE system with vapor phase carbon was the selected remedy for treatment of soil at the Site. This remedy addresses VOCs in the soil, but does not address chromium in the soil, which was addressed in the 1991 Action Memorandum (EPA, 1991a).

Explanation of Significant Differences (ESDs)

PGAN

The first ESD was issued in January 1991 (EPA, 1991b). There were five points to the ESD, four of which applied to PGAN. The four relevant points were intended to:

1. Revise the cleanup level for MEK in groundwater from 170 ppb to 350 ppb.

2. Set a cleanup level for acetone in groundwater at 700 ppb.

3. Clarify the target area and criteria for establishing cleanup goals for soil at PGAN.

4. Clarify the role of soil excavation as an option should the selected remedy be ineffective.

The second ESD was issued in May 1993 (EPA, 1993). There were several goals of this ESD, of which five applied to PGAN:

1. Change the emission control technology for the SVE system from vapor-phase GAC to treatment by thermal oxidation with wet scrubbing.

2. Change the designated end use for water treated by the Subunit C groundwater remedy from incorporation into the community potable water supply to reinjection back into the Subunit C section of the aquifer with an option for municipal use after 1994.

3. Suspend the remedial design and construction of the LGAC treatment requirement from the Subunit A groundwater remedy because ketones were no longer present in groundwater above remediation levels.

4. Add the requirement that wellhead treatment be implemented at any private or municipal drinking water well in the vicinity of the PGA site that has an occurrence of Site contaminants at levels in excess of the groundwater cleanup standards.

5. Establish four additional groundwater cleanup standards: benzene (5 ppb), ethylbenzene (700 ppb), 1,1,2,2-tetrachloroethane (0.18 ppb) and PCE (5 ppb).

The third ESD, issued in December 1995 (EPA, 1995), allowed for air sparging to accelerate soil cleanup and modified the groundwater remedy for chromium-contaminated Subunit A groundwater to include the use of wellhead treatment systems. ESD #3 was optional for PGAN, and it has not been used there.

The fourth ESD, issued in March 1998 (EPA, 1998), updated the current groundwater cleanup standards for both Subunit A and Subunit B/C to be consistent with the Safe Drinking Water Act MCLs adopted in October 1996. Primary contaminants affected by this ESD were toluene and seven metals (barium, beryllium, cadmium, chromium, lead, nickel, and selenium).

The fifth ESD, issued in September 2002 (EPA, 2002a), applied only to SVE at PGAN. ESD#5 changed the air emissions control technology for PGAN SVE to GAC from thermal oxidation with wet scrubbing.

Action Memorandum for Perchlorate at PGAN

An Action Memorandum was issued in April 2008 to address the perchlorate in groundwater at PGAN that was being extracted by the remedial wells or domestic supply wells in the area. The Action Memorandum set forth requirements for wellhead treatment of perchlorate in wells where the level exceeded the Arizona Health-Based Guidance Level of 14 ppb. The Action Memorandum also set forth a process for ensuring ongoing provision of potable water where perchlorate impacts any domestic supply wells. Currently, an ion exchange system is used as a treatment process unit within the MTS to treat perchlorate in extracted groundwater.

PGAS

The first ESD was issued in January 1991 (EPA, 1991b). There were five points to the ESD, two of which applied to PGAS and one of which applied to an off-site agricultural well. These points were intended to:

1. Revise the cleanup level for MEK in groundwater from 170 ppb to 350 ppb.

2. Set a cleanup level for acetone in groundwater at 700 ppb.

3. Revises the selected remedy for an off-site agricultural well referred to as the "Phillips Well" from well-head treatment to routine water quality monitoring.

The second ESD was issued in May 1993 (EPA, 1993). It included:

1. Change the requirement for a centralized air stripping system for the Subunit B/C groundwater remedy to a decentralized system (e.g. two or more independent LGAC treatment systems).

2. Change the designated end use for water treated by the Subunit B/C groundwater remedy from municipal use to reinjection back into the B/C section of the aquifer with an option to reconsider municipal use after 1994.

3. Add the requirement that wellhead treatment be implemented at any private or municipal drinking water well in the vicinity of the PGA site that has an occurrence of Site contaminants at levels in excess of the groundwater cleanup standards.

4. Establish four additional groundwater cleanup standards: benzene (5 ppb), ethylbenzene (700 ppb), 1,1,2,2-tetrachlorethane (0.18 ppb) and tetrachlorethene (5 ppb).

The third ESD was issued in December 1995 (EPA, 1995). Two points to the ESD applied to PGAS, which are as follows:

1. Modify the groundwater remedy for Subunit A groundwater to allow air sparging of Subunit A groundwater in areas where an SVE system can collect and treat the volatile organic compound vapors emitted by the air sparging system in a manner consistent with the ROD.

2. Modify the groundwater remedy for Subunit A groundwater to include use of a metal adsorption wellhead treatment system, where appropriate, for wells connected to the existing groundwater treatment plant. This system would be used at any Subunit A groundwater remedy extraction well with chromium contamination that, without such a system would result in the effluent at the Subunit A groundwater treatment plant exceeding site cleanup standards for metal contaminants.

The fourth ESD, issued in March 1998 (EPA, 1998), updated the current groundwater cleanup standards for both Subunit A and Subunit B/C to be consistent with the Safe Drinking Water Act MCLs adopted in October 1996. Primary contaminants affected by this ESD were toluene and seven metals (barium, beryllium, cadmium, chromium, lead, nickel, and selenium).

The fifth ESD, issued in September 2002 (EPA, 2002a), applied only to PGAN.

Action Memorandum for Chromium at PGAS

An Action Memorandum was issued in October 1991 to address chromium in soil at PGAS. The Action Memorandum set forth requirements for the excavation of the former sludge drying beds (EPA, 1991a). Any soil containing total chromium greater than 2,000 mg/kg or cadmium greater than 100 mg/kg was to be excavated and stabilized, with confirmation samples taken to ensure that the toxicity characteristic leaching procedure (TCLP) leachate did not exceed regulatory limits of 5.2 mg/kg for chromium and 0.066 mg/kg for cadmium.

Remedial Action Objectives

The 1989 ROD set forth cleanup levels for the soil and groundwater at PGAN and PGAS. The goal for remediation of VOCs in soil is to remove contaminants from the soil until EPA determines that the levels remaining will not cause or contribute to contamination of the groundwater above the groundwater cleanup standards. While PGAS used a VLEACH analysis to show that it completed its soil gas remediation in 1999, additional soil gas remediation is ongoing at PGAN. For chromium and other metals in soil at PGAS, EPA set final cleanup levels through the 1991 Action Memorandum (EPA, 1991a). The cleanup levels for soil are set such that remaining contamination will not contribute to groundwater contamination above the groundwater cleanup levels.

Pursuant to the remedy selected in the 1989 ROD, groundwater throughout the aquifer – including Subunits A and B/C (hereafter referred to as Subunit C) - must meet Site-specific cleanup levels which are listed in Table 2-5 of the ROD. Subunit C and the MAU are domestic water supply sources for the area and thus must meet MCLs. Although Subunit A is not a potential source of drinking water, pursuant to Arizona state law, cleanup must achieve the maximum protection of drinking water. Thus, MCLs apply to Subunit A. Some of the cleanup levels established in the ROD were modified in ESD #2 and ESD #4. Original and current cleanup levels are discussed in Section 7.2 and listed in Table 7-1.

4.2 Remedy Implementation

4.2.1 PGAN

Groundwater Treatment Systems (GTS)

Groundwater treatment began at PGAN in 1994. Currently, four groundwater treatment systems are in operation at the PGAN site, including the Main Treatment System (MTS) for Subunits A and C groundwater near the former UPI facility, a wellhead treatment system at Well 33A for Subunit A and B groundwater in a production well north of the former UPI facility, and two treatment systems (EA-05 and EA-06) located in the northern portion of the dissolved plume to better control the TCE impacts in Subunit A groundwater.

Main Treatment System (MTS)

The MTS treats groundwater from the Site's extraction wells in the PGAN source area, consists of the following: EA-01(Subunit A), EB-01 (Subunit B), EA-02 (Subunit A), EA-03 (Subunit A), EC-01 (Subunit C), PZ-01 (Subunit A/B) and MW-20 (Subunit C). An ion exchange module was added to the system in 2005 to remove perchlorate from extracted groundwater. Extracted groundwater is conveyed using submersible pumps from the extraction wells into the surge tank. Extraction wells, EA-02 and EC-01, bypass the surge tank as the perchlorate concentrations in each of these extraction wells are below the MCL. The recovered groundwater is then pumped from the surge tank through bag filters and the ion exchange vessels to remove perchlorate and to the top of the air-stripping columns to remove VOCs. Effluent air from the air-stripping columns is directed through two 10,000-pound vapor-phase GAC vessels in series, which remove the VOCs from the process air. Treated effluent water is injected into the Subunit A aquifer through the network of six injection wells (IA-01 through IA-06) (Matrix, 2010a).

Phase 1 MTS Expansion, which converted PZ-01 into an extraction well for the MTS system, was completed in October 2008. In 2010, the Phase 2 Expansion was completed at the MTS. An upgrade to the booster pump and addition of the Phase 4 Air Stripper improved the treatment capacity of the system by approximately 25 percent. Additionally, MW-29 was converted into a Subunit C extraction well due to high levels of TCE detected in the vicinity. Extraction at MW-29 is serving as an interim measure while the TCE plume near MW-29 is fully characterized.

Well 33A Groundwater Treatment Systems

Extraction Well 33A GTS extracts groundwater from Subunits A and B and conveys it to two parallel trains of two 20,000-pound liquid-phase GAC (LGAC). A bag filter vessel was installed in August 2006 to filter particulate matter from the process stream to prevent clogging of the LGAC vessels. Treated effluent water is discharged to the RID Canal (Matrix, 2010a).

EA-05 Groundwater Treatment Systems

Extraction Well EA-05 GTS extracts groundwater from Subunit A and conveys it to a bag filter unit to remove particulates prior to sending it through two 20,000-pound LGAC vessels operated in series. Treated effluent water is injected into the Subunit Aquifer through injection well IA-10. A sequestering agent is pumped from a 400-gallon tank by means of a metering pump to the effluent piping of the LGAC vessels to reduce scaling in the system components and injection well. Construction of the EA-05 GTS was completed in March 2008 (Matrix, 2010a).

EA-06 Groundwater Treatment Systems

Extraction Well EA-06 GTS extracts groundwater from Subunit A and conveys it to a bag filter unit to remove particulates prior to the two 20,000-pound LGAC vessels operated in series. Treated effluent water is discharged to the RID Canal. Construction of the EA-06 GTS was finished in January 2008. By early 2009, in spite of the additional pumping of EA-06, GW monitoring showed inadequate plume capture in the eastern and northeastern portions of the Subunit A plume north of I-10. This has necessitated the planning and installation of additional extraction and injection wells. Beginning with EA-07-- installed in 2010 and now included in the EA-06 GTS network (Matrix, 2010a) -- and continuing with planning for EA-08, additional work is still needed to gain complete hydraulic control . After finishing the necessary shake-down of EA07, the treated groundwater will be conveyed to a number of injection wells located along Dysart Road and at the Estrella Mountain Community College for re-injection to build a hydraulic barrier along the east/northeast plume boundaries to help reverse the GW gradient and contain the Subunit A TCE plume.

Soil Gas Treatment

The PGAN soil gas remedy is an SVE system addressing vadose zone soil gas near the former UPI main drywells area. The original SVE system was constructed in 1994 with thermal oxidation for air emissions and operated until 1998 removing approximately 10,000 pounds of TCE. In 2004 the SVE system was restarted with GAC treatment for air emissions. The system currently consists of the extraction well network and piping, a VES5 Modular Vapor Extraction System blower assembly, and three in-line GAC vessels (two 1,000 pound and one 2,000-pound vessels) that operate in series. Operation of the SVE system is further explained in the Soil Vapor Extraction System Operations and Maintenance Plan (SVE O&M Plan) (ARCADIS, 2005a).

Source Areas, Soils and Facility Structures Supplemental Remedial Investigation and Feasibility Study (SASFR)

Two investigations of potential source areas were either in process in 2009 or in the planning stages to be implemented in 2010. The Source Areas, Soils, and Facility Structures (SASFR) Investigation began in 2009 with the collection of 268 soil samples in areas adjacent to the former dry wells, believed to be the sources of the groundwater contamination. SASFR activities have continued into 2010. A soils and soil gas sampling investigation was planned throughout the former Unidynamics facility. Phase I called for soil and soil gas samples at 10-foot intervals to groundwater and groundwater grab samples collected to approximately 120 feet below ground surface at six locations. Subsequent phases would be added based on the Phase I results.

4.2.2 PGAS

Subunit A Groundwater Treatment

Following the 1987 ROD, a pilot test for the air stripping and recharge system was conducted by GTRC. Based on the results of that pilot test, a full-scale treatment facility was constructed and began production in early 1990. At the beginning of operation, there were five extraction wells, one air stripper and seven injection wells (Sharp and Associates, 2005).

The offgas from the air stripping tower was treated with vapor-phase GAC until 1995. At that time, GTRC showed that VOC concentrations in the offgas were low enough that treatment was no longer required by the Maricopa County Air Pollution Control District emission standard of 3 lbs/day.

By 1995, the system had 12 Subunit A extraction wells and 14 injection wells, and the volume of water treated by the plant reached as high as 436 million gallons per year in 2001. The treated volume has decreased since that time; in the first half of 2009, approximately 140 million gallons were treated (LATA, 2010). As shown schematically in Figure 4-1, the current treatment system consists of 12 extraction wells, each capable of producing between 20 and 120 gallons per minute (gpm) 16 injection wells; conveyance pipeline from extraction wells to the treatment system (influent); acid tanks for scale reduction; air stripping tower; and conveyance pipeline from the treatment system to the injection wells (effluent).

The Subunit A treatment system does not currently remove chromium from the extracted groundwater. ESD #3 modified the groundwater remedy to include wellhead treatment for chromium. Pursuant to ESD#3, in the third quarter of 1995, a wellhead chromium treatment system was installed to treat water produced by Subunit A extraction well E-17, one of the wells with chromium concentrations above the MCL, prior to piping the water to the treatment plant for VOC removal by air stripping. The chromium treatment system used was an advanced affinity chromatography system which consisted of a chromatography column, prefilter, mechanical flow meter, regeneration system, sample ports and containment pad (Sharp and Associates, 1995b). The treatment system had many operational problems and was shut down in 2001. The treatment system was removed in 2003 with approval by ADEQ and EPA in December 2002 (ADEQ, 2002 and EPA, 2002b), and has not yet been replaced.

Air sparging was used twice on different areas of the Site to accelerate VOC removal.

Subunit B/C Groundwater

There were originally three zones of contamination within Subunit C: the southern plume, the central plume and the northern plume. Contamination is believed to have entered Subunit C from Subunit A through conduit wells. The known conduit wells were investigated in 1992 and were either abandoned or repaired (Sharp and Associates, 1994b). Initially, each of the three plumes had a separate extraction and treatment system. The northern system operated between February 1994 and December 2004 and consisted of one extraction well, one LGAC system and two injection wells. The central system consisted of one extraction well and a reverse osmosis unit and operated for about 3 years. The southern system began operation in September 1994 and is still in operation (LATA, 2010).

The northern plume is believed to have entered Subunit C by conduit flow through well GAC #3, located near the southwest corner of the intersection of Yuma Road and Litchfield Road. GAC #3 was rehabilitated in 1992 to prevent further contaminant migration. One extraction well, E-101, was installed near what was, at the time, the western edge of the plume. Treatment capacity for the Northern Subunit C system was rated at 450 gpm. The northern treatment system began operation in February 1994 using E-101 for extraction. E-101 was discontinued as an extraction well because it was not able to provide hydraulic containment of the plume, which had already migrated north of Yuma Road. A new extraction well, E-102, was installed in June 2003 and began operating in November 2004 to attain northern plume capture. The location of the well was selected using groundwater modeling and flow path analysis, and the well was installed at the leading edge of the northern plume to provide capture. The Northern Subunit C treatment system remains shut down, other than for periodic monitoring purposes, and the water extracted from E-102 is piped to the Southern Subunit C treatment system. When in use, extracted water was treated with a reverse osmosis system and a GAC filter. Since TCE has again been detected at this well above the MCL, beginning in 2008 GAC-4 has been pumped and piped into the Subunit A treatment system for TCE treatment.

The Central Subunit C plume appears to be localized around well GAC #4, because the plume was associated with conduit flow through this well. This well was rehabilitated in 1992 to stop the conduit flow. Between 1992 and 1995, this well was used as the primary water source for the Loral Corporation facility, with extracted water treated with a reverse osmosis system and used on site. Treatment was required until 1995, when the TCE concentration in GAC #4 was below the drinking water standard for 12 consecutive months. This well was used as a backup well for the Loral facility. When in use, extracted water is treated with a reverse osmosis system and a GAC filter. However, TCE has been detected at this well above MCL since 2005, and since 2008 this well has been pumped and piped into Subunit A treatment system for TCE treatment.

The Southern Subunit C treatment system is similar in design to the Northern Subunit C system. There are three extraction wells for the Southern plume, E-201, E-202 and E-203. Extracted groundwater is routed through two bag prefilters to two 20,000-pound LGAC vessels. Treated water is re-injected through three Subunit C injection wells, 1-201, 1-202 and 1-203. In November 2004, an additional well was added to the extraction network, when E-102 was put into operation north of Yuma Road to capture the northern Subunit C plume; water from E-102 is piped to the Southern Subunit C treatment system. Wells E-202 and E-203 were shutdown when the Southern Subunit C plume near these wells consistently attained the remedial action goal of 5µg/L for TCE. Currently wells E-201 and E-102 are in operation. Three additional monitoring wells (GMW-18UC, GMW-19LC, and GMW-20LC) were installed in 2009 and integrated into the groundwater sampling plan (LATA, 2010). Southern Subunit C treatment system wells are shown in Figure 4-2.

In 2009, a pulsed pumping plan was submitted to facilitate the remediation of the residual Subunit C TCE contamination. This plan is devised to combat the hydraulic stagnation that appears to be limiting remedial efforts at PGAS. The pumping schedule will be modified once the proposed pulsed pumping plan is accepted.

Soil Gas Treatment

Several efforts were made to determine which areas of the Site would be most suited for SVE treatment. All efforts involved using soil or soil gas analytical data from different polygonal areas of the Site to predict the effect on TCE concentrations in groundwater below the polygons. In May 1992, a conservative total mass dissolution test was run on 143 polygons, of which 80 polygons failed; that is, were predicted to impact groundwater with TCE concentrations greater than 5 µg/L. VLEACH and a mixing cell model were then run on these 80 polygons, resulting in 14 polygons failing. Additional field data was collected in 1992 and 1993. Additional modeling took place, which resulted in selection of five polygons (79, 84, 96, 92, and 27a) which required remediation using SVE.

The SVE system consisted of five major components: extraction wells and piping; vapor inlet system; vapor treatment system; vacuum extraction module; and electrical control system and power distribution module (Metcalf and Eddy, 1993). The number of extraction wells varied from one to three for each polygon. Flow from each well was piped through the vapor inlet system, which removed liquid from the inlet air and provided the opportunity to blend ambient air into the vapor stream to reduce the vapor concentration to below 25 percent of the Lower Explosive Limit, if needed. Offgases were treated with two 2,000-pound vapor-phase GAC vessels installed in series and vented to the atmosphere.

Polygon 79 was the first to be treated with the SVE system. The SVE system, using four extraction wells to remove VOCs from the soil, operated at Polygon 79 from September 1993 through January 1994. After monitoring rebound concentrations, the polygon was officially closed by EPA on September 3, 1994 (Metcalf and Eddy, 1995). The same SVE system was moved to Polygon 84 in 1994, and operated between late 1994 and early 1995. The Polygon 84 system used three extraction wells to remove VOCs from the soil. Confirmation samples were collected on June 15, 1995, and the polygon was approved for closure (Metcalf and Eddy, 1995).

In late 1995, the SVE system was moved to Polygons 96, 92, and 27a. A total of seven extraction wells were installed to remove VOCs from the soil: three in Polygon 96, three in Polygon 92 and one in Polygon 27a. The system operated from March 1996 through April 1998. The use of air sparging was approved in ESD #3, issued in December 1995. Air sparging was used to further reduce contamination in these three polygons and two adjoining polygons, numbered 81 and 100, between May 1996 and April 1998. During the operation of the SVE and air sparging systems at these five polygons, 1,768 pounds of VOCs were removed from the soil and groundwater. The impact to TCE concentrations in groundwater predicted by VLEACH modeling ranged from 6 μg/L in Polygon 27A to 27 μg/L in Polygon 96 prior to SVE treatment. After the treatment, the VLEACH-predicted impact to TCE groundwater concentrations was less than 1 μg/L for each of the polygons (Ogden Environmental and Energy Services, 1999).

After using air sparging in Polygons 96, 92, 27A, 81, and 100, a work plan was submitted to use the same system to accelerate VOC removal in the airport infield, just south of the UST release (GTRC, 1999). Three air sparging wells and four SVE wells were installed in 2001 near well PMW-15. The air sparging system operated between November 2001 and January 2003 and removed 138 pounds of TCE from the infield area (Sharp and Associates, 2005).

Sludge Drying Beds

The 1983 site inspection identified three sludge drying beds located in the southern portion of the former Goodyear Aerospace Corporation facility. The larger bed, measuring 100 feet by 190 feet (EPA, 1989a) by three feet deep, was constructed in the early 1970s and was in use until 1980 (Ecology and Environment, 1983). It is not known when the two smaller beds, measuring 20 feet by 100 feet by three feet deep, were constructed or used. Prior to 1980, treated wastes from anodizing, metal etching, plating and plastics polishing, and some solvents were disposed in the drying beds. Waste consisted mostly of chromium sludge from the chromate treatment plant, with occasional disposal of waste solvent for evaporation. Approximately 529,375 pounds of metals were disposed in the beds over their lifetime (Ecology and Environment, 1983). The material in the beds was removed in 1980, at which time one of the beds had a hard crust on top, but the deeper contents had not completely dried.

Work to remediate the two smaller sludge drying beds - a total area of about 100 feet by 140 feet - began in June 1992 and was completed in January 1993. The beds were excavated and soil segregated into stockpiles of clean, intermediate and contaminated material using a field instrument and samples submitted to an analytical laboratory. Cleanup standards for metals in soil were set by the October 1991 Action Memorandum (EPA, 1991a) which states "Any soil containing total chromium concentrations greater than 2,000 mg/kg or cadmium concentrations greater than 100 mg/kg required stabilization prior to backfilling".

Before beginning excavation, the entire area was analyzed on a 25-foot grid system for chromium and cadmium levels using an X-Ray Fluorescence detector. This allowed field staff to delineate areas that required excavation. These areas were excavated and the soil screened with an X-Ray Fluorescence detector to determine whether it needed to be stabilized. A total of 1,696 cubic yards of contaminated soil and 1,895 cubic yards of intermediately-contaminated soil were removed from the former sludge drying beds. Comparison samples were collected in the excavated soil and submitted for laboratory analysis to confirm accuracy of the X-Ray Fluorescence detector.

Contaminated soil was blended with intermediate soil to reduce the concentration of metals in the soil to be stabilized. Stabilization was achieved by spreading Portland cement over the contaminated soil and mixing with a loader. Samples were taken of the stabilized soil to confirm that the TCLP leachate would be less than 5.2 mg/kg for chromium and 0.066 mg/kg for cadmium, as specified in the 1991 Action Memorandum (EPA, 1991a). Stabilized soil was compacted back into the excavated areas. The areas were covered with 6 inches of clean fill and a 3-inch layer of gravel. (Bartholomew Engineering, 1993).

4.3 Operation and Maintenance

4.3.1 PGAN System Operations/O&M Activities

The *Draft – Revised Main Treatment System Operations and Maintenance Plan* (Matrix, 2009), for PGAN was completed in October 2009 to meet the requirements set forth in Task 1.1 of the *PGA-North Site Groundwater, Soil Gas, Air, Soils, and Facility Structures Remedy Supplemental Remedial Investigation and Feasibility Study, and Remedial Design, and Continued Remedial Action Consent Decree (CD) and Scope of Work (SOW)* dated April 19, 2005. Amendments following February and May 2009 spills at the MTS have been incorporated listing operating parameters such as flow rates for all extraction and injection wells and alarm conditions.

EA-05 and EA-06 groundwater treatment systems are covered in the *Final EA-05 and EA-06 Groundwater Treatment Systems Operation and Maintenance Plan (*ARCADIS. 2008b. The O&M for the new injection wells (IA-11 and IA-12) and extraction well (EA-07), which are connected to the EA-06 treatment system, will be incorporated into the EA-05 and EA-06 O&M Plan upon approval by EPA.

4.3.2 PGAS System Operations/O&M Activities

Subunit A

The *PGA Operable Unit Treatment Plant Operation and Maintenance Procedures Manual* (ICF, 1990) was submitted in January 1990 and has been periodically updated as the system has been modified. The manual lists operating parameters such as flow rates for extraction and injection wells, the pH range in influent and effluent water, and air flow rates through the air stripper.

Subunit B/C

The *Operation and Maintenance Manual for the Northern Subunit B/C Groundwater Remediation System* was submitted for EPA approval in April, 1994 (Sharp and Associates, 1994a). Operation and maintenance of the southern Subunit B/C system is similar to the northern system and the Operation and Maintenance Manual has not been substantially updated since it was written in 1994.

Currently, the northern Subunit B/C system is shut off because the northern plume (groundwater from E-102) is being treated by the southern Subunit B/C treatment system and the northern system is used only once each month to collect a sample. The plan is to keep this system turned off indefinitely and use only E-102 for extraction from the northern Subunit B/C plume to reduce operation and maintenance costs.

The wellhead treatment system for central Subunit B/C well GAC #4 (the central Subunit B/C plume) is not currently operated.

Section 5
Progress Since Last Five-Year Review

5.1 PGAN

2006 Five-Year Review Protectiveness Statement

The first Five-Year Review for PGAN concluded:

> *"A protectiveness determination of the remedy at PGAN cannot be made at this time until further information is obtained. While remedial action is ongoing at the Site, EPA is implementing a supplemental RI to better characterize Site contamination and its extent and expects that there will be a supplemental FS to examine appropriate alternatives to treat contamination not being adequately addressed currently. It is expected that these actions will be completed by about 2011, at which time a protectiveness determination will be made."*

Results from Implemented Actions since PGAN 2006 Five-Year Review

Table 5-1 lists the issues and recommended follow up actions at PGAN from the first Five-Year Review Report and summarizes the actions taken today.

Table 5-1
Actions Taken Since the Previous Five-Year Review
Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, AZ

Issues from Previous Review	Recommendations/ Follow-Up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Capture of contaminants and progress toward restoration of groundwater has not been demonstrated.	Evaluate capture through installation of additional wells, update of groundwater flow model, and installation of additional extraction wells if needed.	Crane	TBD	Additional extraction wells were installed to expand the treatment capacity of the Main Treatment System. Two new groundwater systems (EA-05 GTS and EA-06 GTS) were constructed to better control the north and northeastern boundaries of the Subunit A TCE plume. One additional Subunit A extraction well (EA-07) and two injection wells were installed to control the NE expansion of Subunit A TCE plume. Pipelines connecting EA-07 to EA-06 GTS and from EA-06 DTS to the new injection wells haven't been completed. Additional monitoring wells are proposed in the vicinity of MW-29 to address transfer of contaminants between Subunit A and Subunit C. The groundwater flow model has been updated as of July 2010. The investigation continues to inform a Supplemental RI for PGAN to address the extent of contamination and perchlorate treatment in the aquifer.	2007 to 2010

Table 5-1 (continued)

Issues from Previous Review	Recommendations/ Follow-Up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
An ecological risk assessment has not been performed.	Conduct a screening level ecological risk assessment.	Crane	TBD	No complete ecological risk assessment has been completed since the previous Five-Year Review.	N/A
Nearby production wells may require wellhead treatment or alternative water supply.	Continuously evaluate production well water quality and need for wellhead treatment or alternative water supply, as called for in the SOW.	Crane	TBD	Production wells are incorporated into the regular groundwater monitoring events.	Ongoing
There has not been a recent human health risk assessment that encompasses all issues at the Site, including the identification of additional COCs.	Complete a risk assessment, as called for in the SOW.	Crane	TBD	No complete human health risk assessment has been completed since the previous Five-Year Review.	NA

5.2 PGAS

PGAS 2005 Five-Year Review Protectiveness Statement

The first Five-Year Review for PGAS concluded:

> *"The remedies at PGAS for groundwater and soil (OUs 1, 2, and 6) are currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled. In order for the remedy to remain protective in the long term, institutional controls may need to be put into place at the site."*

Results from Implemented Actions since PGAS 2005 Five-Year Review

Table 5-2 lists the issues and recommended follow up actions at PGAS from the first Five-Year Review Report and summarizes the outcome.

Table 5-2
Actions Taken Since the Previous Five-Year Review
Phoenix-Goodyear Airport (South) Superfund Site
Goodyear, AZ

Issues from Previous Review	Recommendations/ Follow-Up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
There is a lack of recent data on trace metals other than chromium in groundwater. Metals such as cadmium, lead, arsenic and nickel were identified in the 1989 RI/FS and 1989 ROD as contaminants exceeding ARARs. However, there has been little monitoring for these metals, based on documents obtained as part of the five-year review. It is possible that if these metals are determined to be present in Subunit A, the current remedy will reduce concentrations through redistribution, as is the case with chromium. Compounds listed in Table 3-2 of the 1989 RI/FS that exceeded current MCLs include antimony, arsenic, cadmium, chromium, and lead.	Evaluate areas with potential metals contamination and collect samples for antimony, arsenic, chromium, cadmium and lead	GTRC	Spring 2006	Between September 2007 and August 2008, 17 wells in Subunit A and C were analyzed for trace metals. Dissolved arsenic, cadmium, copper, lead, and zinc were not detected above their respective maximum contaminant levels (MCLs) in any of the samples. Dissolved nickel was detected slightly above its MCL at one Subunit A well and one Subunit C well; these detections are believed to be related to background variations and not related to historic site activities. Chromium was detected above its MCL in two Subunit A wells and one Subunit C well; Chromium is currently being monitored during regular groundwater monitoring events.	2007 to 2008, Ongoing
There has been no confirmation monitoring in the vicinity of the former sludge drying beds. Although geotechnical and chemical tests were performed during the soil stabilization process, there is no post-remedy monitoring data to ensure that the remedy was effective.	Collect Subunit A groundwater samples for chromium, cadmium and lead to confirm that there has been no impact to groundwater	GTRC	Spring 2006	In 2008, soil boring samples were collected to assess any residual contamination from the chromium sludge drying beds and their potential impact on groundwater quality. Analytical results indicate that the non-excavated areas surrounding the former chromium drying bed Bed#2 do not have total chromium, hexavalent chromium or cadmium present in the soils above Arizona SRLs. TCLP results were all below TCLP Resource Conservation and Recovery Act limits, indicating that leaching of significant amounts of contaminants from these soils is unlikely to impact groundwater. Chromium is currently being monitored during regular groundwater monitoring events.	2008

Table 5-2 (continued)

Issues from Previous Review	Recommendations/ Follow-Up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Prior remediation for chromium and cadmium may not be adequately protective of ecological receptors, as there are areas of soil with concentrations of metals above ecological risk levels, but below the human-health-based levels set forth in the 1991 Action Memorandum, which were not excavated as part of the remedial actions. Areas of particular concern include the former chromium sludge drying beds, the airport drainage ditch near Outfall 1, the former sewage treatment plant, former paint tent area and the hangar apron area.	Conduct screening-level Ecological Risk Assessment	GTRC	Fall 2006	A screening-level ecological Risk Assessment was performed in 2008. The results are discussed in *Phoenix-Goodyear Airport South Site-Screening Level Ecological Risk Assessment*.	2008
There has been no assessment of vapor intrusion. There may be areas near buildings that contain residual TCE at levels sufficient to pose a threat to indoor air quality.	Evaluate conditions in shallow soil gas to assess whether VOC levels may pose a threat to indoor air quality	GTRC	Summer 2006	In 2009, an indoor air assessment consisting of 14 samples from the buildings on the JRC Goodyear and City properties, 3 perimeter samples, and 2 ambient air samples. TCE was the only constituent detected and was detected in samples collected from the vicinity of Building 1/2. The TCE concentrations detected in indoor air did not exceed action levels associated with a 1 x 10^{-6} risk or the Region 9 RSLs for industrial/occupational air.	2009

Table 5-2 (continued)

Issues from Previous Review	Recommendations/ Follow-Up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Capture of the northern Subunit B/C plume has not been thoroughly demonstrated. Current understanding of the extent of TCE contamination in the vicinity of E-102, particularly along the northern and western margins, is not confirmed with sentinel wells. E-102 is at the distal end of the northern Subunit B/C plume, with a TCE concentration of 4.9 µg/L in the second half of 2004 Cessation of injection at injection wells and off-site pumping may also impact future plume movement.	a) Evaluate contaminant concentration trends and hydraulic data. b) Expand monitoring program to the north and west, consider installing at least one sentinel well in an appropriate location	GTRC	Summer 2006	Additional monitoring wells (GMW-18UC, GMW-19LC, and GMW-20LC) were added to further delineate the northern edge of the plume.	Ongoing
Vertical capture of the northern and southern Subunit B/C plumes has not been demonstrated.	Evaluate capture of B/C plumes through use of aquifer data, gradient calculations, possible installation of monitoring wells and other appropriate means	GTRC	Summer 2006	Subunit B appears to be in general laterally pervasive within the bounds of PGAS, but contains portions that maybe uneven or discontinuous. Hydraulic testing shows limited hydraulic communication between Subunit A and Subunit C. This is further supported by the lack of historic detection of TCE concentrations above cleanup standards in Subunit C monitoring wells except for those areas which can be explained by known former vertical conduits (leaky production wells; e.g., GAC-02, GAC-03, GAC-04 and PLA#3New).	2010*

Table 5-2 (continued)

Issues from Previous Review	Recommendations/ Follow-Up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Chromium in Subunit A groundwater is not currently being treated as required by ESP #3. Although the chromium treatment system was shut down in 2001 and approved for removal in 2003 based on treatment plant effluent concentrations, this may need to be reevaluated, as TCE removal cannot be optimized without chromium treatment. One alternative that was evaluated in 1995 was the Lewis carbon system. Although this is more expensive to operate for the short term, it may be less problematic than the affinity chromatograph that was used previously at the site. Also, additional technologies may have been developed since 1995.	a) Evaluate installation of one or more chromium treatment systems b) Issue ESD if chromium treatment is determined to be unnecessary.	GTRC	Summer 2006	In 2009, GTRC conducted a review of the status of chromium treatment and submitted the *Status of Subunit A Groundwater Cleanup: Review of Chromium Remedial Action for the Phoenix-Goodyear Airport South Site* documenting its findings. Review of the current site conditions showed that current and foreseeable levels of chromium in Subunit A will remain under the 100 µg/L cleanup goal and that no treatment is necessary.	July 2009
Removal of TCE from Subunit A cannot be optimized due to chromium concentrations above the cleanup level.	Optimize pumping and treatment regime for maximum TCE removal while meeting chromium effluent standard	GTRC	Spring 2007	The *Status of Subunit A Groundwater Cleanup: Review of Chromium Remedial Action for the Phoenix-Goodyear Airport South Site* concluded that the chromium concentration could be maintained under the cleanup goal of 100 µg/L without the need for pumping restrictions that might impact optimal TCE removal	July 2009
The Western Avenue PCE plume has encroached upon the Subunit A TCE plume at the site. Concentrations of PCE are currently below the MCL in groundwater monitoring wells, and it is believed that all contamination migrating onto the PGAS site had been captured by the Subunit A treatment system.	Continue monitoring PCE plume movement	ADEQ	Annually	The Western Avenue TCE plume is overseen by the State of Arizona and continues to be monitored and assessed.	Ongoing

Table 5-2 (continued)

Issues from Previous Review	Recommendations/ Follow-Up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Perchlorate from the PGAN site has been detected in nearby production wells. Although perchlorate is not a contaminant of concern at PGAS, its movement may impact groundwater at PGAS, particularly north of Yuma Road.	Continue monitoring perchlorate concentrations in groundwater	ADEQ	Annually	Perchlorate is being monitored as part of the regular groundwater monitoring events at PGAN. Assessment of perchlorate concentration contours should provide adequate warning if the plume threatens to encroach the PGAS site.	Ongoing
There have been several incidents of unexpected maintenance costs at the site, including a leak in the acid tank at the Subunit A treatment facility, a leak in a raw water line for a Subunit A extraction well, and disruption of electrical services in unprotected buried electric lines. In addition, observations were made during the site inspection of rusting wellhead piping, missing locks on well vaults, and missing caps on discharge pipes and sounding tubes that may lead to additional maintenance costs in the future. Most of these issues are due to the aging of the components of the treatment system. Also, the O&M Plan has not been updated since 1994.	a) Institute preventative maintenance program to reduce maintenance costs b) Update Operation and Maintenance Plans	GTRC	Continually	Additional maintenance was performed on treatment systems to repair wear from aging. The Operations and Maintenance Manual was updated as of June 2008	2007/2008
Current institutional controls may not prevent exposure to contaminated media in the future, particularly as properties change hands. There are no institutional controls currently in place for contaminated soil, including the former sludge drying beds, or for ground water contamination that has migrated beyond the property boundaries.	Add institutional controls such as deed use restrictions	ADEQ, ADWR, and property owners	Fall 2006	No institutional controls have been implemented since the previous Five-Year Review. GTRC is currently working with the property owner, JRC Goodyear, LLC, regarding institutional controls.	N/A

Notes:

* Based on current PGAS site conceptual model as described in *Second Semi-Annual 2009 Groundwater Monitoring Report for the Phoenix-Goodyear Airport South Site* (LATA, 2010).

Section 6
Five-Year Review Process

6.1 Administrative Components

The PGA second Five-Year Review was led by Arizona Department of Environmental Quality (ADEQ) Project Manager, Andre Chiaradia and EPA Remedial Project Manager, Catherine Brown. The Five-Year Review consisted of community and stakeholder interviews, document review, data review, institutional controls review, human risk assessment review, and site inspection. This work was initiated on March 2010, and extended through August 2010.

6.2 Community Involvement and Notification

In December 2009, EPA published the announcement of the Five Year Review and solicited for community interviews in two Arizona newspapers, the *West Valley View* and the *Phoenix New Times*. In February 2010, a public notification fact sheet entitled "Phoenix-Goodyear Airport Superfund Site: Update on Cleanup Activities for the North and South Areas of the Site" was mailed by the EPA to residents in the vicinity of the PGA Site. The update announced that the second Five-Year Review of cleanup actions undertaken at the Phoenix-Goodyear Airport Superfund sites had been initiated and that the review will evaluate whether the cleanup actions for the Site remain protective of human health and the environment.

6.3 Document Review

In preparing this second Five-Year Review, background documents were reviewed to determine the full scope of the remedy and its goals and documents produced in the past five years were reviewed to determine the Site's current status. The list of documents reviewed for this report is provided in Appendix A.

ARARs were reviewed to determine whether any changes to the ARARs have occurred since last Five-Year Review that could impact the protectiveness of the remedy at the Site. The memorandum discussing results of the review is provided in Appendix B and further discussed in Section 7. The review found that there were no changes to the ARARs that affect protectiveness.

The memorandum listing the documents and discussing results of the review is provided in Appendix C and further discussed in Section 7.

6.4 Data Review

6.4.1 PGAN

Water Quality Monitoring

Groundwater samples are collected at the PGAN site in accordance with the *Revised Final Groundwater Monitoring Work Plan* (ARCADIS, 2008a). Currently, groundwater quality is monitored for 20 target volatile contaminants of concern (COCs) identified in the ROD and subsequent Explanation of Significant Differences (ESDs). TCE and perchlorate are the primary focus of on-going remediation at PGAN (Matrix, 2010a).

Subunit A

Potentiometric contours for groundwater in Subunit A at PGAN during the fourth quarter of 2009 are shown in Figure 6-1. These measurements include any effects from the groundwater extraction and injection operations associated with the ongoing remedy. The groundwater flow direction in Subunit A north of Interstate-10 (I-10) tends towards the northeast due to pumping at local supply wells but groundwater pumping at extraction well 33A creates a localized groundwater flow to the northwest. The groundwater in Subunit A south of I-10 flows towards the north (Matrix, 2010b).

Figure 6-2 depicts the TCE plume in Subunit A at the time of the previous Five-Year Review at PGAN while Figure 6-3 depicts the 2009 TCE plume. The TCE plume contains two areas where concentrations exceed 100 µg/L, one north of I-10 and the other south of I-10. Concentrations in plume wells within these high concentration areas in 2005 (such as MW-25, MW-16, MW-12, and MW-07) have generally decreased since the last Five-Year Review (Figure 6-4). However, it appears that the high concentration area is migrating northeast. At the time of the previous Five-Year Review, MW-16, EPA MW-16A, and EA-06 were outside of the 100 µg/L contour; they now are all within the 100 µg/L contour. In contrast, MW-25, which was previously the center of the high concentration area, now has concentrations below 100 µg/L.

The plume along the eastern edge has two locations where the plume appears to be expanding. South of I-10 along the southeastern edge of the plume, as monitored by EPA MW- 7A and EPA MW-10A, have had increasing concentrations since the previous FYR with exceedence of the TCE MCL in 2010 in EPA MW-10A. North of I-10, along the northeastern boundary, TCE concentration trends in EPA MW-35A and EPA-MW-30A indicate that capture in this portion of the plume was incomplete during the past five year period. Since sampling at EPA MW-35A began in 2008, TCE concentrations have fluctuated with concentrations around 10 µg/L and below MCLs, except for a period from November 2008 to April 2009 where concentrations jumped to a high of 63 µg/L. This pattern suggests that a change in pumping during the high period may have impacted the effectiveness of the capture in this portion of the plume. The most recent TCE concentration reported at EPA MW-35A (August 2010) is at the MCL. EPA MW-30A was a boundary well and its TCE concentrations were below MCL when it was installed in 2007. However, since 2008, TCE concentrations in this well have consistently exceeded MCL . Due to the presence of TCE in this well, a step-out monitoring well, EPA MW-43A was installed in January 2009 to define the TCE plume boundary; EPA MW-43A has now shown levels above the MCL (August 2010). Additionally, TCE concentrations along the southeast boundary of the plume indicate that the plume may be expanding eastward. EPA MW-10A, which previously did not have detections above the reporting limit of 0.19 µg/L, began having detections of TCE in 2008 and exceeded MCL in August 2010 with a concentration of 7.3 µg/L.

The western boundary of the plume appears to be unchanged since the previous Five-Year Review; TCE concentrations at MW-17 and MW-24, located on the western boundary north of I-10,and MW-13 and MW-11 located on the western boundary south of I-10, all remain at the non-detect level.

Figure 6-5 depicts the perchlorate plume in Subunit A at the time of the previous Five-Year Review at PGAN while Figure 6-6 depicts the 2009 perchlorate plume. In 2009, perchlorate in Subunit A remained limited to a narrow plume extending east and north of the former UPI facility. Perchlorate was detected in three Subunit A monitoring wells (MW-09, MW-02, and MW-27) above the perchlorate cleanup level of 14 µg/L with a maximum detection of 22 µg/L at monitoring well MW-09 (Matrix, 2010b). Concentrations within the plume wells have slightly increased since the last Five-Year Review; the average concentration at MW-09 increased from 8.95 µg/L in 2005 to 25 µg/L in 2009. However, the perchlorate concentrations in the perimeter wells (MW-02 and MW-27) have been decreasing, and the overall plume size has decreased particularly in the southeastern portion. Perchlorate was also detected above 14 µg/L in one extraction well (PZ-1). Figure 6-7 shows perchlorate concentration trends at discussed plume wells in Subunit A at PGAN.

In summary, TCE plume size in Subunit A has increased since last Five-Year Review, especially in the northeast and southeast area. This indicates that adequate capture of TCE is not occurring in Subunit A. However, the overall perchlorate plume size in Subunit A has decreased.

Subunit C and the MAU

Potentiometric contours for Subunit C at PGAN for the fourth quarter of 2009 are shown in Figure 6-8. The groundwater flow direction in Subunit C north of I-10 tends towards the northwest with a limited northeastern component at the northeastern edge of PGAN. Groundwater extraction well 33A is partially screened in Subunit C and creates a localized component of groundwater flow towards its location. Groundwater in Subunit C south of I-10 is known to be influenced by the MTS extraction wells screened within Subunit C, EC-01 and MW-20 (Matrix, 2010a).

Figure 6-9 depicts the TCE plume in Subunits B, C, and/or MAU wells at the time of the previous Five-Year Review at PGAN while Figure 6-10 depicts the 2009 TCE plume. The shape of the plume south of Interstate-10 (I-10) has changed with some expansion to the north around MW-29 and to the south, as shown by EPA MW-6C being within the 5 µg/L contour. The center of the plume has contracted with east and west edges of the plume boundary being defined by EPA MW-28M, EPA MW-1M, and EPA MW-1C. As of the fourth quarter of 2009, TCE was detected in five Subunits B, C, and/or MAU monitoring wells (OW-B, EPA MW-6C, EPA MW-9C, MW-06, and MW-29) above the TCE cleanup level of 5 µg/L with a maximum detection of 860 µg/L at monitoring well MW-29 in March 2009. North of I-10, TCE was also detected at concentrations above the cleanup level at three Subunits B, C, and MAU irrigation wells (SunCor-26A, SunCor-27C, and SunCor-34B) with a maximum of 140 µg/L at irrigation well SunCor-34B. TCE was not detected at any of the domestic supply wells screened across Subunits B, C, and MAU.

Concentrations of TCE within monitor well MW-29 have increased since the last Five-Year Review, from an average concentration of 4.14 µg/L in 2005 to an average concentration of 487 µg/L in 2009. Due to this increase, pumping was initiated at well MW-29 in June 2010 as an interim measure to mitigate the increase of TCE concentration, and an additional well, EPA MW-3C, was constructed in January 2010 to monitor conditions in the area. Since pumping began at MW-29, TCE concentrations have dropped with the most recent (August 2010) TCE detection being 19 µg/L. EPA MW-3C, installed to monitor the area around MW-29 has had consistently high concentrations ranging from 850 µg/L to 2,000 µg/L since the well was installed in January 2010. Figure 6-11 shows TCE concentration trends at monitor wells in Subunits B, C, and/or the MAU at PGAN.

Figure 6-12 depicts the perchlorate plume in Subunits B, C, and/or MAU wells at the time of the previous Five-Year Review at PGAN while Figure 6-13 depicts the 2009 perchlorate plume. Concentrations within the plume have remained similar to concentrations observed during the last Five-Year Review. In 2009, perchlorate was detected in two Subunits B, C, and/or MAU monitoring wells (OW-B and MW-29) above the perchlorate cleanup level of 14 µg/L with a maximum detection of 27 µg/L at monitoring well OW-B. Perchlorate was not detected above the cleanup level in any of the Subunits B, C, and MAU irrigation wells or the domestic supply wells screened across Subunits B, C, and MAU (Matrix, 2010b). One Subunit B extraction well (EB-01) has perchlorate concentration levels above 14 µg/L. Figure 6-14 shows perchlorate concentration trends at discussed wells in Subunits B, C, and/or MAU at PGAN.

In summary, TCE concentrations detected in monitoring well MW-29 have increased two orders of magnitude since the last FYR. To address this increase, pumping was initiated at well MW-29 and a new well constructed to better monitor the conditions. In contrast, the perchlorate plume boundary in Subunits B, C, and/or MAU appears to be stable.

Soil Vapor Extraction Operations

Since 2006, the yearly total TCE mass removed by SVE operations at PGAN has decreased from 302 lbs to 92 pounds in 2009. A total of 11,332 pounds of TCE have been removed by SVE operations at PGAN from 1994 through 2009 (Matrix, 2010a).

Based on review of historical documents (i.e. Quarterly SVE O&M Reports), current TCE concentrations have reached a steady state with concentrations averaging approximately 22 µg/l at the system influent. A plot of SVE influent TCE concentration shows that concentrations have been asymptotic since December 2008.

Current operating procedures involve extraction of soil vapors from varying sets wells for periods of 3 to 6 months typically. This process has not resulted in a significant increase of mass removal per unit of energy expended within the last two years. It should be noted that during the years of 2009 and 2010 two separate tests were conducted involving the injection of clean air into the vadose zone during periods with high groundwater elevations (fall-winter) and periods of depressed groundwater elevations (spring-summer). Neither test produced increases in mass removal per unit of energy.

Water Treatment Plants

Currently four treatment systems are in operation at the PGAN site. Table 6-1 provides a summary for average TCE, average perchlorate concentrations, and mass removal for each treatment system. The average influent TCE concentrations ranged from 59.9 µg/L at EA-05 to 336 µg/L at the MTS. The average effluent TCE concentration ranges from 0.1 µg/L at EA-05 to 1.8 µg/L at EA-06. All average effluent discharge concentrations were below the TCE MCL of 5 µg/L. The average influent perchlorate concentrations ranged from 3.8 µg/L at EA-06 to 9.5 µg/L at the MTS. The average effluent perchlorate concentration ranges was only calculated for the MTS and was found to be 1.0 µg/L. All average influent and effluent discharge concentrations were below the perchlorate site-specific remediation goal of 14 µg/L. In 2009, a total of 1,077 pounds of TCE and 12.3 pounds of perchlorate were removed from PGAN by the four treatment systems.

Table 6-1
Treatment System Operations Summary 2009
Phoenix-Goodyear Airport (North) Superfund Site
Goodyear, AZ

Treatment System	2009 Average TCE Concentration (µg/L)		2009 Average Perchlorate Concentration (µg/L)		2009 Mass TCE Removed (pounds)	2009 Mass Perchlorate Removed (pounds)
	Influent	Effluent	Influent	Effluent		
Main Treatment System	336	<1.0	9.5	1.0	487.1	12.3
Well 33A	62	0.5	4.8	--	183	--
EA-05	59.9	0.1	4.1	--	132.5	--
EA-06	124	1.7	3.8	--	274.1	--

Notes:
TCE Trichloroethene
µg/L Micrograms per liter
-- Value not calculated
Data source: Matrix, 2010a. 2009 Annual Groundwater Operation and Remediation Report. Table 3.

Groundwater Model Review

The *July 2010 PGA North Flow Model Update Memorandum* (AMEC Geomatrix, Inc., 2010a) identifies the following areas of uncertainty in the model:

- An approximate one-year difference is observed between the measured hydraulic gradient change and the simulated hydraulic gradient change at the area north of I-10.

- Water level weighting appears to serve a significant role in achieving acceptable calibration. More information should be presented on the weighting rationale and the sensitivity of the model to the use of water level weighting. The use of the weighting adds to the uncertainty in the model and the assessment of the model's reasonableness.

- There are uncertainties in the capture in the area northeast of extraction well 33A.

These areas of uncertainty should be identified in future reports whenever flow model simulation results are presented. Recognizing the areas of uncertainty will aid in interpreting and applying the simulation results. Additionally, the model could be further refined and improved with the collection of additional data to increase its representativeness to site conditions.

The effectiveness of the Contaminant Fate and Transport Model (mass transport model) was also evaluated by assessing the calibration and verification results of the model. The *Draft Contaminant Fate and Transport Model* report (AMEC Geomatrix, Inc., 2010b) provides descriptions of model simulation results in response to model changes during the calibration process. The parameters that were evaluated/altered during the calibration process are conductivity, porosity, solver, and numerical solution (single domain dispersion modeling to dual domain). The calibration procedure ended with substantive observations, but no final transport model with agreed upon transport parameters was accepted. Additional work is required to calibrate this model. In summary, the draft transport model has not achieved acceptable calibration, should not be used estimate the time required to remediate Site-related COCs.

In conclusion, the Groundwater Flow Model provides an adequate hydraulic representation of the study area so long as the areas of low confidence and uncertainty in the model are highlighted in the presentation of the simulation results. However, the Contaminant Fate and Transport Model has not achieved a reasonable calibration and requires further refinement.

6.4.2 PGAS

Water Quality Monitoring

Groundwater samples are collected at the PGAS site in general accordance with the Comprehensive Groundwater Monitoring Plan for the Phoenix-Goodyear Airport South Site, Goodyear, Arizona (LATA, 2008). Currently, groundwater is analyzed for volatiles and chromium; of these, TCE and chromium are the primary focus of on-going remediation at PGAS (LATA, 2010).

Subunit A

Potentiometric contours for Subunit A at PGA South for the fourth quarter of 2009 are shown in Figure 6-15. These measurements include any effects from the groundwater extraction and injection operations associated with the ongoing remedy. The groundwater in Subunit A flows toward the west-southwest at PGAS (LATA, 2010).

Figure 6-16 depicts the TCE plume in Subunit A at the time of the previous Five-Year Review at PGAS while Figure 6-17 depicts the 2009 TCE plume. In 2009, the 100 µg/L contour was limited to an area around well E-12, as compared to 2005 when the 100 µg/L extended approximately 3000 feet between GMW-8 and NE-5. The eastern boundary of the TCE plume has remained unchanged, as evidenced in wells EMW-13 (0.2 µg/L in 2005 and non-detect in 2010) and E-11 (4.7 µg/L in 2005 and 4 µg/L in 2010). The Western boundary of the plume has also seen a drop in concentrations, but not a change to the 5 µg/L TCE contour.

Figure 6-19 depicts the chromium plume in Subunit A at the time of the previous Five-Year Review at PGAS while Figure 6-20 depicts the 2009 chromium plume. Chromium has been detected above the 100 µg/L level in several monitoring wells at the site over the past five years. Two of the three extraction wells, E-12 and E-07R have been trending downward in chromium concentrations. Extraction well E-17 had also been trending downward, but since 2009 has shown a steady increase and in 2010 has had detections between 120 and 150 µg/L.

In summary, TCE plume concentrations in Subunit A appear to have decreased as evidenced by the 100 µg/L contour currently limited to an area around well E-12. The western TCE plume boundary has remained consistent, while the eastern boundary has contracted as shown near wells EMW-13 and E-11. The chromium concentrations have shown no pattern.

Subunit C

Potentiometric contours for Subunit C at PGAS for the fourth quarter of 2009 are shown in Figure 6-22. These measurements include any effects from the groundwater extraction and injection operations associated with the ongoing remedy. The groundwater in Subunit C flows toward the west-northwest at PGAS (LATA, 2010). These contour lines are based on the PGAS wells and do not incorporate water elevations from the northern PGAN wells.

Northern Plume Figure 6-23 depicts the TCE plume in Subunit C at the time of the previous Five-Year Review at PGAS while Figure 6-24 depicts the 2009 TCE plume. As of the fourth quarter of 2009, TCE was detected in seven Subunit C wells (GAC-03, GMW-02, GMW-13UC, GMW-14UC, GMW-16UC, GMW-17UC, and GMW-19LC) and in one City of Goodyear well (COG-5) in the northern plume above the TCE cleanup level of 5 µg/L with a maximum detection of 85 µg/L at monitoring well GMW-13UC. Since the previous Five-Year Review, concentrations in select plume wells (such as GMW-02) have shown a slight decreasing trend. However wells to the north of the northern Subunit C plume that are maintaining or slightly decreasing concentrations above the MCL for TCE (GMW-16UC, GMW-18UC , GMW-17UC), with a notable exception of well GMW-19LC in the northwest edge of the northern plume which has increased from <1 ug/L when first sampled in 2009 to 17 ug/L in the most recent 2010 sample.

Figure 6-26 depicts the chromium plume in Subunit C at the time of the previous Five-Year Review at PGAS while Figure 6-27 depicts the 2010 chromium plume. One well, GMW- 13UC has consistently detected chromium with concentrations have varied between 360 µg/L and 570 µg/L.

In summary, the northwestern edge of the northern plume appears to be expanding and the chromium concentrations have not shown improvement over the past five years.

Southern Plume Figure 6-23 depicts the TCE plume in Subunit C at the time of the previous Five-Year Review at PGAS while Figure 6-24 depicts the 2009 TCE plume. The Southern Subunit C plume remediation has, in almost all cases, continued to meet the cleanup standards since 2008. A new pulsed pumping protocol to reduce the remaining low-level TCE contamination was implemented in 2009 and will continue until August 2010 (LATA, 2010).

Figure 6-26 depicts the chromium plume in Subunit C at the time of the previous Five-Year Review at PGAS while Figure 6-27 depicts the 2009 chromium plume. Remedial action for total chromium has not been necessary for this area of the site since remediation began in 1994 (LATA, 2010).

A source of TCE at or around well GAC-04 continues to impact this area. Between 1992 and 1995, the TCE concentration generally remained less than 5.0 µg/L, so sampling at this well ceased between 1995 and 2006. In 2007, when the well was added back into the sampling protocol, TCE concentrations were reported as high as 86 µg/L. Two monitoring wells (GMW-21UC and GMW-22UC) were installed in 2010 near GAC-04 to address this issue. TCE concentrations in these wells during the first sampling in June 2010 were 45 µg/L and 140 µg/L, respectively. On July 27, 2010, a verification sample collected from GMW-21UC had a TCE concentration of 4.5 µg/L. The source of TCE at this well is still not clear.

In summary, TCE continues to be detected below its respective cleanup standard in the southern plume of Subunit C, with the exception of well INJSB-05 and the area near GAC-04.

Water Treatment Plants

Currently three treatment systems are in operation at the PGAS site. Table 6-2 provides a summary for average TCE and mass removal for each Subunit treatment system. The average influent TCE concentrations ranged from 2.8 µg/L at the South Subunit C to 35.0 µg/L at the Subunit A. All effluent discharge sample concentrations were below the TCE MCL of 5 µg/L. In 2009, a total of 81.4 pounds of TCE were removed from Subunit A and approximately 7.3 pounds of TCE were removed from Subunit C.

Table 6-2
Treatment System Operations Summary 2009
Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, AZ

Treatment System	2009 Average TCE Concentration (µg/L)		2009 Mass TCE Removed (pounds)
	Influent	Effluent	
Subunit A	35	<1.0	81.4
North Subunit C	3.1	--	6.2
South Subunit C	2.8	1.9	1.14

Notes:
TCE Trichloroethene
µg/L Micrograms per liter
-- Value not calculated
Data source: LATA, 2010. Second Semi-Annual 2009 Groundwater Monitoring Report. Table 3.

6.5 Site Inspection

The PGAN site inspection was performed on March 25, 2010, and the PGAS site inspection was performed on May 6, 2010. The site inspection checklists are provided in Appendix E and photographs are in Appendix F. Effectiveness of the capture zone created by the external extraction wells cannot be determined using visual observations. However, PGAN and PGAS remedy systems and components that are observable are in very good repair and operating as designed. Similarly, all PGAN and PGAS groundwater remedy systems were adequately secured by fences or other security features. Operations data were not reviewed during the PGAN and PGAS site inspections; thus, conclusions regarding effectiveness of the remedies are based on reports reviewed during the data review process. A few issues were noted with the PGAN SVE system, namely: the system lacks fencing and shows wear on its polyvinyl chloride components. At PGAS, the extraction pump in the Subunit C system shows scaling and the fencing did not have signage indicating site contact information. No other issues were reported.

6.6 Interviews

As part of the Second Five-Year-Review, interviews were conducted with the following parties: Diane Krone, Community Advisory Group Member; Thomas Jones, Community Advisory Group Member; David Iwanski, Water Resource Manager for COG; Jerald A. Postema, Deputy Director of Public Works and Water Resources for COG; Jeff Sussman, Remediation Manager for GTRC; Rebecca Godley, COP Environmental Section Lead for Aviation Department; Thomas Schoaf/Sonny Culbreth, Mayor/Assistant City Manager of the City of Litchfield Park; Marilyn DeRosa, Assistant Director of Water Resources of the City of Avondale; and Julie Riemenschneider, ADEQ Manager of the Remedial Projects Section. Interview summary forms are presented as Appendix G, and a brief summary of the interviews is discussed below.

The interviews indicated that site cleanup at PGAS appears to be progressing well and has shown success in containing the contaminant plume. Additionally, interviewees were in agreement that Goodyear Tire & Rubber Co. (GTRC) has been an active responsible party during the cleanup process and has pursued aggressive treatment throughout the implementation of the remedy.

In contrast, the interviews have indicated that implementing the remedy at PGAN has not been successful in containing the contaminant plumes. Interviewees expressed concern that expansion of the PGAN plume has resulted in the contamination and closure of four drinking water wells thus far and is currently threatening wells COG3, COG-11 and COG-20. Given these developments, interviewees were generally very dissatisfied with Crane Co.'s management of and communications about ongoing site cleanup.

The surrounding communities have expressed increasing concern about the site conditions of PGAN. EPA has been contacted repeatedly in 2010 by stakeholders expressing concern about implementation of the remedy. The Litchfield Park school district has been vocal about the status of cleanup and has expressed concern that untreated groundwater should not be conveyed beneath their properties. Other public concerns were expressed about the inconveniences caused by traffic disruptions and dust control problems that arose in 2009 at PGAN during the building demolitions at the Former Unidynamics Facility.

Other notable events discussed by the interviewees included periodic vandalism at PGAN prior to the demolition of the remaining Unidynamics buildings and a trailer fire at PGAN during 2009. At PGAS, a sulfuric acid spill occurred in December 2006 while upgrading the treatment system.

Section 7
Technical Assessment

7.1 PGAN

Question A: Is the remedy functioning as intended by decision documents?

Remedial Action Performance

The remedy at PGA is not functioning as intended. Adequate plume capture remains the primary concern in Subunit A along the north and eastern plume boundary. There appears to be inadequate plume containment with the eastern boundary of Subunit C. Most notably, the Monitoring well MW-10C has recently exceeded MCLs and is located due west of the City of Goodyear's production well, COG-3. In addition, within Subunit C, concentrations at well MW-29 have increased from an average concentration of 4.14 µg/L in 2005 to an average concentration of 487 µg/L in 2009. Pumping has been initiated at Well MW-29 as an interim measure to mitigate the increase of TCE concentration, and an additional well, EPA MW-3C, was constructed in January 2010 to monitor conditions in the area. Samples collected from this new monitoring well have contained TCE as high as 2,000 µg/L. As of this time, the source of migration from Subunit A to Subunit C has yet to be identified, and without its identification, the effectiveness of the current remedy cannot be fully ascertained.

System Operations/O&M

PGA-N experienced significant operational errors in 2009 at project treatment systems which led to releases of contaminated water. In January 2009, groundwater containing TCE levels above the MCL was discharged from Treatment Systems EA-06 and 33A into the Roosevelt Irrigation District Canal due to Failure to Replace Carbon Filters.

On February 20, 2009, there was a spill of untreated groundwater due to the failure of a booster pump at Main Treatment System Spills. On May 20, 2009, a second, larger spill occurred at the facility under very similar circumstances as the February incident. The initial event which led to the May spill was an electrical storm-caused power outage. The same problems identified after the February spill were contributing causes. O & M manuals have been updated and revised to prevent similar events from occurring.

Opportunities for Optimization

Due to recent developments in the site conceptual model near MW-29 and the northeastern part of the Subunit A plume, the groundwater model may be useful for assessing optimization of the ground water extraction system both on- and off-site. The model could help identify optimal pumping locations for control of Subunit C contamination near MW-20 and MW-29, as well as optimal well locations and pumping rates to control the Subunit A plume north of I-10 and to protect drinking water supply wells with an adequate factor of safety. The model could assess the necessary pumping near the Subunit A source area to reduce contaminant mass flux north of the former UPI property so as to improve the chances and timing for aquifer restoration north of the site. The optimal flow rates may be less than current pumping from the vicinity of the site and such optimization may reduce the flow to the MTS, freeing capacity for more urgent pumping such as near MW-29. The model can also optimize the location and rates of injection of treated water to reduce chances of impacting plume capture in Subunits A and C, as well as possibly locally reversing vertical gradients to protect Subunit C water quality. As additional monitoring wells are constructed and further monitoring events provide more data, the model should be re-examined to verify that it captures the current site conditions.

Early Indicators of Potential Issues

The major concern for future problems at the PGAN site is the uncertainty of lateral TCE plume boundaries in Subunit A and Subunit C, and vertical capture of TCE between Subunit A and Subunit C.

TCE and perchlorate exceedances remain site-wide issues at PGAN, as discussed in the previous Five-Year Review and within this report.

Implementation of Institutional Controls and Other Measures

Institutional Controls (ICs) are administrative or legal mechanisms that ensure remedy protectiveness. The requirement for ICs to ensure remedy protectiveness must be identified in Site decision documents, such as a ROD, ESD, or Action Memorandum. The ICs discussed herein for PGAN have been identified in the Consent Decree, but have not yet been incorporated into the Site decision documents. This should be addressed in future decision documents for the Site. These include restrictions on access to the Site; the type of use or redevelopment of the property; use of the water at the Site; grading, excavations or other removal of soils; and an easement for access to conduct activities related to remedial actions (EPA, 2006b).

Currently, fencing and other security measures around the treatment systems limit access to and exposure to contaminated media. Additionally, Arizona's Well Spacing and Well Impact Rules (Arizona Administrative Code §R12-15-1302 through §R12-15-1307) provides a general restriction to limit contaminant plume migration. The Rule prevents the approval of permits for any new production wells that may contribute to the degradation of groundwater quality by adversely impacting groundwater remediation systems or hydraulic capture of groundwater contamination plumes (ADWR, 2006). Specifically, the Rule allows the Director of ADWR to deny permits for any well whose operation would result in a drawdown that causes a contaminant plume to migrate into an existing, uncontaminated well. The drawdown analysis is typically performed as part of the well permitting process by the Department of ADEQ at ADWR's request (CDM, 2010).

In 2006, as a requirement of the Partial CD, Crane Co. recorded a Notice on the deed for the UPI property. The Partial CD also requires the recording of land use restrictions on Parcels B and C of the UPI property. Those restrictions have not yet been recorded.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Changes in Standards and To Be Considered (TBCs)

An ARAR review was conducted for the Second Five-Year Review. The review found that there were no changes to the ARARs that affect protectiveness.

In 2008, the EPA released the *Interim Drinking Water Health Advisory for Perchlorate* (EPA, 2008b), which recommends a perchlorate health advisory level of 15 µg/L based on the recommendations of the National Research Council and EPA's adopted reference dose. The site-specific action level for extracted perchlorate at PGAN is 14 µg/L, which is based on the Arizona Health-Based Guidance Level. Since the current action level of 14 µg/L identified in the Perchlorate Action Memorandum is more protective than the new EPA health advisory level, the change in 2008 percolate health advisory level does not impact the protectiveness of the current remedy.

Changes in Exposure Pathways

Vapor intrusion issues have only been evaluated for a small portion of the Site. However, these portions have been the areas with highest groundwater contamination and highest vapor concentrations, and the reports have concluded that measured indoor air concentrations are substantially below acceptable risk-based criteria (ARCADIS, 2005b). Other portions of the Site are less likely to present a problem.

Some of the chemicals of concern at the Site are volatile, thus move upwards through the soil and can enter overlying structures. However, Site COCs are generally in groundwater at depths of 90 to 130 feet, therefore the potential risk of vapor intrusion is lower in areas where contamination is only in the groundwater and not in the subsurface soils.

Changes in Toxicity and Other Contaminant Characteristics

Several toxicity factors have changed. In 2009, EPA harmonized the risk-based screening levels from Regions 3, 6, and 9 into a single table: "Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites." The RSLs are developed using risk assessment guidance from the EPA Superfund program. They are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data.

Since the previous Five-Year Review, EPA has lowered the TCE toxicity value. The 1989 ROD selected of 5 ug/l for the clean-up level for TCE. Based on the new toxicity numbers, this would result in a 2.5×10^{-6} risk which is still within EPA's risk range. Therefore, the clean-up levels chosen in the 1989 ROD are still protective.

Changes in Risk Assessment Methods

There have been no changes in risk assessment methods that affect protectiveness.

Expected Progress Towards Meeting the RAOs

Deficiencies in the remedial actions for PGAN have been observed and are discussed within this report. However, the remedy selected, if when fully installed and operated, is expected to achieve remedial action objectives. First, however, full capture must be achieved.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the remedy. No weather-related events have affected the protectiveness of the remedy.

7.2 PGAS

Question A: Is the remedy functioning as intended by decision documents?

Remedial Action Performance

Remedial actions completed to date pertaining to this remedy are functioning as intended according to the applicable decision documents.

However, there is a question about plume contaminant along the northern boundary of the Northern Plume in Subunit C where increasing TCE and chromium have occurred. There is also a question about the source of TCE contamination detected in GAC-04 in the Subunit C Southern Plume.

The southern plume in Subunit C has continued to meet the cleanup standards for TCE and chromium. A new pulsed pumping protocol to reduce the remaining low-level TCE contamination was implemented in 2009.

System Operations/O&M

There was one uncontrolled release of sulfuric acid on site in December 2006.

Opportunities for Optimization

Groundwater quality measurements from future groundwater sampling events should be assessed to verify the effectiveness of the pulsed pumping regime.

Early Indicators of Potential Issues

There are no early indicators of additional potential issues; TCE and chromium exceedances remain issues, as discussed within this report.

Implementation of ICs and Other Measures

Institutional Controls (ICs) are administrative and legal components of a remedy that ensure remedy protectiveness. Although no ICs were identified in the 1987 ROD or 1989 ROD, the 1991 CD, which applied to GTRC and Loral Defense Systems, included a provision preventing the installation or use of groundwater wells at the Site for human consumption unless the extracted water is treated to meet drinking water standards (EPA, 1991c).

The Arizona Department of Water Resources – Groundwater Permitting and Wells Section limits the placement of groundwater wells where they would impact a cleanup. No other ICs are in place to accomplish this at PGAS.

Access to the Site is largely controlled by fencing around the airport property and other commercial or industrial properties at the Site. The fencing is intended for security purposes but does provide some limited protection by preventing access to contaminated media (EPA, 2005).

The requirement for ICs to ensure remedy protectiveness must be identified in Site decision documents, such as a ROD, ESD, or Action Memorandum. The ICs discussed herein for PGAS have been identified in the Consent Decrees, but have not yet been incorporated into the Site decision documents. This should be addressed in future decision documents for the Site.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Changes in Standards and TBCs

An ARAR review was conducted for the Second Five-Year Review. The review found that there were no changes to the ARARs that affect protectiveness.

Changes in Exposure Pathways

The PGA North and South Areas are currently zoned industrial and it is anticipated that future land use of the site will continue to be industrial.

Vapor intrusion issues have only been evaluated for the buildings on the JRC Goodyear and City properties. However, these are the areas with highest groundwater contamination and highest vapor concentrations, and the reports concluded that the TCE concentrations detected in indoor air did not exceed action levels associated with a 1×10^{-6} risk or the Region 9 RSLs for industrial/occupational air (LATA, 2009). Other portions of the Site are less likely to present a problem.

PCE and perchlorate were identified as contaminants with the potential to encroach PGAS from outlying sites in the previous Five-Year Review. Work continues to investigate these contaminants.

Changes in Toxicity and other Contaminant Characteristics

Several toxicity factors have changed. In 2009, EPA harmonized the risk-based screening levels from Regions 3, 6, and 9 into a single table: "Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites." The RSLs are developed using risk assessment guidance from the EPA Superfund program. They are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data.

EPA lowered the TCE toxicity value. The ROD selected of 5 ug/L for the clean-up level for TCE. Based on the new toxicity numbers, this would result in a 2.5×10^{-6} risk which is still within EPA's risk range. Therefore, the clean-up levels chosen in the Record of Decision are still protective.

Changes in Risk Assessment Methods

There have been no changes in risk assessment methods that affect protectiveness.

Expected Progress Toward Meeting the RAOs

The remedial actions have met the RAOs for the Southern Plume and environmental conditions are expected to meet RAOs.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

In 2007, Maricopa Air Quality Department issued a letter to ADEQ, in response to a request to remove air emission equipment at another VOC groundwater plume site, that its Rule 330 does not permit any VOC emissions from the groundwater remediation system regardless of the rate. The Agencies plan to evaluate air emissions at PGAS in light of the 2007 Maricopa Air Quality Department letter.

There is no other information that has come to light that would call into question the protectiveness of the remedy. No weather-related events have affected the protectiveness of the remedy.

Table 7-1
Chemical-Specific ARARs
Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona

Compound	1989 ROD Cleanup Level (µg/L)	2010 Federal MCL (µg/L)	Current* Cleanup Level (µg/L)
1,1-Dichloroethylene	7	7	7 (1)
1,2-Dichloropropane	1	5	1 (1)
Chloroform	100	100	100 (1)
Toluene	340	1,000	1,000 (2)
Trichloroethylene	5	5	5 (1)
Trichlorofluoromethane	1	----	1 (1)
Carbon Tetrachloride	5	5	5 (1)
Methylene Chloride	1	5	1 (1)
Methyl Ethyl Ketone	170	----	350 (3)
Xylenes	440	10,000	440 (1)
Antimony	1.46	6	1.46 (1)
Arsenic	50	10	50 (1)
Barium	1,000	2,000	2,000 (2)
Beryllium	0.0039	4	0.004 (2)
Cadmium	10	5	5 (2)
Chromium	50	100	100 (2)
Lead	50	15 (Action Level)	15 (2)
Mercury	2	2	2 (1)
Nickel	15.4	100	100 (2)
Selenium	10	50	50 (2)
Silver	50	----	50 (1)
Zinc	5,000	----	5,000 (1)
Acetone	----	----	700 (3)
Benzene	----	5	5 (4)
Ethylbenzene	----	700	700 (4)
Tetrachloroethylene	----	5	5 (4)
1,1,2,2,-Tetrachloroethane	----	----	0.18 (4)
Perchlorate	----	----	14 (5)

Notes:
µg/L = micrograms per liter,
MCL = Federal Maximum Contaminant Level
* = Current cleanup level incorporates any changes from original ROD levels, including changes to MCLs and site-specific documents such as Explanation of Significant Differences (ESD).
---- = Not Established

Sources:
(1) EPA. 1989. Record of Decision, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona. September.
(2) EPA. 1998. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. March.
(3) EPA. 1991. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. January.
(4) EPA. 1993. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. May.
(5) EPA. 2008. Removal Action Memorandum Phoenix-Goodyear Airport North Superfund Site, Goodyear, Arizona. June 13.

Table 7-2
Chemical-Specific ARARs
Five-Year Review Report For Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, Arizona

Compound	1989 ROD Cleanup Level (μg/L)	2010 Federal MCL (μg/L)	Current* Cleanup Level (μg/L)
1,1-Dichloroethylene	7	7	7 (1)
1,2-Dichloropropane	1	5	1 (1)
Chloroform	100	100	100 (1)
Toluene	340	1,000	1,000 (2)
Trichloroethylene	5	5	5 (1)
Trichlorofluoromethane	1	----	1 (1)
Carbon Tetrachloride	5	5	5 (1)
Methylene Chloride	1	5	1 (1)
Methyl Ethyl Ketone	170	----	350 (3)
Xylenes	440	10,000	440 (1)
Antimony	1.46	6	1.46 (1)
Arsenic	50	10	50 (1)
Barium	1,000	2,000	2,000 (2)
Beryllium	0.0039	4	0.004 (2)
Cadmium	10	5	5 (2)
Chromium	50	100	100 (2)
Lead	50	15 (Action Level)	15 (2)
Mercury	2	2	2 (1)
Nickel	15.4	100	100 (2)
Selenium	10	50	50 (2)
Silver	50	----	50 (1)
Zinc	5,000	----	5,000 (1)
Acetone	----	----	700 (3)
Benzene	----	5	5 (4)
Ethylbenzene	----	700	700 (4)
Tetrachloroethylene	----	5	5 (4)
1,1,2,2,-Tetrachloroethane	----	----	0.18 (4)

Notes:
μg/L = micrograms per liter
MCL = Federal Maximum Contaminant Level
* = Current cleanup level incorporates any changes from original ROD levels, including changes to MCLs and site-specific documents such as Explanation of Significant Differences (ESD).
---- = Not Established

Sources:
(1) EPA. 1989. Record of Decision, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona. September.
(2) EPA. 1998. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. March.
(3) EPA. 1991. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. January.
(4) EPA. 1993. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. May.

Section 8
Issues

The issues identified during this five-year review for PGAN and PGAS are listed in Tables 8-1 and 8-2, respectively.

Table 8-1
Summary Table of Issues
Second Five-year Review Report for
Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona

	Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1	Groundwater quality monitoring trends indicate the TCE plume is expanding to the northeast and the north. In the southeast (near EPA MW-10A), it is still uncertain if the Subunit A TCE plume is within the capture zones of MTS Subunit A extraction well system.	Y	Y
2	Recently increased detections of TCE at MW-29, located south of I-10 in the Subunit C, indicate an unknown potential migration route from Subunit A to Subunit C.	Y	Y
3	Recent data indicates that the SVE system has been less effective in removing mass from the dry-well source area than in previous years.	N	Y
4	Institutional controls (ICs) were required in the 2006 Partial Consent Decree; restrictive covenants required on portions of the UPI property have not been implemented.	N	Y
5	Extracted groundwater with perchlorate at the Site is being addressed through the 2008 Perchlorate Removal Action. However, no restoration remedy for perchlorate contamination in the aquifer has been selected.	N	Y

Table 8-2
Summary Table of Issues
Second Five-year Review Report for
Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, Arizona

	Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1	Monitoring data suggests that an uncharacterized source may be resulting in contaminant migration at well GAC-04.	Defer	Defer
2	ICs were recommended in the previous Five-Year Review for the residual chromium contamination; however, no chromium related ICs have been implemented at PGAS to date.	N	Y
3	The northern TCE plume in Subunit C is not fully defined	Defer	Defer
4	The chromium concentrations in the northern Subunit A plume have not shown improvement in response to the remedial actions taken	N	Y
5	Although the use of vapor GAC air emission controls is part of the remedy for this site, air emission controls were removed at PGAS in 1995 with concurrence of Maricopa Air Quality Department. A 2007 letter to ADEQ from Maricopa Air Quality Department indicates that the Department has a different current interpretation of its Rule 330 that may require air emissions controls at sites where they were previously not required.	Defer	Defer

Table 8-3
Summary Table of Issues
Second Five-year Review Report for
Phoenix-Goodyear Airport (Sitewide) Superfund Site, Goodyear, Arizona

	Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1	The separate evaluation of the PGAN and PGAS data may not be providing a complete picture of possible threats to the City of Goodyear wells.	N	Y
2	At PGAN, PGAS and Western Avenue WQARF site, ground water sampling and water level measurement events are not conducted on a coordinated schedule. There is also a question about whether the water level data between the PGAN,PGAS and Western Avenue WQARF site are comparable.	N	Y

Section 9
Recommendations and Follow-up Actions

Recommendations

Table 9-1
Summary Table of Issues, Recommendations, and Follow-Up Actions
Phoenix-Goodyear Airport (North) Superfund Site
Goodyear, AZ

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
1	Ensure capture of plume at all boundaries; including evaluating all northern area extraction/injection systems (EA05,EA06,33a,EA07) optimizing injection/extraction of all systems, developing all injection/extraction systems necessary to fully contain in N,NE and NW; and expanding capacity of MTS	Crane	EPA	2011
2	Investigate Subunit C contamination near MW29C to determine source of Subunit A to Subunit C migration	Crane	EPA	2011
3	Optimization of the SVE system should be evaluated.	Crane	EPA	2012
4	Implement ICs as required in the 2006 Partial Consent Decree.	Crane	EPA	2014
5	Remedial action to address perchlorate in the aquifer needs to be selected and documented in a decision document.	Crane	EPA	2014

Table 9-2
Summary Table of Issues, Recommendations, and Follow-Up Actions
Phoenix-Goodyear Airport (South) Superfund Site
Goodyear, AZ

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
1	Continue to monitor ground water in vicinity of GAC-04; investigate source of recently detected contaminants	GTRC	ADEQ/EPA	2011
2	Implement ICs as required.	GTRC	ADEQ/EPA	2014
3	Conduct GW investigation of area to gain more definitive understanding of northern Subunit C plume.	GTRC	ADEQ/EPA	2014
4	Evaluate the ground water monitoring data to gain better understanding of chromium levels over time.	GTRC	ADEQ/EPA	2014
5	Evaluate requirements for air emissions controls at PGAS in light of the 2007 Maricopa Air Quality Department letter.	GTRC	EPA/ADEQ	2014

Table 9-3
Summary Table of Issues, Recommendations, and Follow-Up Actions
Phoenix-Goodyear Airport (Sitewide) Superfund Site, Goodyear, AZ

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
1	Conduct GW investigation of area between PGAN and PGAS to gain understanding of GW sitewide.	Crane/GTRC	EPA/ADEQ	2011
2	Twice per year, parties conduct GW gauging and sampling at same time for wells at all three sites.	Crane GTRC ADEQ	EPA/ADEQ	Ongoing

Follow-up

In addition to the formal recommendations; there are several areas of improvement were identified during the Five Year Review process. Specific suggestions are below:

- Groundwater Treatment Plant and Wells Assessment. All of the mechanical and non-mechanical remediation system components should be evaluated by an engineer to determine the system integrity for the next five years.

- Contingency Well-head Treatment Plan. Prepare water-supply wells for well-head treatment as and where required.

Section 10
Protectiveness Statement

PGAN

The remedy at PGAN is not protective of human health and the environment. In Subunit A, the TCE plume is expanding to the northeast and the north. It is still uncertain if the Subunit A TCE plume is within the capture zones of MTS Subunit A extraction well system in the southeast. In Subunit C, recent detections in MW-29 indicate an unknown potential migration route from Subunit A to the drinking water aquifer, Subunit C. In addition, several issues that affect long term protectiveness have also been identified: the SVE remedy for soil gas has had diminished recovery over the past five years; and all of the institutional controls have yet to be implemented.

PGAS

A protectiveness determination of the remedy at PGAS cannot be made until further information is obtained. While the TCE plume at PGAS has been mostly delineated with COC concentrations in the plume being stable or decreasing over the last five years, the northwestern edge of the northern subunit C plume is not completely defined. Vapor GAC air emission controls are not in use and may be required. Further information will be obtained by conducting a groundwater investigation of northern TCE plume in Subunit C and evaluating requirements for air emissions controls at PGAS It is expected that these actions will take approximately four years to complete, at which time a protectiveness determination will be made for PGAS. In addition, several issues that affect long term protectiveness have also been identified: The source and extent of the TCE contamination in and around GAC-04 has not been determined. The continued occurrence of elevated chromium in the northern Subunit A plume has not been fully understood.

SITEWIDE

The remedy at PGAN and PGAS is not protective. At PGAN, the contaminant plume is expanding along several of its boundaries. There is an unknown conduit of TCE contamination from the Subunit A to the Subunit C. At PGAS, the extent of contamination is not fully defined in the northern plume. There is also an undefined source of TCE contamination at GAC-04 in the Subunit C zone. Production wells tap into the Subunit C zone in the area known to have PGAN and PGAS contamination.

Section 11
Next Review

The next review will be conducted within five years of the completion of this Five-Year Review report.

Figures

References

AMEC Geomatrix, Inc. 2010a. *July 2010 PGA North Flow Model Update*. July 15.

_________. 2010b. *Draft Contaminant Fate and Transport Model*. August 19.

ARCADIS. 2008a. *Revised Final Groundwater Monitoring Work Plan,* Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona. October 10.

_________. 2008b. *Final EA-05 and EA-06 Groundwater Treatment Systems Operation and Maintenance Plan*.

_________. 2007. *Revised Final Site Evaluation Report, Former UPI Site, Phoenix-Goodyear Airport North Superfund Site, Goodyear, Arizona*. March 27.

_________. 2005a. *Soil Vapor Extraction System Operations and Maintenance Plan*. December 2.

_________. 2005b. *Air Sampling Report, Phoenix-Goodyear Airport - North Superfund Site, Goodyear, Arizona.* November 11.

_________. 2005c. *Groundwater Treatment Systems Operation and Maintenance Workplan*.

Arizona Department of Environmental Quality (ADEQ). 2005. *Personal discussion with Nancy Lou Sandoval regarding current status of UST release which is being addressed outside the CERCLA process*. September.

_________. 2002. *Letter to Mr. Jeffrey Sussman, Goodyear Tire and Rubber Company RE: Demolition of the chromium treatment system*. December 20.

Arizona Department of Water Resources (ADWR). 1994. *A Regional Groundwater Flow Model of the Salt River Valley - Phase II Phoenix Active Management Area Numerical Model, Calibration and Recommendations Modeling Report No. 8*. March 1994. (ADWR, 1994)

_________. 2006. *Final Well Spacing Rules*. Adopted August 7, 2006.

Bartholomew Engineering, Inc. 1993. *Phoenix-Goodyear Airport Superfund Site (South) Chromium-Cadmium Response Action, Final Report Inspection Plan*. March 31.

Camp, Dresser, & McKee, Inc. (CDM). 2010. *Interview Record – Scott Miller, Manager, Arizona Department of Water Resources-Groundwater Permitting and Wells Section*. Conducted June 14, 2010.

CH2M HILL. 1989. *Remedial Investigation/Feasibility Study Phoenix Goodyear Airport, Goodyear, Arizona. Volumes I, III, and XII.* June.

Coffman Associates, Inc. 2007. *Final Phoenix Goodyear Airport Master Plan 2005-2025.* November.

Ecology and Environment, Inc. 1983. *Site Inspection Report, Goodyear Aerospace Corporation*. September 1983.

Environmental Data Resources, Inc. (EDR). 2010. *EDR Environmental Lien Report, PGA North and South Parcels* . June 8.

Goodyear Tire and Rubber Company (GTRC). 1999. *Subunit A Groundwater Remedy Acceleration Soil Vapor Extraction/Air Sparging Work Plan - Airport Infield*. September 27.

ICF Technology. 1990. *PGA Operable Unit Treatment Plant Operation and Maintenance Procedures Manual*.

LATA. 2010. *Second Semi-Annual 2009 Groundwater Groundwater Monitoring Report,* Phoenix-Goodyear Airport South Site, Goodyear, Arizona. January.

_________. 2009. *Indoor Air Quality Report for the Phoenix-Goodyear Airport and JRC Goodyear, LLC Properties Phoenix-Goodyear Airport South Superfund site, Goodyear, Arizona.* April.

_________. 2008. *Comprehensive Groundwater Monitoring Plan for the Phoenix-Goodyear Airport South Site, Goodyear, Arizona.* August.

Matrix New World Engineering, Inc (Matrix). 2010a. *2009 Annual Groundwater Operation and Remediation Report, Phoenix-Goodyear Airport – North Superfund Site, Goodyear, Maricopa County, Arizona.* March 30.

_________2010b. *Draft Groundwater Monitoring Report-Fourth Quarter 2009 and 2009 Annual Report, Phoenix-Goodyear Airport-North Superfund Site, Goodyear, Maricopa County Arizona.* January 22.

_________. 2009. *Draft – Revised Main Treatment System Operations and Maintenance Plan*. October.

Metcalf and Eddy. 1993. *Soil Vapor Extraction (SVE) Operable Unit Draft Operation and Maintenance Manual, Phoenix-Goodyear Airport (South), Polygon 79/84*. August 4.

_________. 1995. *Soil Vapor Extraction (SVE) Final Remedy Consent Decree Final Extraction and Treatment System Design - Polygon 96/92/27A*. June 1.

Odgen Environmental and Energy Services. 1999. *Soil Vapor Extraction Final Remedy Consent Decree - Final Closure - Polygons 96/92/27A - Phoenix-Goodyear Airport (South) Superfund Site - Goodyear, Arizona*. May 10.

Sharp and Associates Inc. 2005. *Status of Subunit A Groundwater Cleanup and Groundwater Model Predictions on the Phoenix-Goodyear Airport South Site, Goodyear. Arizona*. February 2005.

_________. 1995a. *Comprehensive Groundwater Monitoring Plan for the Phoenix-Goodyear Airport Site*, Goodyear, Arizona. April 25, 1995.

_________. 1995b. *Letter to Nancy Moore, Arizona Department of Environmental Quality. Re: E-17 Chromium Treatment System*. September 5, 1995.

_________. 1994a. *Final Operations and Maintenance Manual, Northern Subunit B/C Groundwater Remediation System, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona*. April 22.

_________. 1994b. *Draft Final Design Report for the B/C Groundwater Remedy, Phoenix Goodyear Airport Site, Phoenix, Arizona*.

United States Environmental Protection Agency (EPA). 2009. *Draft Toxicological Review of Trichloroethylene: In Support of the Summary Information in the Integrated Risk Information System (IRIS)*. November.

_________. 2008a. *Removal Action Memorandum Phoenix-Goodyear Airport North Superfund Site, Goodyear, Arizona*. June 13.

_________. 2008b. *Interim Drinking Water Health Advisory for Perchlorate.* December.

_________. 2006a. *Five-Year Review Report for Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona.* September.

_________. 2006b. *Partial Consent Decree*. April.

_________. 2005. *Five-Year Review Report for Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, Arizona.* September.

_________ .2003. *Unilateral Administrative Order (Docket No. 9-2003-0001).* January 2

_________. 2002a. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 09/19/2002.

_________ .2002b. *Letter to Ms. Nancy Lou Minkler, Arizona Department of Environmental Quality RE: Request for demolition of chromium treatment system*. December 16, 2002.

_________ .1998. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 03/26/1998.

_________ .1995. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 12/22/1995.

_________.1993. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 05/05/1993.

_________. 1991a. *Action Memorandum for Removal of Chromium*.

_________. 1991b. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 01/24/1991.

_________. 1991c. *Civil Action No. 88-1443 Consent Decree*. May 7.

_________.1990. *Amended Administrative Order, Docket No. 90-20*. October 10.

_________. 1989a. *Remedial Investigation/Feasibility Study Phoenix Goodyear Airport, Goodyear, Arizona*. Volumes I, III, and XII. June.

_________. 1989b. *Record of Decision, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona*. September 1989.

__________. 1988. *Consent Decree*. September 6.

__________.1987a. *Final Feasibility Study for Section 16 Operable Unit, Goodyear, Arizona*. October 19, 1987.

__________. 1987b. EPA. *Record of Decision Summary for Section 16 Operable Unit, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona*. September.

Appendix A
Documents Reviewed

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Appendix A
Documents Reviewed

Agency for Toxic Substances and Disease Registry ([ATSDR] and United States Department of Health and Human Services Public Health Service. 2000. *Public Health Assessment (PHA) for Lithfield Airport Area (a/k/a Phoenix-Goodyear Airport – North) Goodyear, Maricopa County, Arizona.* March.

AMEC Geomatrix, Inc. 2010. *July 2010 PGA North Flow Model Update*. July 15.

_________. 2010. *Draft Contaminant Fate and Transport Model*. August 19.

ARCADIS. 2008. *Revised Final Groundwater Monitoring Work Plan,* Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona. October 10.

_________. 2006. *Groundwater Monitoring Fourth Quarter 2005 and 2005 Annual Report*. March 1.

_________. 2005. *Air Sampling Report, Phoenix-Goodyear Airport - North Superfund Site, Goodyear, Arizona.* November 11.

Arizona Administrative Register (AAR). 2008. *Notices of Final Rulemaking.* Volume 14, Issue 31, pg. 2979-3123. August.

Arizona Department of Health Services (ADHS). 2000. *Public Health Assessment, Litchfield Airport Area (A/K/A Phoenix Goodyear Airport), Goodyear, Maricopa County, Arizona*. December 18.

Arizona Department of Water Resources (ADWR). 2006. *Final Well Spacing Rules*. Adopted August 7, 2006.

Camp, Dresser, & McKee, Inc. (CDM), 2010. *Interview Record – Scott Miller, Manager, Arizona Department of Water Resources-Groundwater Permitting and Wells Section*. Conducted June 14, 2010.

Environmental Data Resources, Inc. 2010. *EDR Environmental Lien Report, PGA North and South Parcels* . June 8.

ITSI/CDM. 2009. *Technical Memorandum: Final Updated Risk Analysis for Storage Lake and Spray Irrigation Using Water from SunCor Well 3B; Phoenix Goodyear Airport North Superfund Site, Goodyear, Arizona.* July 13.

LATA. 2010. *Second Semi-Annual 2009 Groundwater Groundwater Monitoring Report,* Phoenix-Goodyear Airport South Site, Goodyear, Arizona. January.

_________. 2009. *Status of Subunit A Groundwater Cleanup: Review of Chromium Remedial Action for the Phoenix-Goodyear Airport South Superfund Site, Goodyear, Arizona.* July.

_________. 2009. *Indoor Air Quality Report for the Phoenix-Goodyear Airport and JRC Goodyear, LLC Properties Phoenix-Goodyear Airport South Superfund site, Goodyear, Arizona.* April.

_________. 2008. *Metals Sampling Technical Memorandum, Phoenix-Goodyear Airport South Site, Goodyear, Arizona.* October.

_________. 2008. *Comprehensive Groundwater Monitoring Plan for the Phoenix-Goodyear Airport South Site, Goodyear, Arizona.* August.

_________. 2008. *Chromium Sludge Drying Beds Sampling Report for the Phoenix-Goodyear Airport (PGA) South Site, Goodyear, Arizona.* August.

Matrix New World Engineering, Inc (Matrix). 2010a. *2009 Annual Groundwater Operation and Remediation Report, Phoenix-Goodyear Airport – North Superfund Site, Goodyear, Maricopa County, Arizona.* March 30.

_________. 2010b. *Draft Groundwater Monitoring Report-Fourth Quarter 2009 and 2009 Annual Report, Phoenix-Goodyear Airport-North Superfund Site, Goodyear, Maricopa County Arizona.* January 22.

_________. 2009. *Draft Interim Remedial Action Report for Groundwater Remediation Systems EA-05 and EA-06, Phoenix-Goodyear Airport – North Superfund Site, Goodyear, Maricopa County, Arizona.* March 6.

TRC. 2008. *Metals Sampling Report, Phoenix Goodyear Airport South Site in Goodyear, Arizona.* October 31.

United States Environmental Protection Agency (EPA). 2008. *Interim Drinking Water Health Advisory for Perchlorate.* December.

_________. 2006a. *Partial Consent Decree*. April.

_________. 2006b. *Five-year Review Report for Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona.* September.

_________. 2005. *Five-year Review Report for Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, Arizona.* September.

_________. 2003. *Administrative Order*. January 2

_________. 2002a. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 09/19/2002.

_________. 1998. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 03/26/1998.

_________. 1995. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 12/22/1995.

_________. 1993. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 05/05/1993.

_________. 1991a. *Action Memorandum for Removal of Chromium*.

_________. 1991b. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. 01/24/1991.

_________. 1991c. *Civil Action No. 88-1443 Consent Decree*. May 7.

_________. 1990. *Amended Administrative Order, Docket No. 90-20*. October 10.

_________. 1989a. *Remedial Investigation/Feasibility Study Phoenix Goodyear Airport, Goodyear, Arizona*. Volumes I, III, and XII. June.

_________. 1989b. EPA. *Record of Decision, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona*. September 1989.

_________. 1988. *Consent Decree*. September 6.

_________. 1987a. *Final Feasibility Study for Section 16 Operable Unit, Goodyear, Arizona*. October 19, 1987.

_________. 1987b. EPA. *Record of Decision Summary for Section 16 Operable Unit, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona*. September.

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Appendix B
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Appendix C
Human Health Risk Assessment Review Memorandum

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CDM

Memorandum

To: *Catherine Brown, USEPA*

From: *Kassandra Tzou, CDM*

Date: *August 13, 2010*

Subject: *Phoenix-Goodyear Airport (North and South Areas) Superfund Sites, Goodyear, AZ*
Second Five-Year Review Report 2010
Human Health Risk Assessment and Toxicology Review Memorandum

During this Five-Year Review, documents pertaining to risk assessment of the Phoenix-Goodyear Airport (PGA - North and South Areas) Superfund Site were obtained from the EPA. A baseline Human Health Risk Assessment (HHRA) addressing both Phoenix-Goodyear Airport North (PGAN) and Phoenix-Goodyear Airport South (PGAS) was not available. Therefore, this Human Health Risk Assessment and Toxicology review is based on review of the following documents:

- 1987 Record of Decision (ROD) for Operable Unit-1 (OU1)
- 1989 ROD for Operable Unit-2 (OU2)
- Public Health Assessment (PHA) for Lithfield Airport Area (a/k/a Phoenix-Goodyear Airport – North) Goodyear, Maricopa County, Arizona (United States Department of Health and Human Services Public Health Service, Agency for Toxic Substances and Disease Registry ([ATSDR], March 2000)
- Air Sampling Report, Phoenix-Goodyear Airport - North Superfund Site, Goodyear, Arizona (Arcadis, November 11, 2005)
- Indoor Air Quality Report for Selected Buildings at Phoenix-Goodyear Airport [PGAS] and JRC Goodyear, LLC Properties, Goodyear, Arizona (Goodyear Tire and Rubber Company, April 27, 2009).

Although it assesses the Palm Valley and Lakes Golf Course, which is not located on Phoenix-Goodyear Airport (North and South Areas) Superfund Site property, the following risk assessment document was also reviewed because it addresses use of groundwater pumped from PGAN:

- Technical Memorandum: Final Updated Risk Analysis for Storage Lake and Spray Irrigation Using Water from SunCor Well 3B; Phoenix Goodyear Airport North Superfund Site, Goodyear, Arizona (ITSI/CDM, July 13, 2009)

No risk assessments on PGAS (other than the information provided in the 1987 and 1989 RODs and the 2009 Indoor Air Quality Report) were available for review.

Site Background

The PGA (North and South Areas) Superfund Site covers about 35 square miles in the western part of the Salt River Valley, 17 miles west of Phoenix, Arizona. The Section 16 OU is 750 acres and lies west of the City of Goodyear, bordered by The Towns of Avondale and Goodyear on the east.

Contamination from the PGA (North and South Areas) Superfund Site was observed as early as 1951, when a sample collected from the main airport drainage ditch was described as dark-colored, oily, with settlable solids and chromates present. The airport's wastewater treatment plant was upgraded in 1952 to address this contamination, but discharges of solvents into the drainage ditch likely continued after this time (EPA, 1989). In 1981, the Arizona Department of Health Services (ADHS) discovered that groundwater in the PGA area was contaminated with trichloroethene (TCE), other solvents, and chromium. Samples were collected in 1981 from City of Goodyear wells (EPA, 1989), and additional sampling of wells in 1982 and 1983 found 18 wells contaminated with TCE. As a result, the EPA added the PGA site to the National Priorities List (NPL) in September 1983 as the Litchfield Airport Area Superfund Site. In 1984, the United States Environmental Protection Agency (EPA) began a remedial investigation of the Litchfield Airport Area (presently known as the Phoenix-Goodyear Airport) to characterize the site, investigate the extent of contamination, and identify the potential sources.

The primary source of contamination at PGAN was associated with activities at Unidynamics Phoenix, Inc. (UPI). The UPI facility operated from 1963 to 1994 as a research, design, development, testing, assembly and manufacturing plant for ordinance components, and other related electromechanical devices. The products (fuses, switches, detonators, etc.) created at this facility were shipped off-site for integration into larger defense systems by other parties. Typically, these products contained small quantities of explosive or reactive chemicals. A variety of chemicals such as acids, explosives, tear gas, propellants, paints, gules, oils, solvents, and radioactive materials were used and tested at the facility. Additionally, UPI stored reactive chemicals and products, processed powder, and blended and processed propellants. More than 180 different chemicals and chemical mixtures were used over the course of the facility's operation. Several different chemical, including solvents used for manufacturing electromagnetic devices, were reported disposed in the four dry wells located west of their main building. In particular, TCE and perchlorate were known to have been disposed on the UPI facility (Arcadis, 2007). The UPI buildings and bunkers were demolished in 2009 (Matrix, 2010).

At PGAS, two primary contributors to contamination were identified - the Goodyear Aerospace Corporation (GTRC) site (owned at that time by Loral Corporation) and the Navy at the Litchfield Park Naval Air Facility (EPA, 1987). GTRC purchased the facility in 1949 and operated a plant on airport property until 1968, and on property adjacent to (east of) the airport until 1987. The plant developed and manufactured aerospace related products including electronics equipment such as radar; transparent products such as aircraft and automobile windshields; and structural components such as MX missile transporter and aluminum-skinned shelters. Hazardous waste generating operations at the facility were primarily metal treatment processes such as plating, degreasing and etching. These processes used solvents and acids that generated metal sludges, waste solvents and waste acids. Prior to 1980, much of these wastes were disposed on-site in three sludge drying beds located at the southern portion of the facility. The contents of the beds, along with soil and rubberized fabric liner, were removed in 1980; further remediation of one of the beds was completed in 1993. TCE was used at the site prior to 1974, but no records are available indicating substantial on-site disposal (Ecology and Environment, 1983).

The ROD identifies the selected remedy for groundwater to be extraction and treatment for containment and removal. Treatment is by air stripping, vapor phase carbon to remove chlorinated VOC, and granular activated carbon polishing to remove acetone and methyl ethyl ketone (MEK). Treated water is reinjected. A soil vapor extraction (SVE) system with vapor phase granular activated carbon (GAC) air emission controls was selected for treatment of contaminated target areas at vadose zone source areas at the Site. Target areas are those areas where volatile organic compounds (VOCs) were detected in soil gas samples at levels higher than 1 ug/L. Under Explanation of Significant Differences (ESD) #2 (EPA, 1993), the SVE system was changed to utilizing thermox with wet scrubbing for emissions control. Due to numerous technical difficulties with the thermox SVE system and community concerns regarding potential dioxin emissions from using a thermox, the SVE system with vapor phase GAC air emission controls was reinstated with ESD #5 (EPA, 2002). Target clean-up levels are based on Applicable or Relevant and Appropriate Requirements (ARARs), maximum contaminant levels (MCLs), and ambient water quality criteria adjusted for consumption of drinking water only. No chemical-specific ARARs defining cleanup levels for soil were established. Instead, EPA set cleanup levels for soils based on protection of human health and the environment from the contamination of groundwater that would result without a cleanup of soil. The ROD is not clear on how the soil target levels were developed. Cleanup levels for chromium and other metals contamination in the sludge pits on PGAS were established through an administrative order to Goodyear Tire and Rubber Company.

Changes in Exposure Assessment

Potential Receptors

The PGA (North and South Areas) site is currently industrial and it is anticipated that future land use of the site will continue to be industrial.

At PGAN, commercial and industrial properties lie to the north and south of the former UPI facility, agricultural land is to the west, and residential and commercial property is across Litchfield Road to the east. The groundwater contaminant plume at PGAN extends approximately 2 miles northward of the UPI facility, and beneath agricultural fields, a farm, housing developments with golf courses, and the Roosevelt Irrigation District (RID) Canal.

At PGAS, commercial and industrial properties lie to the east of the airport and agricultural land is to the north, south, and west. The nearest residences are approximately one-half mile west of the site and less than one-quarter mile northeast of the site. These areas are generally upgradient or cross-gradient of the contaminant plumes. The main groundwater contaminant plume is in Subunit A. This unit is composed of approximately 110 feet of silty sand and gravel, and depth to water is generally 70 to 80 feet below ground surface (bgs). Commercial and industrial buildings are located above portions of the Subunit A groundwater plume.

The nearest surface drainages in the area are the Gila River, located one to two miles south of the site, and the Agua Fria River, located one to two miles east of the site.

Receptors considered in one or more risk documents are:

- The 1987 ROD does not specify a receptor, but mentions excess lifetime cancer risk over the course of a 70-year lifetime. This statement suggests that an onsite adult resident was evaluated.
- The 1989 ROD considered the following receptors: residents and onsite workers.
- The 2000 PHA considered the following receptors: off-site adult and child residents, onsite industrial workers, off-site farm workers, and off-site recreational children. Specific residential properties identified in the PHA include the Pebble Creek housing development north of the RID Canal, the SunCor housing development located south of the RID Canal and east of Bullard Avenue, and the Park Shadows Apartments located approximately one-half mile south of the UPI facility.
- The 2005 Air Sampling Report considered the following receptors: commercial workers at 140, 190, and 250 North Litchfield Road.
- The 2009 Indoor Air Quality Report considered the following receptors: commercial/industrial workers.
- The 2009 Technical Memorandum for the storage lake considered the following receptors: residents immediately adjacent to the storage lake at Palm Valley Golf Course, residents at the Palm Valley and Lakes Golf Course and golf course maintenance workers at the Palm Valley and Lakes Golf Course.

The list of receptors identified by the various risk assessments appears to be comprehensive, with the exception of construction workers, and appropriate for the current and future uses of the PGA (North and South Areas) Site. Note that PGAS was only assessed for risk in the 1987 and 1989 RODs; thus, only residents and onsite workers were considered for this portion of the site.

Exposure Pathways

The exposure pathways considered in the risk documents are:

- The 1987 ROD evaluated the following exposure pathway: ingestion of contaminated groundwater.

- The 1989 ROD evaluated the following exposure pathways: ingestion of contaminated groundwater and inhalation of volatile emissions from soil.

- The 2000 PHA considered the following exposure pathways: past worker inhalation, ingestion, and dermal exposure to chemicals used at the UPI facility; past residential exposure to thermal oxidizer air emissions; farm worker and recreational child inhalation, ingestion, and dermal exposure to irrigation water; and ingestion of agricultural produce irrigated with contaminated groundwater.

  The report considered the following exposure pathways to be incomplete: direct onsite exposure to soil and groundwater contamination, future exposure to thermal oxidizer air emissions, and exposure to the treated groundwater from SunCor Well #33A being used for the ornamental lake and golf course irrigation.

- The 2005 Air Sampling Report evaluated the following exposure pathway: inhalation of indoor air.

- The 2009 Indoor Air Quality Report evaluated the following exposure pathway: inhalation of indoor air.

- The 2009 Technical Memorandum for the storage lake evaluated the following exposure pathways: inhalation of volatile emissions from the storage lake at Palm Valley Golf Course and inhalation of volatile emissions resulting from spray irrigation of the Palm Valley and Lakes Golf Courses.

Table 1 summarizes receptors and exposure pathways evaluated in the risk assessments for PGAN and PGAS.

Table 1
Exposure Pathways Evaluated for the PGA (North and South Areas) Site

Exposure Pathway	Onsite Industrial Worker	Onsite Adult Resident	Offsite Child Resident	Offsite Adult Resident	Offsite Industrial/ Commercial Worker	Offsite Farm Worker	Offsite Recreational Child	Offsite Golf Course Maintenance Workers
Ingestion of contaminated soils	PGAN[b]	No	No	No	No	No	No	No
Dermal contact with contaminated soils	PGAN[b]	No	No	No	No	No	No	No
Inhalation of volatile emissions from soil	PGAN[b]/ PGAS[a]	No	No	No	No	No	No	No
Inhalation of fugitive dust emissions	PGAN[b]	No	No	No	No	No	No	No
Ingestion of contaminated groundwater	PGAN[b]	PGAN[a]/ PGAS[a]	No	No	No	No	No	No
Dermal contact with contaminated groundwater used for irrigation	No	No	PGAN[b]	PGAN[b]	No	PGAN[b]	PGAN[b]	PGAN[b]
Ingestion of contaminated groundwater used for irrigation	No	No	PGAN[b]	PGAN[b]	No	PGAN[b]	PGAN[b]	PGAN[b]
Ingestion of agricultural produce irrigated with contaminated groundwater	No	No	No	PGAN[b]	No	No	No	No
Inhalation of volatiles released from groundwater into indoor air	No	No	No	No	PGAN[c] PGAS[e]	No	No	No
Inhalation of air emissions from thermal oxidizer	No	No	PGAN[b]	PGAN[b]	No	No	No	No
Inhalation of volatile emissions from contaminated groundwater stored in ornamental lake	No	No	PGAN[d]	PGAN[d]	No	No	No	No
Inhalation of volatile emissions resulting from contaminated groundwater used for spray irrigation	No	No	PGAN[b,d]	PGAN[b,d]	No	PGAN[b]	PGAN[b]	PGAN[d]

a – 1987 and 1989 RODs
b – 2000 PHA
c – 2005 Air Sampling Report
d – 2009 Technical Memorandum
e – 2009 Indoor Air Quality Report

Although the list of exposure pathways evaluated for PGAN appears to be comprehensive, risk evaluations were conducted in several different documents at separate times. As such, total cancer risks and hazards for potential receptors based on exposure through all completed exposure pathways were not assessed. Further, cleanup targets for COPC in soil were established via an administrative order separate from the ROD. In the main facility soil investigation, soil targets were developed using ARARS consisting of EPA Region 9 Preliminary Remediation Goals (PRGs) and Arizona non-residential Soil Remediation Levels (SRLs). These targets were not set based on results of a site-specific risk assessment. In addition, PRGs have since been replaced with EPA Regional Screening Levels (RSLs), which have been updated as recently as May 2010.

Further, some important exposure pathways for VOC have not been evaluated for PGAN or PGAS or have been evaluated only for limited areas.

In contrast, risks and hazards at PGAS were not assessed other than in the original 1987 and 1989 RODs. As such, few potential receptors and exposure pathways were evaluated. As for PGAN, total cancer risks and hazards for potential receptors based on exposure through all completed exposure pathways were never assessed.

One important exposure pathway that has raised concern in human health risk assessments is the inhalation of volatiles released from groundwater into indoor air. Per EPA Subsurface Vapor Intrusion Guidance (2002), a site is considered a candidate for vapor intrusion if two criteria are met: (1) chemicals in the subsurface are volatile and toxic; and (2) existing or future buildings are or may be within 100 feet laterally or vertically of a groundwater or soil gas contaminant plume. The PGAN and PGAS sites meet both of these criteria. This exposure pathway should be comprehensively assessed for onsite workers and offsite residential and commercial receptors at PGAN and PGAS. For both PGAN and PGAS, vapor intrusion issues have been evaluated in the areas with highest groundwater contamination and highest vapor concentrations. Other portion of the site is less likely to present a problem. At present, it is not obvious whether this pathway could call into question the protectiveness of the remedy.

In addition, inhalation of volatiles as a result of domestic use of groundwater (e.g., showering) and dermal contact with groundwater through in-home uses has also not been evaluated. Quantitative risk assessment for this pathway would provide a better understanding of possible site-related risks. However, if MCLs continue to be used as target clean-up levels, further evaluation of this pathway would not affect protectiveness.

Recent developments in human health risk analysis recommend consideration of residential exposure issues that were not evaluated in previous risk analyses for the Site –breastfeeding and early-life exposure to carcinogens. The breastfeeding pathway is commonly a pathway of concern for bioaccumulating chemicals such as polychlorinated biphenyls (PCBs), which are not contaminants of concern at the Site. Thus, further risk assessment for this exposure pathway is not likely to change the current view of remedy protectiveness.

California EPA (CalEPA) has published a few chronic reference doses specifically for children. The list is short and includes cadmium, lead, and nickel, but does not include TCE, chromium, and perchlorate, which have been the focus of remediation activities at PGAN and PGAS. Although the EPA has not established child reference doses for a number of chemicals, some contaminants of concern (or their daughter products) are known to be mutagenic (e.g., vinyl chloride). Risks associated with exposure to such COPC could affect remedy protectiveness. For example, vinyl chloride related risks could be high based on vapor intrusion. If the vapor intrusion pathway is evaluated further, special attention should be paid to early life stage exposure to vinyl chloride.

Changes in Toxicity Criteria

The 1987 ROD identified the risk associated with exposure to contaminated groundwater to be 2×10^{-3} for total cancer risk and with no noncarcinogenic risk (hazard index) from ingestion. These cancer risks are above the acceptable range of upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}. The 1989 ROD identified the cancer risk associated with exposure to TCE in contaminated groundwater to be 3×10^{-6}. Inhalation risk for onsite workers on PGAS from volatile emissions from soil was estimated to be 1×10^{-4} to 2×10^{-5} based on 8-hour exposure over the course of a work lifetime[1].

Although toxicity criteria used in the 1987 and 1989 ROD to develop these risks were not available, Table 2-5 of the 1989 ROD indicates ambient water quality criteria (AWQC) concentrations that would result in cancer risks of 10^{-6}. In this table, 1,1-dichloroethene (1,1-DCE); chloroform; TCE; MEK; arsenic; and beryllium were identified as being carcinogenic. Table 2 provides the current toxicity criteria for this list of chemicals or contaminants of potential concern (COPC). As shown in Table 2, 1,1-DCE; MEK; and beryllium currently do not have oral cancer slope factors.

The 1991 ESD#1 identified that the 1989 ROD was in error when it identified an ARAR for MEK because no Federal AWQC level had been set for MEK. In 1989, the Arizona Department of Environmental Quality (ADEQ) action level had not been promulgated. In addition, a cleanup level for acetone had not been identified in the 1989 ROD because acetone had not been detected in groundwater although it has been detected in soil. To address these issues, toxicity criteria for MEK and acetone in ESD#1were used to develop groundwater cleanup criteria. It should be noted that the calculated cleanup criteria for MEK in ESD#1 was less stringent than the cleanup criterion identified in the original 1989 ROD when the remedy was selected. As shown in Table 2, toxicity criteria used in ESD#1 are more stringent than the current (2003 USEPA IRIS) criteria. Thus, if cleanup targets were recalculated using toxicity criteria for MEK and acetone, these targets would be less stringent than targets established for the site by ESD#1. Thus, changes in toxicity criteria would have little to no effect on the 1989 ROD risk results or the selection of the remedy.

[1] The 1989 ROD does not specify the number of years intended by the phrase "work lifetime".

Table 2
Summary of Carcinogenic Toxicity Criteria

Chemical of Concern	Oral Slope Factor (mg/kg/day)$^{-1}$		Source	Year
	ROD	2010		
1,1-Dichloroethylene	NA	—	USEPA IRIS	2002
Chloroform	NA	0.031	CalEPA	2010
Trichloroethylene	0.011[a]	0.0059	CalEPA	2010
Carbon Tetrachloride	NA	0.07	USEPA IRIS	2010
Methylene Chloride	NA	0.0075	USEPA IRIS	1995
Arsenic	NA	1.5	USEPA IRIS	1998
Beryllium	NA	—	USEPA IRIS	1998
Cadmium	NA	—	USEPA IRIS	1992
Chromium (VI)	NA	0.5	New Jersey	2010
Lead	NA	—	USEPA IRIS	1993
Nickel	NA	—	USEPA IRIS	1994
Benzene	NA	0.055	USEPA IRIS	2000
Tetrachloroethylene	NA	0.54	USEPA RSL	2010
1,1,2,2,-Tetrachloroethane	NA	0.2	USEPA IRIS	1994
Chemical of Concern	**Inhalation Unit Risk (ug/m^3)$^{-1}$**		**Source**	**Year**
	ROD	**2010**		
1,1-Dichloroethylene	NA	—	USEPA IRIS	2002
Chloroform	NA	0.000023	USEPA IRIS	2001
Trichloroethylene	0.000002[a] 0.000002 – 0.0001[b] 0.000002[c]	0.000002	CalEPA	2010
Carbon Tetrachloride	NA	0.000006	USEPA IRIS	2010
Methylene Chloride	NA	0.00000047	USEPA IRIS	1995
Arsenic	NA	0.0043	USEPA IRIS	1998
Beryllium	NA	0.0024	USEPA IRIS	1998
Cadmium	NA	0.0018	USEPA IRIS	1992
Chromium (VI)	NA	0.012	USEPA IRIS	1998
Lead	NA	—	USEPA IRIS	1993
Nickel	NA	0.00026	CalEPA	2010
Benzene	NA	0.0000078	USEPA IRIS	2000
Tetrachloroethylene	0.000006[b]	0.0000059	CalEPA	2010
1,1,2,2,-Tetrachloroethane	NA	0.000058	USEPA IRIS	1994

Table 2 (continued)

Chemical of Concern	Reference Dose (RfD) (mg/kg/day)		Source	Year
	ROD	2010		
1,1-Dichloroethylene	NA	0.05	USEPA IRIS	2002
1,2-Dichloropropane	NA	0.09	ATSDR	—
Chloroform	NA	0.01	USEPA IRIS	2001
Toluene	NA	0.08	USEPA IRIS	2005
Trichloroethylene	0.006[a] 0.01[b]	—	USEPA IRIS	1992
Trichlorofluoromethane	NA	0.3	USEPA IRIS	1992
Carbon Tetrachloride	NA	0.004	USEPA IRIS	2010
Methylene Chloride	NA	0.06	USEPA IRIS	1988
Methyl Ethyl Ketone	0.05[d]	0.6	USEPA IRIS	2003
Xylenes	NA	0.2	USEPA IRIS	2003
Antimony	NA	0.0004	USEPA IRIS	1991
Arsenic	NA	0.0003	USEPA IRIS	1993
Barium	NA	0.2	USEPA IRIS	2005
Beryllium	NA	0.002	USEPA IRIS	1998
Cadmium	NA	0.0005/ (child) 0.000011	USEPA IRIS/CalEPA	1994
Chromium	NA	(III)1.5/(VI)0.003	USEPA IRIS	1998/1998
Lead	NA	—/ (child) 1 ug/L change in blood concentration	USEPA IRIS/CalEPA	2004
Mercury	NA	—	USEPA IRIS	—
Nickel	NA	0.02/ (child) 0.011	USEPA IRIS/CalEPA	1996
Selenium	NA	0.005	USEPA IRIS	1991
Silver	NA	0.005	USEPA IRIS	1996
Zinc	NA	0.3	USEPA IRIS	2005
Acetone	0.1[d]	0.9	USEPA IRIS	2003
Benzene	NA	0.004	USEPA IRIS	2003
Ethylbenzene	NA	0.1	USEPA IRIS	1991
Tetrachloroethylene	NA	0.01	USEPA IRIS	1988
1,1,2,2,-Tetrachloroethane	NA	0.004	PPRTV	—
Perchlorate	NA	0.0007	USEPA IRIS	2005

Table 2 (continued)

Chemical of Concern	Reference Concentration (RfC) (ug/m^3)		Source	Year
	ROD	2010		
1,1-Dichloroethylene	199.5[b]	200	USEPA IRIS	2002
1,2-Dichloropropane	NA	4	USEPA IRIS	1991
Chloroform	NA	98	ATSDR	—
Toluene	NA	5,000	USEPA IRIS	2005
Trichloroethylene	21[a] 35[a]	—	USEPA IRIS	—
Trichlorofluoromethane	NA	700	HEAST	—
Carbon Tetrachloride	NA	100	USEPA IRIS	2010
Methylene Chloride	NA	1,000	ATSDR	1991
Methyl Ethyl Ketone	4,900[b]	5,000	USEPA IRIS	2003
Xylenes	NA	100	USEPA IRIS	2003
Antimony	NA	—	USEPA IRIS	—
Arsenic	NA	0.015	CalEPA	—
Barium	NA	—	USEPA IRIS	1998
Beryllium	NA	0.02	USEPA IRIS	1998
Cadmium	NA	0.01	ATSDR	—
Chromium	NA	(III)— / (VI-mist) 0.006	USEPA IRIS	1998/1998
Lead	NA	—	USEPA IRIS	2004
Mercury	NA	0.3	USEPA IRIS	1995
Nickel	NA	0.09	ATSDR	—
Selenium	NA	20	CalEPA	—
Silver	NA	—	USEPA IRIS	—
Zinc	NA	—	USEPA IRIS	—
Acetone	3,150[b]	31,000	ATSDR	2003
Benzene	NA	30	USEPA IRIS	2003
Ethylbenzene	NA	1,000	USEPA IRIS	1991
Tetrachloroethylene	35[a]	270	ATSDR	—
1,1,2,2,-Tetrachloroethane	NA	—	USEPA IRIS	—
Perchlorate	NA	—	USEPA IRIS	2005

NA - Not Available
— - Not Established
USEPA. 2010a. Online Integrated Risk Information System (IRIS) - http://www.epa.gov/iris/, accessed August 4, 2010.
a – Toxicity criteria used in the 2000 PHA.
b – Toxicity criteria used in the 2005 Air Sampling Report.
c – Toxicity criteria used in the 2009 Technical Memorandum.
d – Toxicity criteria used in the 1991 ESD#1.

As noted above and in previous Five-Year Reviews, a risk assessment has not been conducted for PGAN and PGAS, thus toxicity values from 1989 ROD were not available for review. Table 2 provides toxicity values that could be used in a risk assessment to further evaluate the protectiveness of the remedy. Current remedial efforts are focused on TCE and perchlorate at PGAN and TCE and Chromium at PGAS, so the following describes the current toxicity criteria for these chemicals of concern (COCs):

- **TCE** - EPA started the process to revise the TCE health risk assessment in 2006. In the interim, EPA currently uses the Cal/EPA cancer toxicity values for evaluation of potential carcinogenic risk for TCE. There are no current EPA consensus noncarcinogenic toxicity factors for TCE.

  In November 2009, the EPA released a *Draft Toxicological Review of Trichloroethylene: In Support of the Summary Information in the Integrated Risk Information System (IRIS)*. The draft document was prepared by the National Center for Environmental Assessment within the EPA's Office of Research and Development (ORD). This document provides background information and justification for an IRIS summary of hazard and dose-response assessment of TCE. It proposes Reference Dose (RfD) and Reference Concentration (RfC) values for evaluation of non-cancer hazards, and an oral slope factor (SF) and an inhalation unit risk (IUR) for assessment of cancer risks.

  External review by the Science Advisory Board is nearly complete and initial comments by the Board are largely favorable toward the assessment. Final revisions with subsequent posting of toxicity criteria to IRIS are expected in 2010 or 2011. Table 3 provides a comparison of the proposed TCE toxicity factors with previously promulgated toxicity factors for TCE.

Table 3
Comparison of TCE Toxicity Factors

Toxicity Factors	Unit	Cal/EPA	IRIS 2009 (external draft)
Inhalation Reference Concentration (RfC)	$\mu g/m^3$	600	5
Oral Reference Dose (RfD)	mg/kg/day	NA	4×10^{-4}
Inhalation Unit Risk (IUR)	$(\mu g/m^3)^{-1}$	2×10^{-6}	4×10^{-6}
Oral Slope Factor (SF)	$(mg/kg/day)^{-1}$	5.9×10^{-3}	5×10^{-2}

NA – not available

The implication of these new toxicity criteria would be an increase in carcinogenic risk estimates associated with exposure to TCE of 2 to 10 times, depending on exposure scenarios. For example, carcinogenic risk identified in the 2009 Technical Memorandum for resident inhalation exposure of TCE from the storage lake may increase from 1.3×10^{-7} to 2.6×10^{-7}. Although this does not change the significance of the risk estimate (the value is still below EPA's acceptable risk range of 10^{-6} to 10^{-4}), it could have consequences to risk management at the site when this risk is combined with other site risks.

A greater impact would be evident for risks evaluated for the oral exposure pathway. For example, the 2000 PHA calculated health-based guidance levels (HBGLs) for exposure to irrigation wells through landscape flood irrigation. Assuming a TCE oral SF of 0.011 per milligrams per kilograms per day $(mg/kg/day)^{-1}$, these HBGLs were calculated to be 397 micrograms per liter (ug/L) for an adult, 87 ug/L for a child and 100 ug/L for a worker. If the toxicity factor is changed to 0.05, the resulting HBGLs will be five times smaller - 79 ug/L for an adult, 17 ug/L for a child, and 20 ug/L for a worker. According to the 2000 PHA, measured TCE concentrations in irrigation wells used for comparison to the HBGLs are 39 ug/L and 22 ug/L. Thus, the significance of the risk comparison would change from TCE concentrations in irrigation wells below levels of public health concern to concentrations that may suggest a concern. Similarly, the TCE MCL may become more stringent. Based strictly on a cancer risk target of 1×10^{-6}, a MCL for TCE would be 0.6 ug/L. This value represents a decrease of almost an order of magnitude from the current MCL of 5 ug/L.

- **Perchlorate** - As noted in the 2006 Five-Year Review for PGAN, perchlorate was not identified in the ROD as a chemical of concern for the site because at the time, detection limits for perchlorate were very high. However, since then, perchlorate has been detected in the PGAN Site area groundwater and investigations have been conducted to characterize the extent of perchlorate contamination at the Site and appropriate treatments. As shown in Table 2, perchlorate is not carcinogenic and does not have inhalation toxicity criteria. It is evaluated for noncancer hazard through the oral route, using an oral RfD that was established in 2005. The primary target organ affected by exposure to perchlorate is the thyroid. No changes to the toxicity of perchlorate have occurred since the site-specific remediation goal for perchlorate was established based on the *Removal Action Memorandum Phoenix-Goodyear Airport North Superfund Site, Goodyear, Arizona*, issued by the EPA in 2008.

- **Chromium** – USEPA chromium toxicity criteria have not changed since 1998. The 1998 ESD#4 captured this toxicity update to make the cleanup requirements for chromium to be consistent with the then current state of knowledge about health effects of chromium. Although the ROD does not list hexavalent chromium as a COC, it is currently monitored at PGAS. Hexavalent chromium does not have a MCL; however, the EPA now recognizes an oral slope factor of 0.5 per mg/kg-d for hexavalent chromium developed by New Jersey. The potential risk impact of this contaminant should be assessed for risk management to ensure that remedy protectiveness is maintained.

Changes in Standards/Cleanup Goals

As noted in the ARARs Review Memorandum (CDM, 2010), review of the ARARs for this Five-Year Review reaffirmed that MCLs remain the appropriate applicable groundwater cleanup standards for the current remedy. The MCLs for the two COCs that are the focus of current remediation activities, TCE (PGAN and PGAS) and total chromium (PGAS only), have not changed and no groundwater ARARs were identified that are more stringent than the current groundwater cleanup levels for TCE and total chromium.

However, the original ROD primarily focused on ingestion of groundwater. Target and screening levels for groundwater incorporating potential inhalation of volatiles during domestic use and potential migration from groundwater to indoor air were not included in the original assessment. Table 4 provides a comparison of PGAN and PGAS groundwater concentrations during the 2005 to 2010 period with current groundwater cleanup levels, 2010 federal MCLs, EPA regional screening levels (RSLs) for tap water (which incorporate potential inhalation exposure of volatiles during domestic use), and generic EPA vapor intrusion guidance target groundwater concentrations.

As shown in the comparison, the federal MCL for arsenic is more stringent than the current cleanup level. The RSLs for 1,2-dichloropropane; TCE; chloroform; carbon tetrachloride; xylenes; arsenic; hexavalent chromium; benzene; ethylbenzene; PCE; and 1,1,2,2-tetrachloroethane are more stringent than current cleanup levels. The generic EPA vapor intrusion guidance target groundwater concentrations for mercury and chloroform are more stringent than the current cleanup levels. In many instances, measured PGAN and PGAS site concentrations over the past five years have exceeded these guidance levels, indicating that the remedy protectiveness may be compromised. Potential health impacts and cleanup levels for these chemicals should be re-evaluated.

New Contaminants or Contaminant Sources

In 2006, a Partial Consent Decree for PGAN between the United States and Crane Company (UPI's parent company) was entered by United States District Court of the District of Arizona. The Consent Decree includes a detailed Scope of Work (SOW) which calls for an extensive investigation to fully characterize the extent of soil, soil gas, and groundwater contamination, and for expanded remedial action to address that contamination. The SOW is currently being implemented at PGAN as the roadmap for full characterization and cleanup. In accordance with the Consent Decree, a *Source Areas, Soils and Facility Structures Investigation* (SASFS) *Work Plan* (Arcadis, 2007a and 2007b) was completed and noted that additional target compounds at the Sites, such as semi-volatile organics (including PAHs), explosives, metals, 1,4-dioxane, hexavalent chromium, cyanide, pesticides, herbicides, and radionuclides may be present. When this survey is completed in accordance with the work plan, newly identified contaminants may be incorporated in the groundwater monitoring analytes list, as necessary. The potential risk impacts of these new contaminants would need to be assessed and considered for risk management to ensure that remedy protectiveness is maintained. [2]

[2] It should be noted that Phases I and II of the SASFS work have been completed, but not yet documented in a report. Preliminarily, none of these compounds have been found above remediation levels on site. AMEC Geomatrix, Inc. is currently conducting the addendum work.

Table 4
Groundwater Cleanup Goals and Regulatory Values for Constituents at Phoenix-Goodyear Airport (North and South Areas) Superfund Site, Goodyear, Arizona

Chemical of Concern	Range of Site Concentrations Detected in PGAN Monitoring Wells 2005 to 2009(7) (µg/L)	Range of Site Concentrations Detected in PGAS Monitoring Wells 2005 to 2009* (8,9) (µg/L)	Current** Cleanup Level (µg/L)	2010 Federal MCL (µg/L)	May 2010 Regional Screening Levels for Tapwater(10) (µg/L)	Generic USEPA Vapor Intrusion Guidance Target Groundwater Concentration(11) for Risk = 1×10^{-4} and Hazard Index = 1 (µg/L)
1,1-Dichloroethylene	0.23 – 29		7 (1)	7	340	190
1,2-Dichloropropane	0.15 – **0.75**	NA	1 (1)	5	**0.39**	35
Chloroform	0.15 - **19**	NA	100 (1)	100	**0.19**	**80**
Toluene	0.23 – 3.8	NA	1,000 (2)	1,000	2,300	1,500
Trichlorethylene	0.16 – **39,000**	0.2-**370**	5 (1)	5	**2**	5.3
Trichlorofluoromethane	0.25 - 1	NA	1 (1)	----	1,300	180
Carbon Tetrachloride	0.18 – **2.1**	NA	5 (1)	5	**0.44**	13
Methylene Chloride	0.5 - **61**	NA	1 (1)	5	4.8	5,800
Methyl Ethyl Ketone	4.2 - 87	NA	350 (3)	----	7,100	440,000
Xylenes	0.37 – 0.59	NA	440 (1)	10,000	**200**	22,000
Antimony	NA	NA	1.46 (1)	6	15	NA
Arsenic	NA	3.6-**2,200**	50 (1)	**10**	**0.045**	NA
Barium	NA	NA	2,000 (2)	2,000	7,300	NA
Beryllium	NA	NA	0.004 (2)	4	73	NA
Cadmium	NA	0.63-**6.4**	5 (2)	5	18	NA
Chromium	NA	(total) 3-**7,300**/ (VI) 13-**820**	100 (2)	100	(III) 55,000/ (VI) **0.043**	NA
Lead	NA	0.3-**1,800**	15 (2)	15 (Action Level)	—	NA
Mercury	NA	NA	2 (1)	2	—	**0.68**
Nickel	NA	0.65-**920**	100 (2)	100	1,800	NA
Selenium	NA	NA	50 (2)	50	180	NA
Silver	NA	NA	50 (1)	----	180	NA
Zinc	NA	27-**210,000**	5,000 (1)	----	11,000	NA
Acetone	4.5 - 73	NA	700 (3)	----	22,000	220,000
Benzene	0.1 – **1.8**	NA	5 (4)	5	**0.41**	140
Ethylbenzene	0.2 – 0.46	NA	700 (4)	700	**1.5**	700
Tetrachloroethylene	**0.19– 14**	0.1-**27**	5 (4)	5	**0.11**	110
1,1,2,2,-Tetrachloroethane	**9**	NA	0.18 (4)	----	**0.067**	300
Perchlorate	0.48 – **65.9**	NA	14 (6)	15 (5)	26	NA

Notes:

µg/L	=	micrograms per liter
MCL	=	Federal Maximum Contaminant Level
*	=	Metals data are total metals data from September 2007 to August 2008 and include upgradient, cross-gradient, and downgradient monitoring wells in addition to plume wells.
**	=	Current cleanup level incorporates any changes from original ROD levels, including changes to MCLs and site-specific documents such as Explanation of Significant Differences (ESD).
----	=	Not Established
NA	=	Not Analyzed

Bold site concentrations indicate that site concentration is higher than the most stringent guidance value (includes federal MCL, EPA regional screening levels for tapwater, and EPA target groundwater concentration for vapor intrusion concern. **Bold guidance values** indicate value is more stringent than the current groundwater cleanup level.

Sources:

(1) EPA. 1989. Record of Decision, Phoenix-Goodyear Airport Superfund Site, Goodyear, Arizona. September.

(2) EPA. 1998. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. March.

(3) EPA. 1991. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. January.

(4) EPA. 1993. Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ. May.

(5) United States Environmental Protection Agency (EPA). 2008. Interim Drinking Water Health Advisory for Perchlorate. December.

(6) EPA. 2008. Removal Action Memorandum Phoenix-Goodyear Airport North Superfund Site, Goodyear, Arizona. June 13.

(7) Matrix. 2010. Draft Groundwater Monitoring Report-Fourth Quarter 2009 and 2009 Annual Report, Phoenix-Goodyear Airport-North Superfund Site, Goodyear, Maricopa County Arizona. January 22.

(8) TRC. 2008. Metals Sampling Report, Phoenix Goodyear Airport South Site in Goodyear, Arizona. October 31.

(9) LATA. 2010. Second Semi-Annual 2009 Groundwater Groundwater Monitoring Report, Phoenix-Goodyear Airport South Site, Goodyear, Arizona. January,

(10) EPA 2010. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. May.

(11) EPA Office of Solid Waste and Emergency Response (OSWER), 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). November 2002 (EPA OSWER, 2002). Target Groundwater Concentration to Target Indoor Air Concentration Where the Soil Gas to Indoor Air Attenuation Factor = 0.001 and Partitioning Across the Water Table Obeys Henry's Law Cgw.

NA – not applicable   ND – not detected

In addition, potential degradation compounds of TCE (1,1-DCE, cis-1,2-DCE, and vinyl chloride) should be regularly monitored and compared to risk-based screening levels to ensure that remedy protectiveness is not compromised. Vinyl chloride is more toxic than its parent compound TCE. Although the ROD lists 1,1-DCE as a COC at PGAN and PGAS, cis-1,2-DCE and vinyl chloride are not listed as COCs in the ROD or decision documents. As result, 1,1-DCE is monitored in the groundwater at PGAN and PGAS; however, cis-1,2-DCE and vinyl chloride are only monitored at PGAN and not PGAS. During the 2005 to 2009 period, groundwater monitoring well samples at PGAN analyzed for vinyl chloride only found one detection at 0.38 ug/L and cis-1,2 DCE concentrations ranged from 0.18 to 9.6 ug/L.

It should also be noted that the 2006 Consent Decree requires a "*Site-Wide Risk Assessment Amendment…updating and supplementing the risk assessment contained in the Phoenix-Goodyear Airport Remedial Investigation/Feasibility Study Volumes I through VI (CH2M Hill, June 1989) ("1989 Risk Assessment") and incorporating the Source Areas Baseline Risk Assessment. The Risk Assessment Amendment shall address all media areas, exposure pathways, contaminants, and health risks not addressed in the 1989 Risk Assessment.*"

The objectives of the risk assessment are to:

- *"characterize human health risks potentially associated with the Site to determine whether remediation is necessary to mitigate significant risks to public health"*
- *"characterize ecological risks associated with the Site to determine whether remediation is necessary to mitigate significant risks to ecological receptors"*

Conclusions

In summary, protectiveness of the remedy at PGAN and PGAS may be compromised due to the following:

- **Data are incomplete regarding several contaminants of interest:** Implementation of the SASFS Work Plan may identify additional target compounds at the PGAN, such as semi-volatile organics (including PAHs), explosives, metals, 1,4-dioxane, hexavalent chromium, cyanide, pesticides, herbicides, and radionuclides. The potential risk impacts of these new contaminants would need to be assessed and considered for risk management to ensure that remedy protectiveness is maintained. Preliminary reports on Phases I and II of SASFS work indicate that none of these compounds have been found above remediation levels on site. This issue may be reassessed at the completion of the SASFS report.

  In addition, the potential degradation compounds of TCE - cis 1,2-DCE and vinyl chloride - are not listed as COCs in the ROD and decision documents and should be monitored to ensure remedy protectiveness. Vinyl chloride is more toxic than its parent compound and should be monitored. Although cis-1, 2-DCE and vinyl chloride are listed as COCs in the PGAN Groundwater Monitoring Work Plan and are currently monitored, these two constituents are not reported at PGAS.

- **Toxicity changes for TCE may occur in the near future:** Toxicity criteria changes for TCE may be promulgated in 2010 or 2011. When this occurs, the potential risk impacts to the PGAN and PGAS for this chemical should be reassessed.

- **Cleanup levels did not consider potential inhalation and vapor intrusion pathways:** 1,2-Dichloropropane; TCE; chloroform; carbon tetrachloride; xylenes; arsenic; hexavalent chromium; mercury; benzene; ethylbenzene; PCE; and 1,1,2,2-tetrachloroethane have groundwater guidance values for ingestion and inhalation of volatiles that are more stringent than the current cleanup levels. In many instances, measured PGAN and PGAS site concentrations over the past five years have exceeded these guidance levels, indicating that the remedy protectiveness may be compromised. The potential health impacts and cleanup levels for these chemicals should be re-evaluated.

- **Risk evaluations have only considered portions of the site:** Vapor intrusion issues have only been evaluated for a small portion of the site. However, these portions have been the areas with highest groundwater contamination and highest vapor concentrations. Other portions of the site are less likely to present a problem. More importantly exposure pathways have been evaluated separately and not collectively for an assessment of site total risks and hazards.

References

Agency for Toxic Substances and Disease Registry ([ATSDR] and United States Department of Health and Human Services Public Health Service. 2000. *Public Health Assessment (PHA) for Lithfield Airport Area (a/k/a Phoenix-Goodyear Airport – North) Goodyear, Maricopa County, Arizona.* March.

ARCADIS U.S., Inc. 2007a. *Source Areas, Soils and Facility Structures Investigation Work Plan, Phoenix-Goodyear Airport-North Superfund Site, Goodyear, Maricopa County, Arizona.* March.

_________.2007b. *Final Addendum to the Source Areas, Soils and Facility Structures Investigation Work Plan, Phoenix-Goodyear Airport-North Superfund Site, Goodyear, Maricopa County, Arizona.* September.

_________.2007c. Revised Final Site Evaluation Report, Former UPI Site, Phoenix-Goodyear Airport North Superfund Site, Goodyear, Arizona, March 27.

_________. 2005. *Air Sampling Report, Phoenix-Goodyear Airport - North Superfund Site, Goodyear, Arizona.* November 11.

Camp Dresser & McKee (CDM). 2010. *ARAR Review Memorandum for the Second Five Year Review Report 2010 for Phoenix-Goodyear Airport (North and South Areas) Superfund Site, Goodyear, Arizona.* June 10, revised July 26.

CH2M HILL. 1989. *Remedial Investigation/Feasibility Study Phoenix Goodyear Airport, Goodyear, Arizona. Volumes I, III, and XII.* June.

Ecology and Environment. 1983. *Site Inspection Report, Goodyear Aerospace Corporation.* September.

ITSI/CDM. 2009. *Technical Memorandum: Final Updated Risk Analysis for Storage Lake and Spray Irrigation Using Water from SunCor Well 3B; Phoenix Goodyear Airport North Superfund Site, Goodyear, Arizona.* July 13.

LATA. 2010. *Second Semi-Annual 2009 Groundwater Groundwater Monitoring Report, Phoenix-Goodyear Airport South Site, Goodyear, Arizona*. January 15, Matrix. 2010. *Draft Groundwater Monitoring Report-Fourth Quarter 2009 and 2009 Annual Report, Phoenix-Goodyear Airport-North Superfund Site, Goodyear, Maricopa County Arizona.* January 22.

TRC. 2008. *Metals Sampling Report, Phoenix Goodyear Airport South Site in Goodyear, Arizona.* October 31.

United States Environmental Protection Agency (EPA). 2008. *Interim Drinking Water Health Advisory for Perchlorate.* December.

_________.2008. *Removal Action Memorandum Phoenix-Goodyear Airport North Superfund Site, Goodyear, Arizona*. June 13.

_________. 2006. *Five-Year Review Report for Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona.* September.

_________. 2005. *Five-Year Review Report for Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, Arizona.* September.

_________. 2002. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ*. September.

_________. 1998. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ.* March.

_________. 1995. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ.* December.

_________. 1993. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ.* May.

_________. 1991. *Explanation of Significant Differences: Phoenix-Goodyear Airport Area, EPA ID: AZD980695902, OU 01, Goodyear, AZ.* January.

_________. 1989. *Record of Decision, Phoenix-Goodyear Airport Area, Goodyear, Arizona.* September.

_________. 1987. *Record of Decision, Phoenix-Goodyear Airport Area, Goodyear, Arizona.* September.

_________. Office of Solid Waste and Emergency Response (OSWER). 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* November.

_________. 2010a. Online Integrated Risk Information System (IRIS) - http://www.epa.gov/iris/, accessed August 4, 2010.

_________. 2010b. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. May.

cc: Rachel Hess, ITSI

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Appendix D
Institutional Controls Review Memorandum

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CDM

Memorandum

To: *Catherine Brown, USEPA*

From: *Sibel Tekce, CDM*
Ed Song, CDM

Date: *July 28, 2010*

Subject: *Phoenix-Goodyear Airport (North and South Areas) Superfund Site, Goodyear, AZ*
Second Five-Year Review Report 2010
Institutional Controls Memorandum

Institutional controls (ICs) are non-engineering methods by which access to contaminated environmental media is restricted. For example, these may include restrictions or limitations on access, media use or property use. This memo discusses the findings for existing ICs at both the Phoenix-Goodyear Airport North (PGAN) and South (PGAS) Sites from their respective previous Five-Year Reviews and any changes or revisions to the ICs since that time. Assessment of current status of ICs included a review of regulatory documents for each Site, including the Records of Decision (ROD), Consent Decrees (CD), and Explanation of Significant Differences (ESD); an environmental liens search, conducted by Environmental Data Resources (EDR) to identify any restrictions placed on the parcels associated with each Site; and additional research to determine the status of groundwater and well restrictions.

PGAN

The previous Five-Year Review report found that the 2006 Partial CD stated that the ICs, such as land/water use restrictions, should be implemented as necessary (EPA, 2006a). ICs specifically identified in the CD for possible implementation include restrictions on access to the site; the type of use or redevelopment of the property; use of the water at the site; grading, excavations or other removal of soils; and an easement for access to conduct activities related to remedial actions (EPA, 2006b). In Parcels B and C at the PGAN site, the 2006 Partial CD also specifically mentions prohibiting the installation of groundwater supply wells.

A title and lien search for the parcels associated with PGAN (Assessor's Parcel Numbers 500-04-016-J, 500-04-017-A, 500-04-015-K – see Figure 1-1) was conducted through EDR. Based on their report, no ICs (environmental liens or activity and use limitations) were officially recorded for the Site (EDR, 2010).

PGAS

Although ICs were not required in the 1987 ROD or 1989 ROD, the 1991 CD, which applied to Goodyear Tire & Rubber Company (GTRC) and Loral Defense Systems, included a provision preventing the installation or use of groundwater wells at the site for human consumption unless the extracted water is treated to meet drinking water standards (EPA, 1991). The Arizona Department of Water Resources – Groundwater Permitting and Wells Section (ADWR) was contacted to determine the protectiveness conferred by the 1991 CD. ADWR does not have the power to deny permits based on the IC listed as part of PGAS's 1991 CD. Furthermore, no system is in place to notify ADWR of such restrictions. Compliance the IC would fall under the responsibility of the Site owners/operators (CDM, 2010).

A title and lien search for the parcels associated with PGAS (Assessor's Parcel Numbers 500-07-006-G, 500-07-006-M, 500-07-003-E– see Figure 1-1) was conducted through EDR. Based on their report, no ICs were officially recorded for the Site (EDR, 2010). Access to the Site is largely controlled by fencing around the airport property and other commercial or industrial properties at the site. The fencing is intended for security purposes but does provide some limited protection by preventing access to contaminated media (EPA, 2005).

General Restrictions

Arizona's Well Spacing and Well Impact Rules (Arizona Administrative Code §R12-15-1302 through §R12-15-1307) prevents the approval of permits for any new production wells that may contribute to the degradation of groundwater quality by adversely impacting groundwater remediation systems or hydraulic capture of groundwater contamination plumes (ADWR, 2006). Specifically, the Rule allows the Director of ADWR to deny permits for any well whose operation would result in a drawdown that would cause a contaminant plume to migrate into an existing, uncontaminated well. The drawdown analysis is typically performed as part of the well permitting process by the Department of Arizona Environmental Quality (ADEQ) at ADWR's request (CDM, 2010). Although this general restriction on the installation of wells is not specific to the PGAN and PGAS, it serves as an IC for the Sites in concordance with the 2006 Partial CD prohibiting the installation of groundwater supply wells on PGAN.

References

Arizona Department of Water Resources (ADWR). 2006. *Final Well Spacing Rules*. Adopted August 7, 2006.

Camp, Dresser, & McKee, Inc. (CDM), 2010. *Interview Record – Scott Miller, Manager, Arizona Department of Water Resources-Groundwater Permitting and Wells Section*. Conducted June 14, 2010.

Environmental Data Resources, Inc. 2010. *EDR Environmental Lien Report, PGA North and South Parcels.* June 8.

United States Environmental Protection Agency (EPA). 2006a. *Five-Year Review Report for Phoenix-Goodyear Airport (North) Superfund Site, Goodyear, Arizona.* September.

United States Environmental Protection Agency (EPA). 2006b. *Partial Consent Decree*. April.

United States Environmental Protection Agency (EPA). 2005. *Five-Year Review Report for Phoenix-Goodyear Airport (South) Superfund Site, Goodyear, Arizona.* September.

United States Environmental Protection Agency (EPA). 1991. *Civil Action No. 88-1443 Consent Decree*. May.

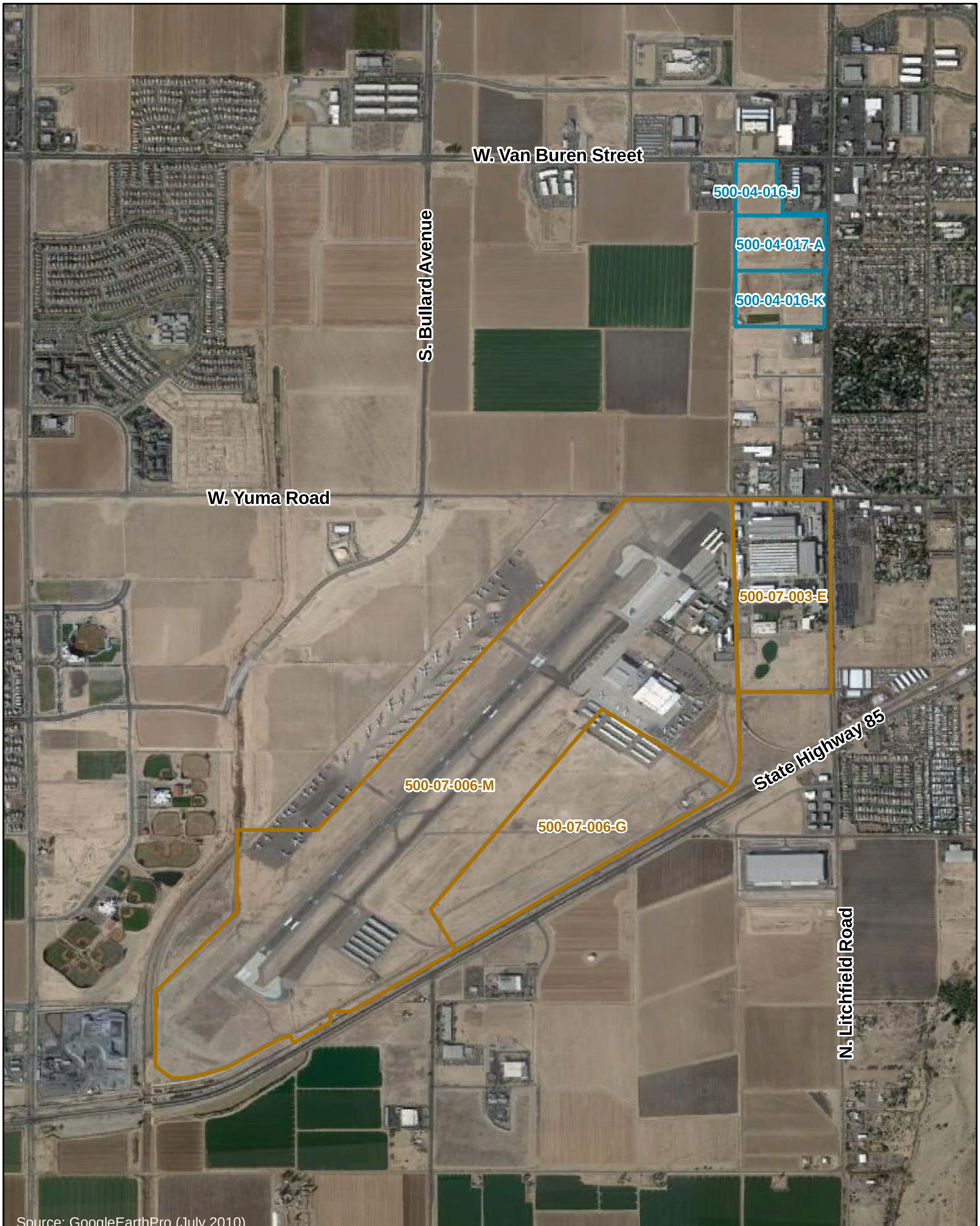
Attachments

Figure 1-1 Project Location Map

EDR Environmental Lien Report, PGA North and South Parcels, June 8, 2010.

Interview Record – Scott Miller, Manager, Arizona Department of Water Resources-Groundwater Permitting and Wells Section.

cc: Rachel Hess, ITSI



CDM

Legend

PGA North Parcels

PGA South Parcels

N

1,000 0 1,000

Feet

Phoenix Goodyear Airport Site
Goodyear, Arizona
Project Location Map

Figure 1-1

Site Name: PGA North and South Parcels

Inquiry Number: 2782761.1
06/08/2010

The EDR Environmental LienSearch™ Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Environmental LienSearch™ Report

The EDR Environmental LienSearch Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied address information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' offices, registries of deeds, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved, and description); and
- provide a copy of the deed or cite documents reviewed.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR Environmental LienSearch™ Report

TARGET PROPERTY INFORMATION

ADDRESS

PGA NORTH AND SOUTH PARCELS
Maricopa County
Goodyear, AZ 85338

RESEARCH SOURCE

Source 1: Maricopa County

PROPERTY INFORMATION

Deed 1:

Type of Deed:	Special Warranty Deed
Title is vested in:	JRC Goodyear, LLC
Deed Dated:	03/28/2006
Deed Recorded:	02/05/2010
Instrument:	2010-0097882

Legal Description: A PARCEL OF LAND LOCATED WITHIN THE EAST HALF OF SECTION 16, TOWNSHIP 1 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN. BEING MORE FULLY DESCRIBED IN INSTRUMENT NO. 2010-0097882, IN THE DEED RECORDS OF MARICOPA COUNTY, ARIZONA.

Legal Current Owner: **JRC Goodyear, LLC**

Property Identifiers: **500-07-003-E**

Deed 2:

Type of Deed:	Quitclaim Deed
Title is vested in:	City of Phoenix, Arizona, a municipal corporation
Deed Dated:	04/08/1968
Deed Recorded:	01/23/1973
Book:	9958
Page:	458

Legal Description: A PART OF SECTIONS 16, 20 AND 21, TOWNSHIP 1 NORTH, RANGE 1 WEST, G&SRB&M. BEING MORE FULLY DESCRIBED IN VOLUME 9958, PAGE 458, IN THE DEED RECORDS OF MARICOPA COUNTY, ARIZONA.

Legal Current Owner: **City of Phoenix, Arizona**

Property Identifiers: **500-07-006-G**

Deed 3:

Type of Deed:	Quit Claim Deed
Title is vested in:	Unidynamcis/Phoenix, Inc., a Delaware Corporation
Deed Dated:	07/15/1970
Deed Recorded:	07/22/1970
Book:	8232
Page:	139

Legal Description:	REAL PROPERTY SITUATED IN MARICOPA COUNTY, ARIZONA. BEING MORE FULLY DESCRIBED IN VOLUME 8232, PAGE 139, IN THE DEED RECORDS OF MARICOPA COUNTY, ARIZONA.
Legal Current Owner:	**Unidynamcis/Phoenix, Inc.**
Property Identifiers:	**500-04-016-J, 500-04-016-K, 500-04-017**

EDR Environmental LienSearch™ Report

ENVIRONMENTAL LIEN

Environmental Lien: Found ☐ Not Found ☒

If found:

1st Party:

2nd Party:

Dated:

Recorded:

Book:

Page:

Docket:

Volume:

Instrument:

Comments:

Miscellaneous:

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

Other AUL's: Found ☐ Not Found ☒

If found:

1st Party:

2nd Party:

Dated:

Recorded:

Book:

Page:

Docket:

Volume:

Instrument:

Comments:

Miscellaneous:

When recorded mail to:

Name: DEI Professional Ser LLC.

Address: 6224 NTH 24TH ST.

STE 200

City/State/Zip: Phoenix Az. 85016

OFFICIAL RECORDS OF
MARICOPA COUNTY RECORDER
HELEN PURCELL
2010-0097882 02/05/10 09:42 AM
1 OF 4

this area reserved for county recorder

CAPTION HEADING:

RE-RECording due To ERROR in Legal DESCRIPTION.

DO NOT REMOVE

This is part of the official document.

20100097882

OFFICIAL RECORDS OF
MARICOPA COUNTY RECORDER
HELEN PURCELL
20060437970 03/31/2006 03:35
ELECTRONIC RECORDING

1439768-7-10-1--
Knappenbergerc

LANDAMERICA COMMERCIAL SERVICES

When recorded, return to:

JRC Goodyear, LLC
c/oTEG, LLC
4425 North 24th Street, Suite 225
Phoenix, Arizona 85016
Attention: Carl Spiekerman

1/9 1439768

SPECIAL WARRANTY DEED

For consideration of Ten Dollars ($10.00), and other valuable consideration, DOS PALOS PARTNERS, LLC, an Arizona limited liability limited partnership and TENBAR, INC., a Colorado corporation (collectively, "Grantor"), hereby convey to JRC GOODYEAR, LLC ("Grantee") the following real property situated in Maricopa County, Arizona, together with all appurtenant benefits, rights, and privileges (collectively, the "Property"):

See Exhibit "A" attached hereto and incorporated herein by this reference.

Subject only to those matters described on Exhibit "B" attached hereto and incorporated herein by reference, Grantor binds itself and its successors to warrant and defend the title to the Property solely against acts of Grantor and no other.

DATED this 28th day of MARCH, 2006.

DOS PALOS PARTNERS, LLC, an Arizona limited liability limited company

By: ____________________
Name: DON H. BENNETT
Title: MANAGER/MEMBER

TENBAR, INC., a Colorado corporation

By: ____________________
Name: WILLIAM C. BARBER
Title: PRESIDENT

625779

20100097882
20060437970

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

The foregoing instrument was acknowledged before me this 28th day of MARCH, 2006 by DON H. BENNETT, the MANAGER/MEMBER of DOS PALOS PARTNERS, LLC, an Arizona limited liability company, on behalf of the limited liability limited partnership.

Betsy Kitchens
Notary Public - Arizona
Maricopa County
My Commission Expires
June 24, 2007

Betsy Kitchens
Notary Public

My Commission Expires:
June 24, 2007

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

The foregoing instrument was acknowledged before me this 30th day of MARCH, 2006, by WILLIAM C. BARBER, the PRESIDENT of TENBAR, INC., a Colorado corporation, on behalf of the corporation.

Betsy Kitchens
Notary Public - Arizona
Maricopa County
My Commission Expires
June 24, 2007

Betsy Kitchens
Notary Public

My Commission Expires:
June 24, 2007

625779

EXHIBIT "A"

PARCEL NO. 1:

A parcel of land located in the East half of Section 16, Township 1 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, more fully described as follows:

COMMENCING at the Northeast corner of said Section 16, being a brass cap in hand hole from which the East quarter corner of Section 16 being a brass cap in hand hole bears, South 02 degrees 10 minutes 46 seconds East, a distance of 2641.43 feet;

THENCE South 89 degrees 53 minutes 22 seconds West, along the North line of the Northeast quarter of said Section 16, a distance of 40.03 feet;

THENCE South 02 degrees 10 minutes 46 seconds East, departing said North line a distance of 33.02 feet to the Northerly right-of-way of Yuma Road and the Westerly right-of-way of Litchfield Road, said point also being the POINT OF BEGINNING of the parcel herein described;

THENCE South 02 degrees 10 minutes 46 seconds East, parallel to and 40 feet West of the East line of the Northeast quarter of Section 16 and along said Westerly right-of-way a distance of 1889.76 feet;

THENCE South 87 degrees 49 minutes 14 seconds West, continuing along said Westerly right-of-way of Litchfield Road, a distance of 15.00 feet;

THENCE South 02 degrees 10 minutes 46 seconds East, parallel to and 55 feet West of the East line of the Northeast quarter of Section 16 and along said Westerly right-of-way a distance of 720.22 feet;

THENCE South 02 degrees 12 minutes 40 seconds East, parallel to and 55 feet West of the East line of the Southeast quarter of Section 16 and along the Westerly right-of-way of Litchfield Road, a distance of 293.53 feet;

THENCE South 62 degrees 21 minutes 16 seconds West, departing said right-of-way a distance of 100.20 feet;

THENCE South 87 degrees 27 minutes 06 seconds West, a distance of 1070.11 feet to a point on the Easterly right-of-way of the Southern Pacific Railroad;

EXHIBIT "A" Continued

THENCE North 02 degrees 13 minutes 04 seconds West, along said right-of-way a distance of 2823.37 feet to a point of curvature of tangent curve, having a radius of 11,434.06 feet and a central angle of 00 degrees 51 minutes 52 seconds;

THENCE continuing along said right-of-way a distance of 172.49 feet along the arc of said curve to the right, to the Southerly right-of-way of Yuma Road;

THENCE North 89 degrees 53 minutes 30 seconds East, along said Southerly right-of-way a distance of 1176.85 feet to the POINT OF BEGINNING of the parcel herein described.

PARCEL NO. 2:

A parcel of land located in the West half of the Northwest quarter of Section 15, Township 1 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, more fully described as follows:

COMMENCING at the Northwest corner of said Section 15, from which the West quarter corner of Section 15, bears South 02 degrees 10 minutes 46 seconds East, a distance of 2641.43 feet;

THENCE South 02 degrees 10 minutes 46 seconds East, along the West line of the Northwest quarter of said Section 15, a distance of 197.43 feet;

THENCE North 87 degrees 49 minutes 14 seconds East, departing said West line, a distance of 72.00 feet to the Easterly right of way of Litchfield Road and the POINT OF BEGINNING of the parcel herein described;

THENCE North 89 degrees 31 minutes 26 seconds East, departing said Easterly right of way of Litchfield Road a distance of 195.44 feet;

THENCE South 02 degrees 34 minutes 40 seconds east, a distance of 82.94 feet;

THENCE North 89 degrees 31 minutes 26 seconds East, a distance of 14.46 feet;

THENCE South 00 degrees 28 minutes 34 seconds East, a distance of 49.00 feet;

EXHIBIT "A" Continued

THENCE South 89 degrees 31 minutes 26 seconds West, a distance of 12.66 feet;

THENCE South 02 degrees 34 minutes 40 seconds East, a distance of 18.01 feet;

THENCE North 88 degrees 53 minutes 16 seconds east, a distance of 1.08 feet;

THENCE South 02 degrees 23 minutes 44 seconds East, a distance of 92.08 feet;

THENCE North 87 degrees 33 minutes 43 seconds East, a distance of 332.18 feet;

THENCE South 02 degrees 10 minutes 46 seconds East, a distance of 894.90 feet;

THENCE South 89 degrees 31 minutes 59 seconds West, a distance of 530.24 feet to a point on the easterly right of way of Litchfield Road;

THENCE North 02 degrees 10 minutes 46 seconds West, along said right of way, a distance of 1125.44 feet to the POINT OF BEGINNING of the parcel herein described.

EXHIBIT B

PERMITTED EXCEPTIONS

1. RESERVATIONS contained in the Patent from the State of Arizona, reading as follows: This Patent is issued subject to any and all easements or rights of way heretofore legally obtained and now in full force and effect. (Parcel 1)

2. RESERVATIONS contained in the Patent from the United States of America, reading as follows: SUBJECT to any vested and accrued water rights for mining, agricultural, manufacturing or other purposes, and rights to ditches and reservoirs used in connection with such water rights as may be recognized and acknowledged by the local customs, laws and decisions of courts; and there is reserved from the lands hereby granted, a right of way thereon for ditches or canals constructed by the authority of the United States of America. (Parcel 2)

3. RIGHT OF ENTRY to prospect for, mine and remove the minerals in said land as reserved in Patent to said land, as set forth in instrument recorded in Book 128 of Deeds, page 161. (Parcel 1)

4. WATER RIGHTS, claims or title to water, and agreements, covenants, conditions or rights incident thereto, whether or not shown by the public records. This exception is not limited by reason of the disclosure of any matter relating to Water Rights as may be set forth elsewhere in Schedule B.

5. TAXES AND ASSESSMENTS collectible by the County Treasurer, a lien not yet due and payable for the following year:

   2006

6. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Book.	66 of Miscellaneous records
Page	230
Purpose	electric down guys
Affects	Parcel No. 2

7. Intentionally omitted. (Easement)

8. Intentionally omitted. (Easement)

9. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Docket	3084
Page	513
Purpose	electric lines
Affects	Parcel No. 2

10. Intentionally omitted. (Easement)

11. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Docket	7081
Page	511
Purpose	electric lines
Affects	Parcel No. 1

12. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Docket	7453
Page	552
Purpose	electric lines
Affects	Parcel No. 1

13. Intentionally omitted. (Easement)

14. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Docket	15434
Page	510
Purpose	water pipeline
Affects	Parcel No. 2

15. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Document No.	85-204781
Purpose	overhead and underground electric lines
Affects	Parcel No. 1

16. TERMS AND PROVISIONS set forth in Document 87-210444, and re-recorded in Document No. 89-292977 and re-recorded in Document No. 89-310432 and re-recorded in Document No. 92-75465 and re-recorded in Document No. 92-78686.
(Affects Parcel No. 1)

17. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Document No.	2002-83204
Purpose	sewer
Affects	Parcel No. 2

18. EASEMENT and rights incident thereto, as set forth in instrument:

Recorded in Document No.	2004-760470
Purpose	access
Affects	Parcel No. 1

19. AGREEMENT according to the terms and conditions contained therein:

Purpose	Easement
Recorded	September 23, 2004
Document No.	2004-1108510
Affects	Parcel No. 1

20. Intentionally omitted. (Access)

21. Intentionally omitted. (Survey)

22. Intentionally omitted. (Inspection)

23. RIGHTS OF PARTIES in possession.

20060437970
OFFICIAL RECORDS OF
MARICOPA COUNTY RECORDER
HELEN PURCELL

The foregoing instrument is an
electronically prepared
full, true and correct copy
of the original record in this
office.
Attest: 02/05/2010 09:36:29 AM

By ____________ Recorder

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
33315
JASON R.
KACK
Date Signed 2/4/10
ARIZONA, U.S.A.
Expires 03/31/2011

EXHIBIT "A"

PARCEL NO. 1:

A PARCEL OF LAND LOCATED WITHIN THE EAST HALF OF SECTION 16, TOWNSHIP 1 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 16, TOWNSHIP 1 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST ALONG THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 16, A DISTANCE OF 40.58 FEET TO A POINT;

THENCE SOUTH 88 DEGREES 19 MINUTES 41 SECONDS WEST, DEPARTING SAID EAST LINE, A DISTANCE OF 40.00 FEET TO THE WESTERLY RIGHT OF WAY OF LITCHFIELD ROAD PER DOCKET 1803, PAGE 379, RECORDS OF MARICOPA COUNTY, ARIZONA, AND THE **POINT OF BEGINNING** OF THE PARCEL HEREIN DESCRIBED;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST, ALONG SAID WESTERLY RIGHT OF WAY LINE, A DISTANCE OF 1,879.22 FEET TO THE SOUTH LINE OF THE NORTH 1920.00 FEET OF THE NORTHEAST QUARTER OF SECTION 16, TOWNSHIP 1 NORTH, RANGE 1 WEST;

THENCE NORTH 89 DEGREES 36 MINUTES 20 SECONDS WEST, ALONG SAID SOUTH LINE, A DISTANCE OF 15.01 FEET TO THE WESTERLY RIGHT OF WAY OF LITCHFIELD ROAD PER DOCKET 10334, PAGE 1305, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST, ALONG SAID RIGHT OF WAY, A DISTANCE OF 721.42 FEET;

THENCE SOUTH 01 DEGREES 42 MINUTES 14 SECONDS EAST, CONTINUING ALONG THE WESTERLY RIGHT OF WAY OF LITCHFIELD ROAD PER DOCKET 10334, PAGE 1305, RECORDS OF MARICOPA COUNTY, ARIZONA, A DISTANCE OF 715.73 FEET TO A POINT, SAID POINT BEING 359.40 FEET NORTHWESTERLY AT RIGHT ANGLE FROM THE CENTER LINE OF THE SOUTHERN PACIFIC RAILROAD COMPANY'S CONSTRUCTED MAIN TRACK FROM PHOENIX TO WELLTON, AS DESCRIBED IN BOOK 95 OF DEEDS, PAGE 84, RECORDS OF MARICOPA COUNTY, ARIZONA, AND THE NORTH LINE OF THE PARCEL DESCRIBED IN DOCUMENT NUMBER 2007-0373285, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 55 DEGREES 56 MINUTES 16 SECONDS WEST, ALONG SAID NORTH LINE, A DISTANCE OF 855.12 FEET TO THE NORTHEASTERLY RIGHT OF WAY OF THE EAST LEG OF THE SOUTHERN PACIFIC RAILROAD COMPANY'S WYE TRACK ON THE LITCHFIELD PARK BRANCH, AS DESCRIBED IN BOOK 149

OF DEEDS, PAGE 341, RECORDS OF MARICOPA COUNTY, ARIZONA, SAID POINT BEING 25.00 FEET NORTHEASTERLY MEASURED RADIALLY FROM THE CENTER LINE OF SAID TRACK NEAR THE CENTER OF A CURVE, HAVING A DEGREE OF CURVE OF 07 DEGREES 44 MINUTES 52 SECONDS, A RADIUS OF 739.50 FEET WHICH BEARS NORTH 22 DEGREES 32 MINUTES 52 SECONDS EAST, AND A TANGENT OF 421.20 FEET;

THENCE NORTHWESTERLY ALONG SAID RIGHT OF WAY AND THE ARC OF SAID CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 59 DEGREES 19 MINUTES 48 SECONDS, A DISTANCE OF 765.75 FEET TO THE END OF CURVE;

THENCE CONTINUING ALONG THE RIGHT OF WAY AS DESCRIBED IN BOOK 149 OF DEEDS, PAGE 341, RECORDS OF MARICOPA COUNTY, ARIZONA, NORTH 08 DEGREES 14 MINUTES 44 SECONDS WEST, A DISTANCE OF 59.20 FEET TO A POINT 25.00 FEET EAST AT RIGHT ANGLE FROM THE CENTER LINE OF THE MAIN TRACK BEING THE EASTERLY RIGHT OF WAY OF THE SOUTHERN PACIFIC RAILROAD COMPANY LITCHFIELD PARK BRANCH, AS DESCRIBED IN BOOK 149 OF DEEDS, PAGE 341, RECORDS OF MARICOPA COUNTY, ARIZONA, ALSO BEING ON THE NORTH END OF THE EAST LEG OF THE SOUTHERN PACIFIC RAILROAD COMPANY'S WYE TRACK ON THE LITCHFIELD PARK BRANCH AS DESCRIBED IN BOOK 149 OF DEEDS, PAGE 341, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE NORTH 01 DEGREES 42 MINUTES 27 SECONDS WEST, CONTINUING ALONG SAID RIGHT OF WAY, A DISTANCE OF 3,001.99 FEET TO A POINT 25.00 FEET EAST AT RIGHT ANGLE FROM CENTER LINE OF THE MAIN TRACK AS DESCRIBED IN BOOK 149 OF DEEDS, PAGE 341, RECORDS OF MARICOPA COUNTY, ARIZONA, SAID POINT BEING THE BEGINNING OF A CURVE TO THE RIGHT, HAVING A DEGREE OF CURVE OF 00 DEGREES 30 MINUTES 04 SECONDS, A RADIUS OF 11434.15 FEET AND A TANGENT OF 75.59 FEET;

THENCE CONTINUING ALONG SAID RIGHT OF WAY AND THE ARC OF SAID CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 00 DEGREES 45 MINUTES 27 SECONDS, A DISTANCE OF 151.19 FEET TO A POINT ON THE SOUTHERLY RIGHT OF WAY LINE OF YUMA ROAD PER DOCKET 10334, PAGE 1305, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE ALONG SAID SOUTHERLY RIGHT OF WAY LINE THE REMAINING 3 COURSES, SOUTH 89 DEGREES 36 MINUTES 20 SECONDS EAST, A DISTANCE OF 85.93 FEET;

THENCE NORTH 01 DEGREES 40 MINUTES 19 SECONDS WEST, A DISTANCE OF 13.00 FEET;

THENCE SOUTH 89 DEGREES 36 MINUTES 20 SECONDS EAST, A DISTANCE OF 1,090.71 FEET TO THE **POINT OF BEGINNING** OF THE PARCEL HEREIN DESCRIBED.

EXCEPT THAT PORTION LYING SOUTH OF THE FOLLOWING DESCRIBED LINE;

COMMENCING AT THE NORTHEAST CORNER OF SECTION 16, TOWNSHIP 1 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST ALONG THE EAST

LINE OF THE NORTHEAST QUARTER OF SAID SECTION 16, A DISTANCE OF 40.58 FEET TO A POINT;

THENCE SOUTH 88 DEGREES 19 MINUTES 41 SECONDS WEST, DEPARTING SAID EAST LINE, A DISTANCE OF 40.00 FEET TO THE WESTERLY RIGHT OF WAY OF LITCHFIELD ROAD PER DOCKET 1803, PAGE 379, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST, ALONG SAID WESTERLY RIGHT OF WAY LINE, A DISTANCE OF 1,879.22 FEET TO THE SOUTH LINE OF THE NORTH 1920.00 FEET OF THE NORTHEAST QUARTER OF SECTION 16, TOWNSHIP 1 NORTH, RANGE 1 WEST;

THENCE NORTH 89 DEGREES 36 MINUTES 20 SECONDS WEST, ALONG SAID SOUTH LINE, A DISTANCE OF 15.01 FEET TO THE WESTERLY RIGHT OF WAY OF LITCHFIELD ROAD PER DOCKET 10334, PAGE 1305, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST, ALONG SAID RIGHT OF WAY, A DISTANCE OF 721.42 FEET;

THENCE SOUTH 01 DEGREES 42 MINUTES 14 SECONDS EAST, A DISTANCE OF 294.30 FEET TO THE **POINT OF BEGINNING** OF THE LINE HEREIN DESCRIBED;

THENCE SOUTH 62 DEGREES 51 MINUTES 43 SECONDS WEST, A DISTANCE OF 100.20 FEET;

THENCE SOUTH 87 DEGREES 57 MINUTES 33 SECONDS WEST, A DISTANCE OF 1069.75 FEET, TO THE EASTERLY RIGHT OF WAY OF THE SOUTHERN PACIFIC RAILROAD COMPANY'S WYE TRACK ON THE LITCHFIELD PARK BRANCH, AS DESCRIBED IN BOOK 149 OF DEEDS, PAGE 341, RECORDS OF MARICOPA COUNTY, ARIZONA, AND THE **POINT OF TERMINUS** OF THE LINE HEREIN DESCRIBED."

PARCEL NO. 2:

A PARCEL OF LAND LOCATED IN THE WEST HALF OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 1 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING MORE FULLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SAID SECTION 15, BEING A BRASS CAP IN HANDHOLE, FROM WHICH THE WEST QUARTER CORNER OF SECTION 15, BEING A BRASS CAP IN HANDHOLE, BEARS SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST, A DISTANCE OF 2640.66 FEET;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST, ALONG THE WEST LINE OF THE NORTHWEST QUARTER OF SAID SECTION 15, A DISTANCE OF 197.43 FEET;

THENCE NORTH 88 DEGREES 19 MINUTES 41 SECONDS EAST, LEAVING SAID WEST LINE OF THE NORTHWEST QUARTER OF SECTION 15, A DISTANCE OF 72.00 FEET TO A POINT ON THE EASTERLY RIGHT OF WAY LINE OF LITCHFIELD ROAD AS DESCRIBED IN DOCKET NUMBER 10334, PAGE 1302, RECORDS OF

MARICOPA COUNTY, ARIZONA, SAID POINT ALSO BEING THE SOUTHWEST CORNER OF THE PARCEL AS DESCRIBED IN DOCUMENT NUMBER 1987-0532716, RECORDS OF MARICOPA COUNTY, ARIZONA, AND THE **POINT OF BEGINNING** OF THE PARCEL HEREIN DESCRIBED;

THENCE SOUTH 89 DEGREES 57 MINUTES 59 SECONDS EAST, LEAVING SAID EASTERLY RIGHT OF WAY OF LITCHFIELD ROAD AND ALONG THE SOUTH LINE OF THE PARCEL AS DESCRIBED IN DOCUMENT NUMBER 1987-0532716, RECORDS OF MARICOPA COUNTY, ARIZONA, A DISTANCE OF 195.43 FEET TO THE WEST LINE OF THE PARCEL AS DESCRIBED IN DOCUMENT NUMBER 1989-0387496, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 02 DEGREES 04 MINUTES 05 SECONDS EAST, ALONG SAID WEST LINE, A DISTANCE OF 82.94 FEET TO THE NORTHWEST CORNER OF THE PARCEL AS DESCRIBED IN DOCUMENT NUMBER 1999-0367098, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 02 DEGREES 04 MINUTES 13 SECONDS EAST, ALONG THE WEST LINE OF SAID PARCEL, A DISTANCE OF 49.03 FEET TO THE SOUTHWEST CORNER OF SAID PARCEL AND A POINT LYING ON THE WEST LINE OF THE PARCEL AS DESCRIBED IN DOCUMENT NUMBER 1989-0387496, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 02 DEGREES 04 MINUTES 05 SECONDS EAST, ALONG SAID WEST LINE, A DISTANCE OF 18.01 FEET TO THE SOUTH LINE OF SAID PARCEL;

THENCE NORTH 89 DEGREES 23 MINUTES 51 SECONDS EAST, ALONG SAID SOUTH LINE, A DISTANCE OF 1.08 FEET TO THE WEST LINE OF A PARCEL AS DESCRIBED IN DOCUMENT NUMBER 2005-0259144, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 01 DEGREES 53 MINUTES 09 SECONDS EAST, ALONG SAID WEST LINE, A DISTANCE OF 92.08 FEET;

THENCE NORTH 88 DEGREES 04 MINUTES 18 SECONDS EAST, DEPARTING SAID WEST LINE AND ALONG THE SOUTH LINE OF SAID PARCEL, A DISTANCE OF 332.20 FEET TO THE EAST LINE OF THE WEST 602.00 FEET OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 1 NORTH, RANGE 1 WEST, AND THE WEST LINE OF THE PARCEL DESCRIBED IN DOCUMENT NUMBER 2006-0905275, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 01 DEGREES 40 MINUTES 19 SECONDS EAST, ALONG SAID EAST AND WEST LINE, A DISTANCE OF 894.51 FEET TO THE SOUTH LINE OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 15;

THENCE NORTH 89 DEGREES 57 MINUTES 27 SECONDS WEST, ALONG SAID SOUTH LINE, A DISTANCE OF 530.24 FEET TO A POINT ON THE EASTERLY RIGHT OF WAY LINE OF LITCHFIELD ROAD AS DESCRIBED IN DOCKET NUMBER 10334, PAGE 1302, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE NORTH 01 DEGREES 40 MINUTES 19 SECONDS WEST, PARALLEL WITH AND 72.00 FEET EAST OF THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 15 AND ALONG SAID RIGHT OF WAY LINE, A DISTANCE OF 1125.06 FEET TO THE **POINT OF BEGINNING** OF THE PARCEL HEREIN DESCRIBED.

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DKT 9958 PAGE 458

When recorded mail to:
City of Phoenix,
930 Municipal Bldg.
251 W. Washington St.
Phoenix, Arizona 85003

10038

01-DEED

Escrow #C02012397-4

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS, That the UNITED STATES OF AMERICA, acting by and through the Administrator of General Services, under and pursuant to the powers and authority contained in the provisions of the Federal Property and Administrative Services Act of 1949, approved June 30, 1949 (63 Stat. 377), as amended, and applicable rules, regulations and orders promulgated thereunder, Grantor, hereby sells and quitclaims to the CITY OF PHOENIX, Arizona, a Municipal Corporation, Grantee, for and in consideration of the sum of Two Hundred Ninety-three Thousand One Hundred Thirty and No/100 Dollars ($293,130.00), receipt of which is hereby acknowledged, all of its right, title and interest in the following described property in the County of Maricopa, State of Arizona, to-wit:

That part of Sections 16, 20 and 21, Township 1 North, Range 1 West, G&SRB&M, described as follows:

Commencing at the Northwest corner of said Section 21; thence South 0°09'30" West along the West line of said Section 21 a distance of 1944.05 feet to a point on the Northwesterly right of way line of the Southern Pacific Railroad, said point being the point of beginning; thence North 34°14' West a distance of 300.02 feet; thence North 37°53'40" East a distance of 4225.55 feet; thence South 52°06'20" East a distance of 1677.78 feet to a point on said Northwesterly right of way line of said Railroad; thence South 55°46' West along said right of way line a distance of 4536.54 feet to the point of beginning, containing 97.0 acres, more or less.

EXCEPT any part thereof lying within the East 20 feet of the Northeast quarter of the Northwest quarter of said Section 21; and except the South 33.0 feet of that portion of Section 16 lying therein, the North 33.0 feet of the West 182.55 feet of the Northeast quarter, and the North 33.0 feet of the Northeast quarter of the Northwest quarter of Section 21, all in Township 1 North, Range 1 West of G&SRB&M, as shown and recorded in Book 2, Page 14 of Road Maps.

TOGETHER WITH improvements and appurtenances thereon.

SUBJECT, HOWEVER, to the following reservations and rights:

1. Any state of facts which may be disclosed by a physical inspection or an accurate survey of the premises.

2. Rights of way for canals, laterals, and ditches and all improvements and appurtenances thereto, and rights of way for roads; existing easements of record for roads, highways, public utilities, railways, pipelines and other purposes.

3. Any outstanding interests in third persons in oil, gas, minerals and subsurface rights.

4. Any encumbrance or charge upon the said land by reason of its inclusion in Roosevelt Irrigation District.

19730123_DKT_9958_458_2

IN WITNESS WHEREOF, the United States of America has caused these presents to be executed as of the 8th day of April, 1968.

UNITED STATES OF AMERICA
Acting by and through
Administrator of General Services

By [signature]
G. E. McNAMARA
Regional Administrator, Region 8
General Services Administration

STATE OF COLORADO)
) ss.
COUNTY OF JEFFERSON)

On the 8th day of April, 1968, personally appeared before me, G. E. McNamara, Regional Administrator, Region 8, General Services Administration, the signer of the foregoing instrument, who duly acknowledged to me that he executed the same on behalf of the United States of America as such Regional Administrator, Region 8, General Services Administration.

WITNESS my hand and notarial seal.

My Commission expires April 15, 1969.

NOTARY PUBLIC STATE OF COLORADO

Harold E. Zimmer
Notary Public

STATE OF ARIZONA } ss.
County of Maricopa }

I hereby certify that the within instrument was filed and recorded at request of TRANSAMERICA TITLE INSURANCE COMPANY
JAN 23 1973 -9 00 AM

In Docket 9958
on page 458-459
Witness my hand and official seal the day and year aforesaid.
Paul N. Marks
County Recorder
By [signature]
Deputy Recorder

10

PAY-OFF DEED FOR AGREEMENT
RECORDED PRIOR 10-6-20-69

STATE OF ARIZONA)
) SS. 132886 01-DEED DKT 8232 PAGE 139
COUNTY OF MARICOPA)

I hereby certify that the within instrument was filed and recorded in DOCKET 8232 PAGE 139-140 and indexed in DEEDS at the request of CHICAGO TITLE INSURANCE COMPANY .

JUL 22 70 -1 15 WITNESS my hand and official seal.

PAUL N. MARSTON
~~[illegible]~~D, County Recorder

By [signature]
Deputy Recorder

4.00

Bryan, Cave, McPheeters & McRoberts
a 1600 Boatmen's Bank Building
St. Louis, Missouri 63102
Att George V. Meisel

QUIT CLAIM DEED

COURTESY RECORDING
NO TITLE LIABILITY

For the consideration of Ten Dollars ($10.00) and other valuable considerations, the undersigned, U M C INDUSTRIES, INC., (formerly known as UNIVERSAL MATCH CORPORATION), a Delaware corporation, qualified to transact business in the State of Arizona, "GRANTOR", does hereby quitclaim to UNIDYNAMICS/PHOENIX, INC., a Delaware corporation, qualified to transact business in the State of Arizona, "GRANTEE", all right, title and interest in the following real property situated in Maricopa County, Arizona:

PARCEL I

The South 867 feet of the North 1767 feet of the East Half of the Northeast Quarter of Section Nine (9), Township One (1) North, Range One (1) West of the Gila and Salt River Base and Meridian, lying East of the East right of way line of the Southern Pacific Railroad,

EXCEPT the East 33 feet.

PARCEL II

The North 900 feet of the Northeast quarter of the Northeast quarter of Section 9, Township 1 North, Range 1 West of the Gila and Salt River Base and Meridian, lying East of the East right of way line of the Southern Pacific Railroad,

EXCEPT THE EAST 33 FEET; and
EXCEPT THE NORTH 33 FEET.

PARCEL III

The East half of the Northeast quarter of Section 9, Township 1 North, Range 1 West of the Gila and Salt River Base and Meridian, lying East of the East right of way line of the Southern Pacific Railroad;

EXCEPT the East 33 feet; and
EXCEPT the North 1767 feet.

SUBJECT TO, restrictions, reservations and easements of record, if any.

Dated this 15th day of July, 1970.

U M C INDUSTRIES, INC.

By [signature]
Executive Vice President

Grantor

ATTEST:

[signature]
Asst. Secretary

STATE OF Missouri)
) SS.
City OF St. Louis)

On this the 15th day of July, 1970, before me [signature], the undersigned officer, personally appeared [signature], who acknowledged himself to be the Executive Vice President of U M C INDUSTRIES, INC., a corporation, and that he as such Vice President, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as Exec. Vice President.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

[signature]
Notary Public

My commission expires: August 26, 1971

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport (PGA) North and South	**EPA ID No.:** AZD980695902	
Subject: Arizona Well Spacing Rule and Site Restrictions	**Time:** 12:22	**Date:** 6/14/10
Type: X Telephone ☐ Visit ☐ Other **Location of Visit:**	☐ Incoming X Outgoing	

Contact Made By:

Name: Edward Song	**Title:** Staff Engineer	**Organization:** Camp, Dresser & McKee, Inc. (CDM)

Individual Contacted:

Name: Scott Miller	**Title:** Manager, Groundwater Permitting and Wells Section	**Organization:** Arizona Department of Water Resources – Groundwater Permitting and Wells Section
Telephone No: (602) 771-8604 **Fax No:** **E-Mail Address:** jsmiller@azwater.gov		**Street Address:** 3550 N. Central Avenue **City, State, Zip:** Phoenix, AZ 85012

Summary Of Conversation

Mr. Miller is the Manager for the Arizona Department of Water Resources (ADWR) – Groundwater Permitting and Wells Section

1. **CDM contacted the Arizona Department of Water Resources (ADWR) – Groundwater Permitting and Wells Section to clarify the restrictions placed by the Arizona Well Spacing Rule and to determine the responsible party for enforcement of the Institutional Control (IC) in PGA South's 1991 Consent Decree (CD).**
   - Mr. Miller indicated that the Arizona Well Spacing Rule allows the ADWR to deny permits for any well whose operation would result in a drawdown that causes a contaminant plume to migrate into an existing, uncontaminated well. The drawdown analysis is typically performed as part of the well permitting process by the Department of Arizona Environmental Quality (ADEQ) at ADWR's request.
   - Mr. Miller also noted that ADWR does not have the power to deny permits based on the IC listed as part of PGAS's 1991 CD. Furthermore, no system is in place to notify ADWR of such restrictions. Compliance the IC would fall under the responsibility of the Site owners/operators.

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Appendix E
Site Inspection Checklist

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Phoenix-Goodyear Airport - North

Five-Year Review Site Inspection Checklist
PGA North: EA-05

I. SITE INFORMATION	
Site name: PGA-North/EA-05	**Date of inspection: March 25, 2010**
Location and Region: Goodyear, AZ/Region 9	**EPA ID: AZD980695902**
Agency, office, or company leading the five-year review: Innovative Technical Solutions, Inc. ITSI	**Weather/temperature: Sunny, calm, ~70° F - 80° F**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ■ **Access controls**
- ■ **Institutional controls**
- ■ **Groundwater pump and treatment**
- ☐ Surface water collection and treatment
- ■ **Other Liquid Phase Carbon** ______________________________
- ☐ Monitored natural attenuation
- ■ **Groundwater containment**
- ☐ Vertical barrier walls

Attachments: • **Inspection team roster attached** ☐ Site map attached

II. INTERVIEWS

1. **O&M site manager** **Ben King** (Name) **Project Engineer** (Title) **3/25/2010** (Date)
   Interviewed • **at site** □ at office □ by phone Phone no. **480-389-7197**
   Problems, suggestions; ☐ Report attached ______________________________

2. **O&M staff** **Tom Vanasky** (Name) **O&M Technician** (Title) **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office □ by phone Phone no. **623-670-3236**
   Problems, suggestions; ☐ Report attached ______________________________

3. **O&M staff** **Steve Parker** (Name) **O&M Technician** (Title) **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office □ by phone Phone no. **623-523-9114**
   Problems, suggestions; ☐ Report attached ______________________________

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - • **O&M manual** • **Readily available** • **Up to date** ☐ N/A
   - • **As-built drawings** • **Readily available** • **Up to date** ☐ N/A
   - • **Maintenance logs** • **Readily available** • **Up to date** ☐ N/A

   Remarks **Records located at MTS facility**

2. **Site-Specific Health and Safety Plan** • **Readily available** • **Up to date** ☐ N/A
   - ☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

   Remarks **Located at MTS facility**

3. **O&M and OSHA Training Records** • **Readily available** • **Up to date** ☐ N/A

   Remarks **Located at MTS facility**

4. **Permits and Service Agreements**
   - • **Air discharge permit** • Readily available ☐ Up to date • **N/A**
   - ☐ Effluent discharge ☐ Readily available ☐ Up to date • **N/A**
   - ☐ Waste disposal, POTW ☐ Readily available ☐ Up to date • **N/A**
   - ☐ Other permits______ ☐ Readily available ☐ Up to date • **N/A**

   Remarks

5. **Gas Generation Records** ☐ Readily available ☐ Up to date • **N/A**

   Remarks

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date • N/A

   Remarks

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date • N/A

   Remarks To be determined from review of historical reports

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date • N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air ☐ Readily available ☐ Up to date • N/A
   - ☐ Water (effluent) ☐ Readily available ☐ Up to date • N/A

   Remarks

10. **Daily Access/Security Logs** ☐ Readily available • **Up to date** ☐ N/A

    Remarks

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
• Other Matrix New World

2. **O&M Cost Records**
• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews.

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate____________________ ☐ Breakdown attached

Total annual cost by year for review period if available

From__________ To__________ ____________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ____________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ____________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ____________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ____________________ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: ____________________

V. ACCESS AND INSTITUTIONAL CONTROLS • Applicable **(2006 FYR)** ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map • **Gates secured** ☐ N/A
Remarks **Fencing in good condition**

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks **Electronic security system interlocked to treatment system and security contractor**

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews.

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) ____________________
Frequency ____________________
Responsible party/agency ____________________
Contact ____________________ ____________________ __________ __________
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks____________________

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map • **No vandalism evident**
Remarks____________________

2. **Land use changes on site • N/A**
Remarks____________________

3. **Land use changes off site • N/A**
Remarks____________________

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ■ **Roads adequate** • N/A
Remarks____________________

B. Other Site Conditions

Remarks ____

VII. LANDFILL COVERS ☐ Applicable • N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent______________ Depth____________
Remarks____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
Lengths____________ Widths___________ Depths__________
Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent______________ Depth____________
Remarks____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
Areal extent______________ Depth____________
Remarks____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent______________ Height____________
Remarks____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent______________
☐ Ponding ☐ Location shown on site map Areal extent______________
☐ Seeps ☐ Location shown on site map Areal extent______________
☐ Soft subgrade ☐ Location shown on site map Areal extent______________
Remarks____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent______________
Remarks____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent______________ Depth____________
Remarks____

2.	**Material Degradation**	☐ Location shown on site map	☐ No evidence of degradation
	Material type_______________	Areal extent_____________	
	Remarks____		
3.	**Erosion**	☐ Location shown on site map	☐ No evidence of erosion
	Areal extent______________	Depth____________	
	Remarks____		

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent______________ Depth____________
Remarks____

5. **Obstructions** Type_____________________ ☐ No obstructions
☐ Location shown on site map Areal extent______________
Size____________
Remarks____

6. **Excessive Vegetative Growth** Type____________________
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent______________
Remarks____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A	
1.	**Gas Treatment Facilities** ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs Maintenance Remarks_______________
2.	**Gas Collection Wells, Manifolds and Piping** ☐ Good condition ☐ Needs Maintenance Remarks_______________
3.	**Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs Maintenance ☐ N/A Remarks_______________
F. Cover Drainage Layer ☐ Applicable ☐ N/A	
1.	**Outlet Pipes Inspected** ☐ Functioning ☐ N/A Remarks_______________
2.	**Outlet Rock Inspected** ☐ Functioning ☐ N/A Remarks_______________
G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A	
1.	**Siltation** Areal extent_______ Depth_______ ☐ N/A ☐ Siltation not evident Remarks_______________
2.	**Erosion** Areal extent_______ Depth_______ ☐ Erosion not evident Remarks_______________
3.	**Outlet Works** ☐ Functioning ☐ N/A Remarks_______________
4.	**Dam** ☐ Functioning ☐ N/A Remarks_______________

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____________ Vertical displacement________________
Rotational displacement_____________
Remarks____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent_______________ Depth_____________
Remarks____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent_______________ Type_____________
Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_______________ Depth_____________
Remarks____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☐ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_______________ Depth_____________
Remarks____

2. **Performance Monitoring** Type of monitoring____________________________
☐ Performance not monitored
Frequency_________________________________ ☐ Evidence of breaching
Head differential____________________________
Remarks____

IX. GROUNDWATER/SURFACE WATER REMEDIES ■ Applicable ☐ N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines **• Applicable** ☐ N/A
1. **Pumps, Wellhead Plumbing, and Electrical** **• Good condition** **• All required wells properly operating** ☐ Needs Maintenance ☐ N/A Remarks
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** **• Good condition** ☐ Needs Maintenance Remarks
3. **Spare Parts and Equipment** **• Readily available** ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks **All parts readily available within 1-2 days excluding well pump**
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☐ N/A
1. **Collection Structures, Pumps, and Electrical** ☐ Good condition☐ Needs Maintenance Remarks
2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition☐ Needs Maintenance Remarks
3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided Remarks

C. Treatment System ☐ Applicable ☐ N/A
1. **Treatment Train** (Check components that apply) ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation ☐ Air stripping ☐ **Carbon adsorbers** ☐ **Filters**__________ ☐ **Additive (*e.g.*, chelation agent, flocculent)** **Anti-Scaling** ☐ Others__________ ☐ Good condition ☐ Needs Maintenance ☐ Sampling ports properly marked and functional ☐ Sampling/maintenance log displayed and up to date ☐ Equipment properly identified ☐ Quantity of groundwater treated annually__________ ☐ Quantity of surface water treated annually__________ Remarks__________
2. **Electrical Enclosures and Panels** (properly rated and functional) ☐ N/A • **Good condition** ☐ Needs Maintenance Remarks__________
3. **Tanks, Vaults, Storage Vessels** ☐ N/A • **Good condition** • **Proper secondary containment** ☐ Needs Maintenance Remarks__________
4. **Discharge Structure and Appurtenances** ☐ N/A • **Good condition** ☐ Needs Maintenance Remarks__________
5. **Treatment Building(s)** • **N/A** ☐ Good condition (esp. roof and doorways) ☐ Needs repair ☐ Chemicals and equipment properly stored Remarks__________
6. **Monitoring Wells** (pump and treatment remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance • **N/A** Remarks__________
D. Monitoring Data • N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews.
1. Monitoring Data ☐ Is routinely submitted on time ☐ Is of acceptable quality
2. Monitoring data suggests: ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation
1. **Monitoring Wells** (natural attenuation remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance • N/A Remarks______________________________
X. OTHER REMEDIES
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.
XI. OVERALL OBSERVATIONS • N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews
A. Implementation of the Remedy
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).
B. Adequacy of O&M
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

E.	Additional Questions/Comments

1. What is your current role as it relates to the site?

Ben King/Project Engineer, Tom Vanasky/O&M Technician, Steve Parker/O&M Technician

2-A Explain the purpose of the system and list what contaminants it is treating for

Plume capture and removal of TCE

2-A. What is your overall impression of the system with regards to safety, efficiency and effectiveness?

System has adequate controls to allow for safe operation

2-B Have any system enhancements been made since the 2006 FYR? If so, explain.

No

2-C. Are there any improvements you recommend to system operation to improve these areas?

Possible addition of redundant pressure switches

3-A. Is there a continuous on-site O&M presence or is there the ability to monitor the system remotely (If so describe)?

Operators visit site daily M-F

3-B. If there is not continuous onsite presence, how often are personnel on-site during routine operations?

See 3-A

3-C. Describe routine O&M activities.

vGAC change outs, performance sampling and groundwater monitoring

3-D. Have there been any significant changes in O&M requirements, maintenance schedule and activities, or sampling routines since the last five year review (September 2006)? If so please explain changes and reasons for change.

No

E. Additional Questions/Comments – Continued

3-E. Have there been unexpected O&M difficulties or costs changes at the site since the last five year review (September 2006)?

N/A All O&M costs since last FYR anticipated

4-A. Please describe what controls in place to prevent or reduce the impact of an unintended release of untreated water in the event of system upset.

Pressure switches located process piping and interlocked to pump VFD to shut down system due to pressure loss

4-B. When was the last time these controls were inspected/tested and documented?

4-C.Have their been any unintended release of untreated water since the last 5 year review (September 2006)? If so describe nature of release, lessons learned and changes to system and/or SOPs as a result.

5. Are you aware of any community concerns or complaints regarding the site or operation of the remediation treatment systems at the site?

No

F. System Condition

1. Extraction, Injection & Monitor Wells

a) Is there a regular well maintenance program? If so, What is the well maintenance protocol:

Well maintenance performed on as needed basis

b) Can the prescribed well maintenance be carried out given the layout of the well and the available Personnel and equipment?

Yes

c) When were the well(s) last developed and when will it (they) be redeveloped?

Well EA-05 Rehabbed in December 0f 2009

d) Is there a maintenance schedule for the pump and how is it documented? Has there been excessive pump wear noticed due to sediments?

N/A

e) Are all of the flow meters/totalizers in good working order?

Yes

f) Is there an inventory of appropriate spare parts for the pumps and related equipment?

No

g) Is there an up-to-date logbook for recording performance & maintenance for each extraction well?

Yes

2. General Treatment System Inspection

a) What is the design basis for the above-ground portion of the water treatment system? (e.g., minimum and maximum influent flow, influent concentrations, operating hours per day, expected downtime)

b) What is the average total of treated water annually?

F. System Condition – Continued

c) What are the average total hours of down time annually?

~8762 (~99% operational)

d) List the amounts of consumable materials used in the treatment processes (e.g., acid, caustic, sequestering agents, coagulants, activated carbon).

e) What are the quantities of secondary waste products generated (e.g., sludge, spent activated carbon).

f) Are all ancillary equipment (pumps, blowers, valves, etc) are maintained per manufacturers recommendations?

Yes

h) Do any pumps, blowers or ancillary equipment produce excessive noise?

No

i) Are there any signs of wear or corrosion present on system components (i.e. ion exchange vessels, air stripper towers, vapor phase carbon vessels, pipes and/or ductwork)?

No

Five-Year Review Site Inspection Checklist
PGA North: EA-06

I. SITE INFORMATION	
Site name: PGA-North Area/EA-06	**Date of inspection: March 25, 2009**
Location and Region: Goodyear, AZ/Region 9	**EPA ID: AZD980695902**
Agency, office, or company leading the five-year review: Innovative Technical Solutions, Inc. ITSI	**Weather/temperature: Sunny, calm, ~70° F - 80° F**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ■ **Access controls**
- ■ **Institutional controls**
- ■ **Groundwater pump and treatment**
- ☐ Surface water collection and treatment
- ☐ Other
- ☐ Monitored natural attenuation
- ■ **Groundwater containment**
- ☐ Vertical barrier walls

Attachments: • **Inspection team roster attached** ☐ Site map attached

II. INTERVIEWS

1. **O&M site manager** **Ben King** (Name) **Project Engineer** (Title) **3/25/2010** (Date)
   Interviewed • **at site** □ at office □ by phone Phone no. **480-389-7197**
   Problems, suggestions; ☐ Report attached

2. **O&M staff** **Tom Vanasky** (Name) **O&M Technician** (Title) **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office □ by phone Phone no. **623-670-3236**
   Problems, suggestions; ☐ Report attached

3. **O&M staff** **Steve Parker** (Name) **O&M Technician** (Title) **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office □ by phone Phone no. **623-523-9114**
   Problems, suggestions; ☐ Report attached

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ______________________________
Contact ______________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - • **O&M manual** — • **Readily available** — • **Up to date** — ☐ N/A
   - • **As-built drawings** — • **Readily available** — • **Up to date** — ☐ N/A
   - • **Maintenance logs** — • **Readily available** — • **Up to date** — ☐ N/A

   Remarks **Records located at MTS facility**

2. **Site-Specific Health and Safety Plan** — • **Readily available** — • **Up to date** — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks **Located at MTS facility**

3. **O&M and OSHA Training Records** — • **Readily available** — • **Up to date** — ☐ N/A

   Remarks **Located at MTS facility**

4. **Permits and Service Agreements**
   - • **Air discharge permit** — • Readily available — ☐ Up to date — • **N/A**
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — • **N/A**
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — • **N/A**
   - ☐ Other permits________ — ☐ Readily available — ☐ Up to date — • **N/A**

   Remarks

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — • **N/A**

   Remarks

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — • N/A

   Remarks

7. **Groundwater Monitoring Records** — ☐ Readily available — ☐ Up to date — • N/A

   To be determined from review of historical reports

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — • N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — • N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — • N/A

   Remarks

10. **Daily Access/Security Logs** — ☐ Readily available — • **Up to date** — ☐ N/A

    Remarks

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
• Other Matrix New World

2. **O&M Cost Records**
• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews
☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate____________________ ☐ Breakdown attached

Total annual cost by year for review period if available

From__________ To__________ ________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ________________ ☐ Breakdown attached
Date Date Total cost
From__________ To__________ ________________ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: ____

V. ACCESS AND INSTITUTIONAL CONTROLS • Applicable (2006 FYR) ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map • **Gates secured** ☐ N/A
Remarks **Block wall**

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks **Electronic security system interlocked to treatment system and security contractor**

C. Institutional Controls (ICs)

• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented	☐ Yes	☐ No	☐ N/A
Site conditions imply ICs not being fully enforced	☐ Yes	☐ No	☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) ______________________________

Frequency ______________________________

Responsible party/agency ______________________________

Contact ____________________ ____________________ __________ __________

Name Title Date Phone no.

Reporting is up-to-date	☐ Yes	☐ No	☐ N/A
Reports are verified by the lead agency	☐ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met	☐ Yes	☐ No	☐ N/A
Violations have been reported	☐ Yes	☐ No	☐ N/A

Other problems or suggestions: ☐ Report attached

____

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks______________________________

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map **• No vandalism evident**

Remarks______________________________

2. **Land use changes on site • N/A**

Remarks______________________________

3. **Land use changes off site • N/A**

Remarks______________________________

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map **■ Roads adequate** ☐ N/A

Remarks______________________________

B. Other Site Conditions

Remarks ____

VII. LANDFILL COVERS ☐ Applicable • N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent______________ Depth____________
   Remarks____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths____________ Widths___________ Depths__________
   Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent______________ Depth____________
   Remarks____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent______________ Depth____________
   Remarks____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent______________ Height____________
   Remarks____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident ☐ Wet areas ☐ Location shown on site map Areal extent______ ☐ Ponding ☐ Location shown on site map Areal extent______ ☐ Seeps ☐ Location shown on site map Areal extent______ ☐ Soft subgrade ☐ Location shown on site map Areal extent______ Remarks______	
9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability Areal extent______ Remarks______	
B. Benches ☐ Applicable ☐ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)	
1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay Remarks______	
2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay Remarks______	
3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay Remarks______	
C. Letdown Channels ☐ Applicable ☐ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)	
1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement Areal extent______ Depth______ Remarks______	

2.	**Material Degradation** □ Location shown on site map □ No evidence of degradation Material type_______________ Areal extent_____________ Remarks____ ____
3.	**Erosion** □ Location shown on site map □ No evidence of erosion Areal extent______________ Depth____________ Remarks____ ____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting Areal extent______________ Depth____________ Remarks____ ____
5. **Obstructions** Type_____________________ ☐ No obstructions ☐ Location shown on site map Areal extent______________ Size____________ Remarks____ ____
6. **Excessive Vegetative Growth** Type____________________ ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Areal extent______________ Remarks____ ____
D. Cover Penetrations ☐ Applicable ☐ N/A
1. **Gas Vents** ☐ Active☐ Passive ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
2. **Gas Monitoring Probes** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
3. **Monitoring Wells** (within surface area of landfill) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
4. **Leachate Extraction Wells** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A Remarks____ ____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks____

☐. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent______________ Depth____________ ☐ N/A
☐ Siltation not evident
Remarks____

2. **Erosion** Areal extent______________ Depth____________
☐ Erosion not evident
Remarks____

3. **Outlet Works** ☐ Functioning ☐ N/A
Remarks____

4. **Dam** ☐ Functioning ☐ N/A
Remarks____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____________ Vertical displacement________________
Rotational displacement_____________
Remarks____
____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks____
____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent_______________ Depth_____________
Remarks____
____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent_______________ Type_____________
Remarks____
____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_______________ Depth_____________
Remarks____
____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks____
____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ■ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_______________ Depth_____________
Remarks____
____

2. **Performance Monitoring** Type of monitoring____________________________
☐ Performance not monitored
Frequency_________________________________ ☐ Evidence of breaching
Head differential____________________________
Remarks____
____

IX. GROUNDWATER/SURFACE WATER REMEDIES ■ Applicable ☐ N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines	**• Applicable** ☐ N/A
1.	**Pumps, Wellhead Plumbing, and Electrical** **• Good condition** **• All required wells properly operating** ☐ Needs Maintenance ☐ N/A Remarks
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** **• Good condition** ☐ Needs Maintenance Remarks
3.	**Spare Parts and Equipment** **• Readily available** ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks **All parts readily available within 1-2 days excluding well pump**
B. Surface Water Collection Structures, Pumps, and Pipelines	☐ Applicable • N/A
1.	**Collection Structures, Pumps, and Electrical** ☐ Good condition☐ Needs Maintenance Remarks
2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition☐ Needs Maintenance Remarks
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided Remarks

C. Treatment System ■ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ■ **Carbon adsorbers**
☐ Filters____________________
■ **Additive (*e.g.*, chelation agent, flocculent)_Anti-Scaling________________**
☐ Others____________________
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually________________
☐ Quantity of surface water treated annually________________
Remarks____________________

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A • **Good condition** ☐ Needs Maintenance
Remarks____________________

3. **Tanks, Vaults, Storage Vessels**
☐ N/A • **Good condition** • **Proper secondary containment** ☐ Needs Maintenance
Remarks____________________

4. **Discharge Structure and Appurtenances**
☐ N/A • **Good condition** ☐ Needs Maintenance
Remark **Discharge into RID Canal**____________________

5. **Treatment Building(s)**
• **N/A** ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks____________________

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance • **N/A**
Remarks____________________

D. Monitoring Data • N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ■ N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

- N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. **Proposal to install injection well(s) has been submitted** **Current system treating ~60% of it's total capacity (flow), possibility of adding additional extraction well** **Adequate room in treatment area for 2 additional 20,000 lb lGAC vessels**

E. Additional Questions/Comments

1. What is your current role as it relates to the site?

Ben King/Project Engineer, Tom Vanasky/O&M Technician, Steve Parker/O&M Technician

2-A Explain the purpose of the system and list what contaminants it is treating for

Plume capture and removal of TCE

2-A. What is your overall impression of the system with regards to safety, efficiency and effectiveness?

System has adequate controls to allow for safe operation

2-B Have any system enhancements been made since the 2006 FYR? If so, explain.

No

2-C. Are there any improvements you recommend to system operation to improve these areas?

3-A. Is there a continuous on-site O&M presence or is there the ability to monitor the system remotely (If so describe)?

Operators visit site daily M-F

3-B. If there is not continuous onsite presence, how often are personnel on-site during routine operations?

See 3-A

3-C. Describe routine O&M activities.

vGAC change outs, performance sampling and groundwater monitoring

3-D. Have there been any significant changes in O&M requirements, maintenance schedule and activities, or sampling routines since the last five year review (September 2006)? If so please explain changes and reasons for change.

No

E. Additional Questions/Comments – Continued

3-E. Have there been unexpected O&M difficulties or costs changes at the site since the last five year review (September 2006)?

N/A All O&M costs since last FYR anticipated

4-A. Please describe what controls in place to prevent or reduce the impact of an unintended release of untreated water in the event of system upset.

Pressure switches located process piping and interlocked to pump VFD to shut down system due to pressure loss

4-B. When was the last time these controls were inspected/tested and documented?

4-C.Have their been any unintended release of untreated water since the last 5 year review (September 2006)? If so describe nature of release, lessons learned and changes to system and/or SOPs as a result.

5. Are you aware of any community concerns or complaints regarding the site or operation of the remediation treatment systems at the site?

No

F. System Condition

1. Extraction, Injection & Monitor Wells

a) Is there a regular well maintenance program? If so, What is the well maintenance protocol:

Well maintenance performed on as needed basis

b) Can the prescribed well maintenance be carried out given the layout of the well and the available Personnel and equipment?

Yes

c) When were the well(s) last developed and when will it (they) be redeveloped?

d) Is there a maintenance schedule for the pump and how is it documented? Has there been excessive pump wear noticed due to sediments?

N/A

e) Are all of the flow meters/totalizers in good working order?

Yes

f) Is there an inventory of appropriate spare parts for the pumps and related equipment?

No

g) Is there an up-to-date logbook for recording performance & maintenance for each extraction well?

Yes

2. General Treatment System Inspection

a) What is the design basis for the above-ground portion of the water treatment system? (e.g., minimum and maximum influent flow, influent concentrations, operating hours per day, expected downtime)

b) What is the average total of treated water annually?

F.	System Condition – Continued

c) What are the average total hours of down time annually?

~8762 (~99% operational)

d) List the amounts of consumable materials used in the treatment processes (e.g., acid, caustic, sequestering agents, coagulants, activated carbon).

e) What are the quantities of secondary waste products generated (e.g., sludge, spent activated carbon).

f) Are all ancillary equipment (pumps, blowers, valves, etc) are maintained per manufacturers recommendations?

Yes

h) Do any pumps, blowers or ancillary equipment produce excessive noise?

No

i) Are there any signs of wear or corrosion present on system components (i.e. ion exchange vessels, air stripper towers, vapor phase carbon vessels, pipes and/or ductwork)?

No

Five-Year Review Site Inspection Checklist
PGA North: Main Treatment System (MTS)

I. SITE INFORMATION	
Site name: PGA North Area/MTS	**Date of inspection: March 25, 2010**
Location and Region: Goodyear, AZ/Region 9	**EPA ID: AZD980695902**
Agency, office, or company leading the five-year review: Innovative Technical Solutions, Inc. ITSI	**Weather/temperature: Sunny, calm, ~70° F - 80° F**

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
☐ Monitored natural attenuation
■ **Access controls**
■ **Groundwater containment**
■ **Institutional controls**
☐ Vertical barrier walls
■ **Groundwater pump and treatment**
☐ Surface water collection and treatment
■ Other **Ion Exchange, Air Stripper, Vapor Phase Carbon**

Attachments: • **Inspection team roster attached** ☐ Site map attached

II. INTERVIEWS

1. **O&M site manager** **Ben King** (Name) **Project Engineer** (Title) **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office ☐ by phone Phone no. **480-389-7197**
   Problems, suggestions; ☐ Report attached

2. **O&M staff** **Tom Vanasky** (Name) **O&M Technician** (Title) **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office ☐ by phone Phone no. **623-670-3236**
   Problems, suggestions; ☐ Report attached

2. **O&M staff** **Steve Parker** (Name) **O&M Technician** (Title) **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office ☐ by phone Phone no. **623-523-9114**
   Problems, suggestions; ☐ Report attached

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency ____________________________
Contact ____________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ____________________________
Contact ____________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ____________________________
Contact ____________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

Agency ____________________________
Contact ____________________________ ___________________ ________ ____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____
____

4. **Other interviews** (optional) □ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - • **O&M manual** — • **Readily available** — • **Up to date** — ☐ N/A
   - • **As-built drawings** — • **Readily available** — • **Up to date** — ☐ N/A
   - • **Maintenance logs** — • **Readily available** — • **Up to date** — ☐ N/A

   Remarks **Included site visit logbook, weekly maintenance logs and monthly interlock test logs Need copy of current Annual O&M Manual**

2. **Site-Specific Health and Safety Plan** — • **Readily available** — • **Up to date** — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks

3. **O&M and OSHA Training Records** — • **Readily available** — • **Up to date** — ☐ N/A

   Remarks

4. **Permits and Service Agreements**
   - • **Air discharge permit** — • Readily available — ☐ Up to date — • **N/A**
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — • **N/A**
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — • **N/A**
   - ☐ Other permits — ☐ Readily available — ☐ Up to date — • **N/A**

   Remarks **A permit renewal review is under way by Maricopa County Air Quality (MCAQ) of the (expired SVE) permit with modifications to include the Vapor Phase Granular Activated Carbon vGAC at the MTS that will effectively make the permit a Site wide permit.**

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — • **N/A**

   Remarks

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — • N/A

   Remarks

7. **Groundwater Monitoring Records** — • **Readily available** — ☐ Up to date — ☐ N/A

   Remarks

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — •N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — • **Readily available** — ☐ Up to date — ☐ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — • **N/A**

   Remarks

10. **Daily Access/Security Logs** — • **Readily available** — ☐ Up to date — ☐ N/A

    Remarks **Sign in logbook at MTS entrance**

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
• Other **Matrix New World**

2. **O&M Cost Records**
• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews
☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate__________ ☐ Breakdown attached

Total annual cost by year for review period if available

From______ To______ __________ ☐ Breakdown attached
Date Date Total cost
From______ To______ __________ ☐ Breakdown attached
Date Date Total cost
From______ To______ __________ ☐ Breakdown attached
Date Date Total cost
From______ To______ __________ ☐ Breakdown attached
Date Date Total cost
From______ To______ __________ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons:

V. ACCESS AND INSTITUTIONAL CONTROLS • Applicable **(2006 FYR)** ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map • **Gates secured** ☐ N/A
Remarks

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks **Fence surrounds MTS with security alarm, motion detection, sign posted**

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No • **N/A**
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No • **N/A**

Type of monitoring (*e.g.*, self-reporting, drive by) ____________________
Frequency ____________________
Responsible party/agency ____________________
Contact ____________ ____________ ______ ______
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No • **N/A**
Reports are verified by the lead agency ☐ Yes ☐ No • **N/A**

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No • **N/A**
Violations have been reported ☐ Yes ☐ No • **N/A**
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate • **N/A**
Remarks

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident
Remarks **System operators report periodic trespassing (~2 months) through holes cut in fence. During the previous weekend theft of tools from drill rig left onsite over weekend was reported**

2. **Land use changes on site** ☐ N/A
Remarks Small scale use of treated effluent to grow agricultural crops (experimental)

3. **Land use changes off site** • **N/A**
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map • **Roads adequate** ☐ N/A
Remarks

B. Other Site Conditions

Remarks **Demolition of buildings recently completed, need Construction Complete for Building Demo Report**

VII. LANDFILL COVERS ☐ Applicable • **N/A**

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent______ Depth______
   Remarks______

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths______ Widths______ Depths______
   Remarks______

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent______ Depth______
   Remarks______

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent______ Depth______
   Remarks______

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks______

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks______

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent______ Height______
   Remarks______

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent______
   ☐ Ponding ☐ Location shown on site map Areal extent______
   ☐ Seeps ☐ Location shown on site map Areal extent______
   ☐ Soft subgrade ☐ Location shown on site map Areal extent______
   Remarks______

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent______________
Remarks____
____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks____
____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks____
____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks____
____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent______________ Depth____________
Remarks____
____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_______________ Areal extent_____________
Remarks____
____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent______________ Depth____________
Remarks____
____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent______________ Depth____________
Remarks____

5. **Obstructions** Type_____________________ ☐ No obstructions
☐ Location shown on site map Areal extent______________
Size____________
Remarks____

6. **Excessive Vegetative Growth** Type____________________
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent______________
Remarks____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks____

☐. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent______________ Depth____________ ☐ N/A
☐ Siltation not evident
Remarks____

2. **Erosion** Areal extent______________ Depth____________
☐ Erosion not evident
Remarks____

3. **Outlet Works** ☐ Functioning ☐ N/A
Remarks____

4. **Dam** ☐ Functioning ☐ N/A
Remarks____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____________ Vertical displacement________________
Rotational displacement_____________
Remarks____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent_______________ Depth_____________
Remarks____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent_______________ Type_____________
Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_______________ Depth_____________
Remarks____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ■ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_______________ Depth_____________
Remarks____

2. **Performance Monitoring** Type of monitoring____________________________
☐ Performance not monitored
Frequency_________________________________ ☐ Evidence of breaching
Head differential____________________________
Remarks____

IX. GROUNDWATER/SURFACE WATER REMEDIES ■ Applicable ☐ N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines **• Applicable** ☐ N/A	
1.	**Pumps, Wellhead Plumbing, and Electrical** **• Good condition** ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks____________
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** **• Good condition** ☐ Needs Maintenance Remarks ____________
3.	**Spare Parts and Equipment** **• Readily available** ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks____________
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable • N/A	
1.	**Collection Structures, Pumps, and Electrical** ☐ Good condition☐ Needs Maintenance Remarks____________
2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition☐ Needs Maintenance Remarks____________
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided Remarks____________

C. Treatment System	■ Applicable ☐ N/A
1.	**Treatment Train** (Check components that apply) ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation • **Air stripping** ☐ **Carbon adsorbers-Vapor** • **Filters <u>Multi-Bag</u>** • **Additive (*e.g.*, chelation agent, flocculent) <u>Anti-Scaling</u>** • **Others <u>Ion Exchange</u>** ☐ Good condition ☐ Needs Maintenance ☐ Sampling ports properly marked and functional ☐ Sampling/maintenance log displayed and up to date ☐ Equipment properly identified ☐ Quantity of groundwater treated annually________ ☐ Quantity of surface water treated annually________ Remarks **<u>Low profile air stripper recently added to increase capacity of treatment system</u>**
2.	**Electrical Enclosures and Panels** (properly rated and functional) ☐ N/A • **Good condition** ☐ Needs Maintenance Remarks________
3.	**Tanks, Vaults, Storage Vessels** ☐ N/A • **Good condition** • **Proper secondary containment** ☐ Needs Maintenance Remarks________
4.	**Discharge Structure and Appurtenances** ☐ N/A • **Good condition** ☐ Needs Maintenance Remarks **<u>Injection Wells</u>**
5.	**Treatment Building(s)** ☐ N/A ■ **Good condition (esp. roof and doorways)** ☐ Needs repair ☐ Chemicals and equipment properly stored Remarks **<u>Construction Trailer</u>**
6.	**Monitoring Wells** (pump and treatment remedy) • **Properly secured/locked** ☐ Functioning ☐ Routinely sampled ☐ **Good condition** ☐ All required wells located ☐ Needs Maintenance ☐ N/A Remarks________
D. Monitoring Data	• N/A <u>This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews</u>
1.	Monitoring Data ☐ Is routinely submitted on time ☐ Is of acceptable quality
2.	Monitoring data suggests: ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance • N/A
Remarks______________________________

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. __________ __________ __________ __________
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. __________ __________ __________ __________

E.	Additional Questions/Comments

1. What is your current role as it relates to the site?

Ben King/Project Engineer, Tom Vanasky/O&M Technician, Steve Parker/O&M Technician

2-A Explain the purpose of the system and list what contaminants it is treating for

Plume capture and removal of TCE and perchlorate from groundwater

2-A. What is your overall impression of the system with regards to safety, efficiency and effectiveness?

System has adequate controls to allow for safe operation

2-B Have any system enhancements been made since the 2006 FYR? If so, explain.

1. Addition of low profile air stripper to increase system capacity

2. Additional devices/alarms/interlocks to increase system safety

2-C. Are there any improvements you recommend to system operation to improve these areas?

See PGA North MTS Expansion Work plan

3-A. Is there a continuous on-site O&M presence or is there the ability to monitor the system remotely (If so describe)?

Operators on site 7:00 am to 4:00 pm M-F, system upset triggers alarm callout to Operators, system can be monitored remotely

3-B. If there is not continuous onsite presence, how often are personnel on-site during routine operations?

See 3-A

3-C. Describe routine O&M activities.

Routine O&M includes equipment monitoring and maintenance, alarm testing, vGAC change outs, performance sampling and groundwater monitoring

3-D. Have there been any significant changes in O&M requirements, maintenance schedule and activities, or sampling routines since the last five year review (September 2006)? If so please explain changes and reasons for change.

Increased testing of system interlocks and alarms due to 2009 release of untreated water. New O&M procedures associated with low profile air stripper.

E. Additional Questions/Comments – Continued

3-E. Have there been unexpected O&M difficulties or costs changes at the site since the last five year review (September 2006)?

N/A All O&M costs since last FYR anticipated

4-A. Please describe what controls are in place to prevent or reduce the impact of an unintended release of untreated water in the event of system upset.

Pressure switches at wells and within system components to shut down system due to out of range conditions. Level sensors within system components to shutdown system due to out of range conditions. Actuated valves and pressure sensors separate from PLC based interlocks for redundancy

4-B. When was the last time these controls were inspected/tested and documented?

Controls tested monthly

4-C.Have their been any unintended release of untreated water since the last 5 year review (September 2006)? If so describe nature of release, lessons learned and changes to system and/or SOPs as a result.

See 2009 Release Report

5. Are you aware of any community concerns or complaints regarding the site or operation of the remediation treatment systems at the site?

No

F. System Condition

1. Extraction, Injection & Monitor Wells

a) Is there a regular well maintenance program? If so, What is the well maintenance protocol:

Well maintenance performed on as needed basis

b) Can the prescribed well maintenance be carried out given the layout of the well and the available Personnel and equipment?

Yes

c) When were the well(s) last developed and when will it (they) be redeveloped?

N/A

d) Is there a maintenance schedule for the pump and how is it documented? Has there been excessive pump wear noticed due to sediments?

N/A

e) Are all of the flow meters/totalizers in good working order?

Yes

f) Is there an inventory of appropriate spare parts for the pumps and related equipment?

No

g) Is there an up-to-date logbook for recording performance & maintenance for each extraction well?

Yes

2. General Treatment System Inspection

a) What is the design basis for the above-ground portion of the water treatment system? (e.g., minimum and maximum influent flow, influent concentrations, operating hours per day, expected downtime)

See 2010 Annual O&M Report

b) What is the average total of treated water annually?

See 2009 Annual Report

F. System Condition – Continued

c) What are the average total hours of down time annually?

__**See 2009 Annual Report**

d) List the amounts of consumable materials used in the treatment processes (e.g., acid, caustic, sequestering agents, coagulants, activated carbon).

e) What are the quantities of secondary waste products generated (e.g., sludge, spent activated carbon).

__ Data was not available in the field, see historical reports, interviews.

f) Are all ancillary equipment (pumps, blowers, valves, etc) are maintained per manufacturers recommendations?

Yes

h) Do any pumps, blowers or ancillary equipment produce excessive noise?

No

i) Are there any signs of wear or corrosion present on system components (i.e. ion exchange vessels, air stripper towers, vapor phase carbon vessels, pipes and/or ductwork)?

No

Five-Year Review Site Inspection Checklist
PGA North: Soil Vapor Extraction System

I. SITE INFORMATION	
Site name: PGA-North Area/SVETS	**Date of inspection: March 25, 2010**
Location and Region: Goodyear, AZ/Region 9	**EPA ID: AZD980695902**
Agency, office, or company leading the five-year review: Innovative Technical Solutions, Inc. (ITSI)	**Weather/temperature: Sunny, calm, ~70° F - 80° F**

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
☐ Access controls
■ **Institutional controls**
☐ Groundwater pump and treatment
☐ Surface water collection and treatment
■ **Other Soil Vapor Extraction and Treatment System (Vapor Phase GAC)**
☐ Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls

Attachments: • **Inspection team roster attached** ☐ Site map attached

II. INTERVIEWS

1. **O&M site manager** **Ben King** (Name) — **Project Engineer** (Title) — **3/25/2010** (Date)
   Interviewed • **at site** □ at office □ by phone Phone no. **480-389-7197**
   Problems, suggestions; ☐ Report attached ______

2. **O&M staff** **Tom Vanasky** (Name) — **O&M Technician** (Title) — **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office □ by phone Phone no. **623-670-3236**
   Problems, suggestions; ☐ Report attached ______

3. **O&M staff** **Steve Parker** (Name) — **O&M Technician** (Title) — **3/25/2010** (Date)
   Interviewed • **at site** ☐ at office □ by phone Phone no. **623-523-9114**
   Problems, suggestions; ☐ Report attached ______

3.	**Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply. Agency ______________________ Contact ______________________ ______________ ______ ________ Name Title Date Phone no. Problems; suggestions; ☐ Report attached ________________________________ ____ Agency ______________________ Contact ______________________ ______________ ______ ________ Name Title Date Phone no. Problems; suggestions; ☐ Report attached ________________________________ ____ Agency ______________________ Contact ______________________ ______________ ______ ________ Name Title Date Phone no. Problems; suggestions; ☐ Report attached ________________________________ ____ Agency ______________________ Contact ______________________ ______________ ______ ________ Name Title Date Phone no. Problems; suggestions; ☐ Report attached ________________________________ ____
4.	**Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - • **O&M manual** • **Readily available** • **Up to date** ☐ N/A
   - • **As-built drawings** • **Readily available** • **Up to date** ☐ N/A
   - • **Maintenance logs** • **Readily available** • **Up to date** ☐ N/A

   Remarks **Maintenance logs located in construction trailer at MTS**

2. **Site-Specific Health and Safety Plan** • **Readily available** • **Up to date** ☐ N/A
   ☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A
   Remarks

3. **O&M and OSHA Training Records** • **Readily available** • **Up to date** ☐ N/A
   Remarks

4. **Permits and Service Agreements**
   - • **Air discharge permit** ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Effluent discharge ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Other permits ☐ Readily available ☐ Up to date ☐ N/A

   Remarks **A permit renewal review is under way by Maricopa County Air Quality (MCAQ) of the (expired SVE) permit with modifications to include the Vapor Phase Granular Activated Carbon (vGAC) at the Main Treatment System (MTS) that will effectively make the permit a Site wide permit.**

5. **Gas Generation Records** ☐ Readily available ☐ Up to date • N/A
   Remarks

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date • N/A
   Remarks

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date • N/A
   Remarks

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date • N/A
   Remarks

9. **Discharge Compliance Records**
   - ☐ Air • **Readily available** ☐ Up to date ☐ N/A
   - ☐ Water (effluent) ☐ Readily available ☐ Up to date • **N/A**

   Remarks

10. **Daily Access/Security Logs** • **Readily available** ☐ Up to date ☐ N/A
    Remarks **Sign in logbook at MTS entrance**

Innovative Technical Solutions, Inc.

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
• **Other <u>Matrix-New World</u>**

2. **O&M Cost Records**
• N/A <u>This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews</u>
☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate__________ ☐ Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons:

V. ACCESS AND INSTITUTIONAL CONTROLS • Applicable (2006 FYR) ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured • **N/A**
Remarks **<u>No fence around system. Site is secured with chainlike fence and posted with signs</u>**

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map • **N/A**
Remarks

C. Institutional Controls (ICs)

• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) ____________________
Frequency ____________________
Responsible party/agency ____________________
Contact ____________ ____________ ________ ________
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks____________________

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map • **No vandalism evident**
Remarks____________________

2. **Land use changes on site • N/A**
Remarks____________________

3. **Land use changes off site • N/A**
Remarks____________________

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate • **N/A**
Remarks____________________

B. Other Site Conditions

Remarks ____

____

____

VII. LANDFILL COVERS ☐ Applicable • N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent______________ Depth____________
   Remarks____
   ____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths____________ Widths___________ Depths__________
   Remarks____
   ____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent______________ Depth____________
   Remarks____
   ____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent______________ Depth____________
   Remarks____
   ____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks____
   ____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks____
   ____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent______________ Height____________
   Remarks____
   ____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent______________
   ☐ Ponding ☐ Location shown on site map Areal extent______________
   ☐ Seeps ☐ Location shown on site map Areal extent______________
   ☐ Soft subgrade ☐ Location shown on site map Areal extent______________
   Remarks____
   ____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent______________
Remarks____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent______________ Depth____________
Remarks____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_______________ Areal extent_____________
Remarks____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent______________ Depth____________
Remarks____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent______________ Depth____________
Remarks____
____

5. **Obstructions** Type_____________________ ☐ No obstructions
☐ Location shown on site map Areal extent______________
Size____________
Remarks____
____

6. **Excessive Vegetative Growth** Type____________________
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent______________
Remarks____
____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks____
____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____
____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____
____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks____
____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent______________ Depth____________ ☐ N/A
☐ Siltation not evident
Remarks____

2. **Erosion** Areal extent______________ Depth____________
☐ Erosion not evident
Remarks____

3. **Outlet Works** ☐ Functioning ☐ N/A
Remarks____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____________ Vertical displacement_______________
Rotational displacement____________
Remarks____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent______________ Depth____________
Remarks____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent______________ Type____________
Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent______________ Depth____________
Remarks____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ■ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent______________ Depth____________
Remarks____

2. **Performance Monitoring** Type of monitoring__________________________
☐ Performance not monitored
Frequency________________________________ ☐ Evidence of breaching
Head differential__________________________
Remarks____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ■ N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A
1. **Pumps, Wellhead Plumbing, and Electrical** ☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks_______
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks_______
3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks_______
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☐ N/A
1. **Collection Structures, Pumps, and Electrical** ☐ Good condition ☐ Needs Maintenance Remarks_______
2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks_______
3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks_______

C. Treatment System • Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters____
☐ Additive (*e.g.*, chelation agent, flocculent)________________________
☐ Others____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually__________________
☐ Quantity of surface water treated annually__________________
Remarks____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks____

5. **Treatment Building(s)**
☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks____

D. Monitoring Data

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

X. SOIL VAPOR EXTRACTION & TREATMENT REMEDIES ■ Applicable □ N/A
A. Soil Vapor Extraction Wells, Pumps, and Pipelines • Applicable □ N/A
1. **Blowers, Wellhead Plumbing, and Electrical** □ Good condition □ All required wells properly operating **• Needs Maintenance** □ N/A Remarks **Above ground piping from wells being replaced – work in progress**
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** □ Good condition **• Needs Maintenance** Remarks **Above ground piping from wells being replaced – work in progress**
3. **Spare Parts and Equipment** **• Readily available** □ Good condition □ Requires upgrade □ Needs to be provided Remarks **Equipment available with 1-2 days** `

B. Treatment System ■ Applicable ☐ N/A
1. **Treatment Train** (Check components that apply) •**Carbon adsorbers** • **Others Heat Exchanger**____________________ • **Good condition** ☐ Needs Maintenance ☐ Sampling ports properly marked and functional ☐ Sampling/maintenance log displayed and up to date ☐ Equipment properly identified ☐ Average System Flowrate (Influent)____________ ☐ Mass treated annually (TCE & VOCs)____________ Remarks____________________
2. **Electrical Enclosures and Panels** (properly rated and functional) ☐ N/A • **Good condition** ☐ Needs Maintenance Remarks____________________
3. **Tanks, Vaults, Storage Vessels** ☐ N/A • **Good condition** ☐ Proper secondary containment ☐ Needs Maintenance Remarks____________________
4. **Discharge Structure and Appurtenances** • **N/A** ☐ Good condition ☐ Needs Maintenance Remarks____________________
5. **Treatment Building(s)** • **N/A** ☐ Good condition (esp. roof and doorways) ☐ Needs repair ☐ Chemicals and equipment properly stored Remarks____________________
6. **Monitoring Wells** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance • **N/A** Remarks____________________
D. Monitoring Data • N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews.
3. Monitoring Data ☐ Is routinely submitted on time ☐ Is of acceptable quality
4. Monitoring data suggests: ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ■ N/A
Remarks____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

- N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

____

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

____

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

E.	**Additional Questions/Comments**

1. What is your current role as it relates to the site?

Ben King/Project Engineer, Tom Vanasky/O&M Technician, Steve Parker/O&M Technician

2-A Explain the purpose of the system and list what contaminants it is treating for

Extract TCE from the vadose zone

2-A. What is your overall impression of the system with regards to safety, efficiency and effectiveness?

2-B Have any system enhancements been made since the 2006 FYR? If so, explain.

Pilot test consisting of re-injection of treated vapor to enhance remediation

2-C. Are there any improvements you recommend to system operation to improve these areas?

3-A. Is there a continuous on-site O&M presence or is there the ability to monitor the system remotely (If so describe)?

Operators visit site daily M-F

3-B. If there is not continuous onsite presence, how often are personnel on-site during routine operations?

See 3-A

3-C. Describe routine O&M activities.

vGAC change outs, performance sampling

3-D. Have there been any significant changes in O&M requirements, maintenance schedule and activities, or sampling routines since the last five year review (September 2006)? If so please explain changes and reasons for change.

No

E. Additional Questions/Comments - Continued

3-D. Have there been any significant changes in O&M requirements, maintenance schedule and activities, or sampling routines since the last five year review (September 2006)? If so please explain changes and reasons for change.

No

3-E. Have there been unexpected O&M difficulties or costs changes at the site since the last five year review (September 2006)?

No

4-A. Please describe what controls are in place to prevent or reduce the impact of an unintended release of untreated vapor in the event of system upset.

N/A

4-B. When was the last time these controls were inspected/tested and documented?

N/A

4-C.Have their been any unintended emissions of untreated process vapor since the last 5 year review (September 2006)? If so describe nature of release, lessons learned and changes to system and/or SOPs as a result.

No

5. Are you aware of any community concerns or complaints regarding the site or operation of the remediation treatment systems at the site?

No

F. System Condition

1. General Treatment System Inspection

a) What is the design basis for the above-ground portion of the Soil Vapor treatment system? (e.g., minimum and maximum influent flow, influent concentrations, operating hours per day, expected downtime)

____

____

b) What is the average mass removed from the vadose zone annually?

____

c) What are the average total hours of down time annually?

____

d) List the amounts of consumable materials used in the treatment processes (i.e. activated carbon).

____

e) Is all ancillary equipment (pumps, blowers, valves, etc) are maintained per manufacturers recommendations?

Yes

____

f) Do any pumps, blowers or ancillary equipment produce excessive noise?

No

g) Are there any signs of wear or corrosion present on system components (i.e. vapor phase carbon vessels, pipes and/or ductwork)?

Process Piping (4" PVC) is weathered and shows sun damage

____

____

h) What are the average total hours of down time annually?

____

i) List the amounts of consumable materials used in the treatment processes (e.g., acid, caustic, sequestering agents, coagulants, activated carbon).

____

j) What are the quantities of secondary waste products generated (e.g., sludge, spent activated carbon).

____

k) Are all ancillary equipment (pumps, blowers, valves, etc) are maintained per manufacturers recommendations?

Yes

____

Phoenix-Goodyear Airport - South

Five-Year Review Site Inspection Checklist
PGA South: Subunit A GW Treatment System

I. SITE INFORMATION	
Site name: PGA-South/ Subunit A GWTS	**Date of Inspection: May 6th, 2010**
Location and Region: Goodyear, AZ/Region 9	**EPA ID: AZD980695902**
Agency, office, or company leading the five-year review: ITSI	**Weather/Temperature: Clear, ~75°-85° F**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ■ **Access controls**
- ■ **Institutional controls**
- ■ **Groundwater pump and treatment**
- ☐ Surface water collection and treatment
- ■ Other **Air Stripper** ____________________________
- ☐ Monitored natural attenuation
- ■ **Groundwater containment**
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (See States List)

1. **O&M site manager** Shannon Lloyd ______ Operations manager ______ Same as above
   Name / Title / Date
   Interviewed ■ at site □ at office □ by phone Phone no. ______________
   Problems, suggestions; ☐ Report attached ______________________________

2. **O&M staff** ______________________ ______________ __________
   Name / Title / Date
   Interviewed ☐ at site □ at office □ by phone Phone no. ______________
   Problems, suggestions; ☐ Report attached ______________________________

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency __ADEQ_______________________
Contact ___Andre Chiaradia ______ __Project Manager_ _____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____

Agency ______________________________
Contact ______________________________ ____________________ _________ _____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____

Agency ______________________________
Contact ______________________________ ____________________ _________ _____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____

Agency ______________________________
Contact ______________________________ ____________________ _________ _____________
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached ____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	■ O&M manual	■ Readily available	■ Up to date	□ N/A
	■ As-built drawings	■ Readily available	■ Up to date	□ N/A
	■ Maintenance logs	■ Readily available	■ Up to date	□ N/A
	Remarks			
2.	**Site-Specific Health and Safety Plan**	■ Readily available	■ Up to date	□ N/A
	■ Contingency plan/emergency response plan	■ Readily available	■ Up to date	□ N/A
	Remarks			
3.	**O&M and OSHA Training Records**	■ Readily available	□ Up to date	□ N/A
	Remarks			
4.	**Permits and Service Agreements**			
	□ Air discharge permit	□ Readily available	□ Up to date	■ N/A
	□ Effluent discharge	□ Readily available	□ Up to date	■ N/A
	□ Waste disposal, POTW	□ Readily available	□ Up to date	■ N/A
	□ Other permits	□ Readily available	□ Up to date	■ N/A
	Remarks According to Mr. Lloyd the treatment system does not have nor does it require an air discharge or aquifer protection permit.			
5.	**Gas Generation Records**	□ Readily available	□ Up to date	■ N/A
	Remarks			
6.	**Settlement Monument Records**	□ Readily available	□ Up to date	• N/A
	Remarks			
7.	**Groundwater Monitoring Records**	□ Readily available	□ Up to date	■ N/A
	Remarks See current groundwater report			
8.	**Leachate Extraction Records**	□ Readily available	□ Up to date	•N/A
	Remarks			
9.	**Discharge Compliance Records**			
	□ Air	□ Readily available	□ Up to date	■ N/A
	□ Water (effluent)	□ Readily available	□ Up to date	■ N/A
	Remarks See current groundwater report			
10.	**Daily Access/Security Logs**	■ Readily available	□ Up to date	□ N/A
	Remarks Signed into site field logbook			

IV. O&M COSTS

1. **O&M Organization**
   - ☐ State in-house ☐ Contractor for State
   - ☐ PRP in-house ■ Contractor for PRP
   - ☐ Federal Facility in-house ☐ Contractor for Federal Facility
   - ☐ Other ______

2. **O&M Cost Records**
   - • N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews
   - ☐ Readily available ☐ Up to date
   - ☐ Funding mechanism/agreement in place
   - Original O&M cost estimate______ ☐ Breakdown attached

   Total annual cost by year for review period if available

   From______ To______ ______ ☐ Breakdown attached
   Date Date Total cost
   From______ To______ ______ ☐ Breakdown attached
   Date Date Total cost
   From______ To______ ______ ☐ Breakdown attached
   Date Date Total cost
   From______ To______ ______ ☐ Breakdown attached
   Date Date Total cost
   From______ To______ ______ ☐ Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: ______

V. ACCESS AND INSTITUTIONAL CONTROLS • Applicable **(2006 FYR)** ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ■ Gates secured ☐ N/A
   Remarks Good Condition ______

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
   Remarks Posted ______

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented	☐ Yes	■ No	☐ N/A
Site conditions imply ICs not being fully enforced	☐ Yes	■ No	☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Self reporting, remote monitoring
Frequency 2-4 times per week
Responsible party/agency TRC

Contact	Name	Title	Date	Phone no.
	Dennis Maslonowski	Area Manager		925-260-4000

Reporting is up-to-date	■ Yes	☐ No	☐ N/A
Reports are verified by the lead agency	■ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met	☐ Yes	☐ No	☐ N/A
Violations have been reported	■ Yes	☐ No	☐ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ■ No vandalism evident
Remarks

2. **Land use changes on site** ■ N/A
Remarks

3. **Land use changes off site** ■ N/A
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ■ Roads adequate ☐ N/A
Remarks

B. Other Site Conditions

Remarks General housekeeping is adequate, decommissioned equipment is stored in compound

VII. LANDFILL COVERS ☐ Applicable • **N/A**

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent______________ Depth____________
   Remarks____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths____________ Widths___________ Depths__________
   Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent______________ Depth____________
   Remarks____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent______________ Depth____________
   Remarks____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent______________ Height____________
   Remarks____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent______________
☐ Ponding ☐ Location shown on site map Areal extent______________
☐ Seeps ☐ Location shown on site map Areal extent______________
☐ Soft subgrade ☐ Location shown on site map Areal extent______________
Remarks____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent______________
Remarks____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent______________ Depth____________
Remarks____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_______________ Areal extent_____________
Remarks____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent______________ Depth____________
Remarks____

4.	**Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting Areal extent______________ Depth____________ Remarks____
5.	**Obstructions** Type____________________ ☐ No obstructions ☐ Location shown on site map Areal extent______________ Size____________ Remarks____
6.	**Excessive Vegetative Growth** Type____________________ ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Areal extent______________ Remarks____
D. Cover Penetrations	☐ Applicable ☐ N/A
1.	**Gas Vents** ☐ Active☐ Passive ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____
2.	**Gas Monitoring Probes** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____
3.	**Monitoring Wells** (within surface area of landfill) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____
4.	**Leachate Extraction Wells** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____
5.	**Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A Remarks____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A	
1.	**Gas Treatment Facilities** ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs Maintenance Remarks_______________
2.	**Gas Collection Wells, Manifolds and Piping** ☐ Good condition ☐ Needs Maintenance Remarks_______________
3.	**Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs Maintenance ☐ N/A Remarks_______________
F. Cover Drainage Layer ☐ Applicable ☐ N/A	
1.	**Outlet Pipes Inspected** ☐ Functioning ☐ N/A Remarks_______________
2.	**Outlet Rock Inspected** ☐ Functioning ☐ N/A Remarks_______________
☐. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A	
1.	**Siltation** Areal extent__________ Depth__________ ☐ N/A ☐ Siltation not evident Remarks_______________
2.	**Erosion** Areal extent__________ Depth__________ ☐ Erosion not evident Remarks_______________
3.	**Outlet Works** ☐ Functioning ☐ N/A Remarks_______________
4.	**Dam** ☐ Functioning ☐ N/A Remarks_______________

H. Retaining Walls	☐ Applicable	☐ N/A	
1.	**Deformations** ☐ Location shown on site map ☐ Deformation not evident Horizontal displacement__________ Vertical displacement__________ Rotational displacement__________ Remarks__________		
2.	**Degradation** ☐ Location shown on site map ☐ Degradation not evident Remarks__________		
I. Perimeter Ditches/Off-Site Discharge	☐ Applicable	☐ N/A	
1.	**Siltation** ☐ Location shown on site map ☐ Siltation not evident Areal extent__________ Depth__________ Remarks__________		
2.	**Vegetative Growth** ☐ Location shown on site map ☐ N/A ☐ Vegetation does not impede flow Areal extent__________ Type__________ Remarks__________		
3.	**Erosion** ☐ Location shown on site map ☐ Erosion not evident Areal extent__________ Depth__________ Remarks__________		
4.	**Discharge Structure** ☐ Functioning ☐ N/A Remarks__________		
VIII. VERTICAL BARRIER WALLS	☐ Applicable	■ N/A	
1.	**Settlement** ☐ Location shown on site map ☐ Settlement not evident Areal extent__________ Depth__________ Remarks__________		
2.	**Performance Monitoring** Type of monitoring__________ ☐ Performance not monitored Frequency__________ ☐ Evidence of breaching Head differential__________ Remarks__________		

IX. GROUNDWATER/SURFACE WATER REMEDIES ■ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ■ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ■ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ■ Needs Maintenance
Remarks Signs of corrosion evident on equipment and electrical conduit

3. **Spare Parts and Equipment**
■ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks Spare parts for typical repairs are stocked; groundwater extraction pumps are available within 2-3 days according to Mr. Lloyd.

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable • N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition☐ Needs Maintenance
Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition☐ Needs Maintenance
Remarks

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided
Remarks

C. Treatment System ■ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
■ **Air stripping** ☐ Carbon adsorbers-Vapor
☐ Filters_
■ **Additive (*e.g.*, chelation agent, flocculent)** **Anti-Scaling (93% H_2SO_4)**
☐ Others
☐ Good condition ■ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually
☐ Quantity of surface water treated annually
Remarks See groundwater report

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ■ Needs Maintenance
Remarks Signs of corrosion

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ■ Good condition ■ Proper secondary containment ☐ Needs Maintenance
Remarks

4. **Discharge Structure and Appurtenances**
☐ N/A ■ Good condition ☐ Needs Maintenance
Remarks **Injection Wells**

5. **Treatment Building(s)**
☐ N/A ■ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks

6. **Monitoring Wells** (pump and treatment remedy)
■ Properly secured/locked ☐ Functioning ■ Routinely sampled ■ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks See groundwater report

D. Monitoring Data • N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance • N/A
Remarks____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

E. Additional Questions/Comments

1. What is your current role as it relates to the site?

____

____

2-A Explain the purpose of the system and list what contaminants it is treating for

____

____

2-A. What is your overall impression of the system with regards to safety, efficiency and effectiveness?

____

____

2-B Have any system enhancements been made since the 2006 FYR? If so, explain.

Containment system for Sulfuric acid used for anti scaling was switched from a carbon steel tank to a HDPE tank and secondary with containment.

____

____

2-C. Are there any improvements you recommend to system operation to improve these areas?

____

____

3-A. Is there a continuous on-site O&M presence or is there the ability to monitor the system remotely (If so describe)?

No, remote monitoring of site

____

3-B. If there is not continuous onsite presence, how often are personnel on-site during routine operations?

2-4 times per week

____

3-C. Describe routine O&M activities.

System maintenance and routine monitoring

____

____

____

3-D. Have there been any significant changes in O&M requirements, maintenance schedule and activities, or sampling routines since the last five year review (September 2006)? If so please explain changes and reasons for change.

____

____

E. Additional Questions/Comments - Continued

3-E. Have there been unexpected O&M difficulties or costs changes at the site since the last five year review (September 2006)?

Influent piping and H_2SO_4 tank were replaced due to corrosion

4-A. Please describe what controls are in place to prevent or reduce the impact of an unintended release of untreated water in the event of system upset.

PLC is interlocked with field sensors (i.e. flow, level and pressure sensors) to disable system during upset conditions

4-B. When was the last time these controls were inspected/tested and documented?

4-C.Have their been any unintended release of untreated water since the last 5 year review

(September 2006)? If so describe nature of release, lessons learned and changes to system and/or SOPs as a result.

50k-60k gallons of untreated water and sulfuric acid were released when a replacement injection quill for the anti-scaling injection system failed.

5. Are you aware of any community concerns or complaints regarding the site or operation of the remediation treatment systems at the site?

F. System Condition

1. Extraction, Injection & Monitor Wells

a) Is there a regular well maintenance program? If so, What is the well maintenance protocol:

As needed

b) Can the prescribed well maintenance be carried out given the layout of the well and the available Personnel and equipment?

Yes

c) When were the well(s) last developed and when will it (they) be redeveloped?

See groundwater reports

d) Is there a maintenance schedule for the pump and how is it documented? Has there been excessive pump wear noticed due to sediments?

No

e) Are all of the flow meters/totalizers in good working order?

Yes

f) Is there an inventory of appropriate spare parts for the pumps and related equipment?

g) Is there an up-to-date logbook for recording performance & maintenance for each extraction well?

No, site activities are recorded in site logbook

2. General Treatment System Inspection

a) What is the design basis for the above-ground portion of the water treatment system? (e.g., minimum and maximum influent flow, influent concentrations, operating hours per day, expected downtime)

See groundwater reports

b) What is the average total of treated water annually?

See groundwater reports

F.	System Condition - Continued

c) What are the average total hours of down time annually?

See groundwater reports

d) List the amounts of consumable materials used in the treatment processes (e.g., acid, caustic, sequestering agents, coagulants, activated carbon).

93% H_2SO_4

e) What are the quantities of secondary waste products generated (e.g., sludge, spent activated carbon).

None

f) Is all ancillary equipment (pumps, blowers, valves, etc) are maintained per manufacturers recommendations?

Yes

h) Do any pumps, blowers or ancillary equipment produce excessive noise?

No

i) Are there any signs of wear or corrosion present on system components (i.e. ion exchange vessels, air stripper towers, vapor phase carbon vessels, pipes and/or ductwork)?

Yes, corrosion is apparent on piping and equipment within compound

G. Additional Questions/Comments

1. Anti-scaling containment switched from an 6,600 gallon carbon steel tank to an 1,100 gallon HDPE tank with HDPE secondary containment.
2. In 2006 50,000 to 60,000 gallons of untreated water an unknown quantity of H_2SO_4 were release due to a pipe failure (see item 4-C).
3. Gophers periodically chew through direct buried electrical lines running to extraction wells.
4. Un-labeled full drums onsite

Five-Year Review Site Inspection Checklist
PGA South: Northern Subunit C GW Treatment System

I. SITE INFORMATION	
Site name: PGA-South/Northern SubC GWTS	**Date of Inspection: May 6th, 2010**
Location and Region: Goodyear, AZ/Region 9	**EPA ID: AZD980695902**
Agency, office, or company leading the five-year review: Arizona Department of Environmental Quality ADEQ	**Weather/Temperature: Sunny, ~75-85° F**

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
■ **Access controls**
■ **Institutional controls**
■ **Groundwater pump and treatment**
☐ Surface water collection and treatment
■ **Other Liquid Phase Carbon**____________________
☐ Monitored natural attenuation
■ **Groundwater containment**
☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS

1. **O&M site manager** _Shannon Lloyd______ __Operations Manager____ ____________
   Name Title Date
   Interviewed ■ at site □ at office □ by phone Phone no. ____________
   Problems, suggestions; ☐ Report attached ____________________

2. **O&M staff** __________________ ________________ ____________
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. ____________
   Problems, suggestions; ☐ Report attached ____________________

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency ADEQ
Contact Andre Chiaradia | Project Manager | | (602) 771-2296
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached

Agency
Contact
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached

Agency
Contact
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached

Agency
Contact
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	■ O&M manual	■ Readily available	■ Up to date	☐ N/A
	■ As-built drawings	■ Readily available	■ Up to date	☐ N/A
	■ Maintenance logs	■ Readily available	■ Up to date	☐ N/A
	Remarks			
2.	**Site-Specific Health and Safety Plan**	■ Readily available	■ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	■ Readily available	■ Up to date	☐ N/A
	Remarks			
3.	**O&M and OSHA Training Records**	☐ Readily available	■ Up to date	☐ N/A
	Remarks			
4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	■ N/A
	☐ Effluent discharge	☐ Readily available	☐ Up to date	■ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	■ N/A
	☐ Other permits	☐ Readily available	☐ Up to date	■ N/A
	Remarks Mr. Lloyd stated that an Aquifer Protection Permit (APP) was not required for reinjection of treated effluent into the aquifer was required for the system.			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	■ N/A
	Remarks			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	• N/A
	Remarks			
7.	**Groundwater Monitoring Records**	☐ Readily available	☐ Up to date	■ N/A
	Remarks See current groundwater monitoring report			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	• N/A
	Remarks			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	■ N/A
	☐ Water (effluent)	☐ Readily available	☐ Up to date	■ N/A
	Remarks See current groundwater monitoring report			
10.	**Daily Access/Security Logs**	■ Readily available	☐ Up to date	☐ N/A
	Remarks No sign in sheets at facility, signed into Shannon Lloyd's field logbook			

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ■ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other ______________________________

2. **O&M Cost Records**

• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate____________________ ☐ Breakdown attached

Total annual cost by year for review period if available

From__________ (Date)	To__________ (Date)	__________ (Total cost)	☐ Breakdown attached
From__________ (Date)	To__________ (Date)	__________ (Total cost)	☐ Breakdown attached
From__________ (Date)	To__________ (Date)	__________ (Total cost)	☐ Breakdown attached
From__________ (Date)	To__________ (Date)	__________ (Total cost)	☐ Breakdown attached
From__________ (Date)	To__________ (Date)	__________ (Total cost)	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: ______________________________

V. ACCESS AND INSTITUTIONAL CONTROLS • Applicable (2006 FYR) ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ■ Gates secured ☐ N/A

Remarks Block walls and swinging gate secure compound. Compound is located airside on Goodyear Airport property.___

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks No contact information posted on exterior compound walls or fence._

C. Institutional Controls (ICs)

• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) ______
Frequency ______
Responsible party/agency ______
Contact ______ ______ ______ ______
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks______

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ■ No vandalism evident
Remarks______

2. **Land use changes on site** ■ N/A
Remarks______

3. **Land use changes off site** ■ N/A
Remarks______

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ■ Roads adequate ☐ N/A
Remarks______

B. Other Site Conditions

Remarks ____

VII. LANDFILL COVERS ☐ Applicable • N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent______________ Depth____________
   Remarks____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths____________ Widths___________ Depths__________
   Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent______________ Depth____________
   Remarks____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent______________ Depth____________
   Remarks____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent______________ Height____________
   Remarks____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent____________
☐ Ponding ☐ Location shown on site map Areal extent____________
☐ Seeps ☐ Location shown on site map Areal extent____________
☐ Soft subgrade ☐ Location shown on site map Areal extent____________
Remarks____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent____________
Remarks____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent____________ Depth__________
Remarks____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type____________ Areal extent__________
Remarks____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent____________ Depth__________
Remarks____

4.	**Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting Areal extent______________ Depth____________ Remarks________________________________
5.	**Obstructions** Type____________________ ☐ No obstructions ☐ Location shown on site map Areal extent______________ Size____________ Remarks________________________________
6.	**Excessive Vegetative Growth** Type____________________ ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Areal extent______________ Remarks________________________________
D. Cover Penetrations ☐ Applicable ☐ N/A	
1.	**Gas Vents** ☐ Active☐ Passive ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks________________________________
2.	**Gas Monitoring Probes** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks________________________________
3.	**Monitoring Wells** (within surface area of landfill) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks________________________________
4.	**Leachate Extraction Wells** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks________________________________
5.	**Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A Remarks________________________________

E. Gas Collection and Treatment ☐ Applicable ☐ N/A	
1.	**Gas Treatment Facilities** ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs Maintenance Remarks____________________
2.	**Gas Collection Wells, Manifolds and Piping** ☐ Good condition ☐ Needs Maintenance Remarks____________________
3.	**Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs Maintenance ☐ N/A Remarks____________________
F. Cover Drainage Layer ☐ Applicable ☐ N/A	
1.	**Outlet Pipes Inspected** ☐ Functioning ☐ N/A Remarks____________________
2.	**Outlet Rock Inspected** ☐ Functioning ☐ N/A Remarks____________________
□. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A	
1.	**Siltation** Areal extent__________ Depth__________ ☐ N/A ☐ Siltation not evident Remarks____________________
2.	**Erosion** Areal extent__________ Depth__________ ☐ Erosion not evident Remarks____________________
3.	**Outlet Works** ☐ Functioning ☐ N/A Remarks____________________
4.	**Dam** ☐ Functioning ☐ N/A Remarks____________________

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement__________ Vertical displacement__________
Rotational displacement__________
Remarks__________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks__________

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent__________ Depth__________
Remarks__________

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent__________ Type__________
Remarks__________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent__________ Depth__________
Remarks__________

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks__________

VIII. VERTICAL BARRIER WALLS ☐ Applicable ■ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent__________ Depth__________
Remarks__________

2. **Performance Monitoring** Type of monitoring__________
☐ Performance not monitored
Frequency__________ ☐ Evidence of breaching
Head differential__________
Remarks__________

IX. GROUNDWATER/SURFACE WATER REMEDIES ■ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ■ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
■ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
■ Good condition ☐ Needs Maintenance
Remarks

3. **Spare Parts and Equipment**
■ Readily available ■ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks According to Mr. Lloyd replacement pumps are available within 2-3 days.

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ■ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks

C. Treatment System ■ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ■ **Carbon adsorbers**
☐ **Filters**__________
☐ **Additive** (*e.g.*, chelation agent, flocculent) Anti-Scaling
☐ Others__________
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually__________
☐ Quantity of surface water treated annually__________
Remarks No equipment tags for components (ID tags)

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ■ Good condition ☐ Needs Maintenance
Remarks__________

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ■ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks__________

4. **Discharge Structure and Appurtenances**
☐ N/A ■ Good condition ☐ Needs Maintenance
Remarks__________

5. **Treatment Building(s)**
☐ N/A ■ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks__________

6. **Monitoring Wells** (pump and treatment remedy)
■ Properly secured/locked ■ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks__________

D. Monitoring Data • N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance • N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

• N/A This was not discussed in the site interviews. Information is to be obtained from historical reports and or interviews

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.
O&M consists of 2-4 site visits per week; activities include routine O&M, ground water monitoring and sampling and system performance sampling.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

E. Additional Questions/Comments

1. What is your current role as it relates to the site?

Shannon Lloyd, O&M Manager

2-A Explain the purpose of the system and list what contaminants it is treating for.

System is intended to extract and treat groundwater contaminated with TCE and contain ground water plume.

2-A. What is your overall impression of the system with regards to safety, efficiency and effectiveness?

Effective

2-B Have any system enhancements been made since the 2006 FYR? If so, explain.

2-C. Are there any improvements you recommend to system operation?

3-A. Is there a continuous on-site O&M presence or is there the ability to monitor the system remotely (If so describe)?

No, system is monitored remotely.

3-B. If there is not continuous onsite presence, how often are personnel on-site during routine operations?

2-4 times per week

3-C. Describe routine O&M activities.

Ground water monitoring and equipment maintenance

3-D. Have there been any significant changes in O&M requirements, maintenance schedule and activities, or sampling routines since the last five year review (September 2006)? If so please explain changes and reasons for change.

Groundwater well I-202 will be used for injection while I-201 and I-203 are rehabilitated; I-201 and 203 are used for injection during routine operations.

E. Additional Questions/Comments – Continued

3-E. Have there been unexpected O&M difficulties or costs changes at the site since the last five year review (September 2006)?

No

4-A. Please describe what controls are in place to prevent or reduce the impact of an unintended release of untreated water in the event of system upset.

PLC with redundant interlocks designed to shutdown the system during upset conditions

4-B. When was the last time these controls were inspected/tested and documented?

4-C.Have their been any unintended release of untreated water since the last 5 year review (September 2006)? If so describe nature of release, lessons learned and changes to system and/or SOPs as a result.

No

5. Are you aware of any community concerns or complaints regarding the site or operation of the remediation treatment systems at the site?

F. System Condition

1. Extraction, Injection & Monitor Wells

a) Is there a regular well maintenance program? If so, What is the well maintenance protocol:

_Well rehab occurs on an as needed basis_____________________________

b) Can the prescribed well maintenance be carried out given the layout of the well and the available Personnel and equipment?

___Yes____

c) When were the well(s) last developed and when will it (they) be redeveloped?

d) Is there a maintenance schedule for the pump and how is it documented? Has there been excessive pump wear noticed due to sediments?

____As needed____

e) Are all of the flow meters/totalizers in good working order?

Yes____

f) Is there an inventory of appropriate spare parts for the pumps and related equipment?

Yes____

g) Is there an up-to-date logbook for recording performance & maintenance for each extraction well?

Yes____

2. General Treatment System Inspection

a) What is the design basis for the above-ground portion of the water treatment system? (e.g., minimum and maximum influent flow, influent concentrations, operating hours per day, expected downtime)

1,100 gpm water flow at 50 ppb TCE__________________________________

b) What is the average total volume of water treated annually?

See current groundwater report_______________________________________

F.	System Condition – Continued

c) What are the average total hours of down time annually?

See current groundwater report

d) List the amounts of consumable materials used in the treatment processes (e.g. activated carbon).

Activated Carbon

e) What are the quantities of secondary waste products generated (e.g. spent activated carbon).

f) Is all ancillary equipment (pumps, blowers, valves, etc) are maintained per manufacturers recommendations?

Yes

h) Do any pumps, blowers or ancillary equipment produce excessive noise?

No

i) Are there any signs of wear or corrosion present on system components (i.e. liquid phase carbon vessels, pipe, etc)?

Extraction pump shows signs of scaling

G.	Additional Questions/Comments

Appendix F
Site Inspection Photographs

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Phoenix-Goodyear Airport - North

Photo 1. PGAN Site Visit. EA-05 treatment system compound access.

Photo 2. PGAN Site Visit. Liquid phase carbon vessel at EA-05.

Photo 3. PGAN Site Visit. Sequestering agent, control panel, and motor control panel at EA-05.

Photo 4. PGAN Site Visit. EA-05 control panel.

Photo 5. PGAN Site Visit. EA-05 treatment system compound.

Photo 6. PGAN Site Visit. Liquid phase carbon vessels at EA-06.

Photo 7. PGAN Site Visit. Liquid phase carbon vessels at EA-06.

Photo 8. PGAN Site Visit. Tie-in for Maricopa County Flood Control District access to treated effluent at EA-06.

Photo 9. PGAN Site Visit. EA-06 influent bag filter housing (black vessel).

Photo 10. PGAN Site Visit. EA-06 treated effluent discharge.

Photo 11. PGAN Site Visit. Roosevelt Irrigation District canal, which receives EA-06 discharge.

Photo 12. PGAN Site Visit. Irrigation test plot outside of MTS compound.

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Phoenix-Goodyear Airport - South

Photo 1. PGAS Site Visit. Subunit A influent piping showing manual shutoff valve and sample port.

Photo 2. PGAS Site Visit. Subunit A influent piping showing manual shutoff valve and sample port.

Photo 3. PGAS Site Visit. Subunit A influent piping showing manual shutoff valve and sample port.

Photo 4. PGAS Site Visit. Subunit A influent flow meter.

Photo 5. PGAS Site Visit. Variable Frequney Drives operating process water (injection) pumps, Southern Subunit A.

Photo 6. PGAS Site Visit. Motor Control Center for Southern Subunit A.


Photo 7. PGAS Site Visit. Piping from Subunit A airstripper to injection wells.


Photo 8. PGAS Site Visit. Piping from Subunit A airstripper to injection wells showing manual shutoff valve.


Photo 9. PGAS Site Visit. Piping from Subunit A airstripper to injection wells penetrating compound wall.

Photo 10. PGAS Site Visit. Subunit A treatment compound showing unmarked drums, some of which contain material.

Photo 11. PGAS Site Visit. Subunit A treatment compound showing decommissioned equipment.

Photo 12. PGAS Site Visit. Subunit A treatment compound.

Photo 13. PGAS Site Visit. Subunit A treatment compound showing inlet piping and anti-scalant storage.


Photo 14. PGAS Site Visit. Influent anti-scaling injection location.


Photo 15. PGAS Site Visit. Subunit A extraction piping and airstripper.

Photo 16. PGAS Site Visit. Subunit A airstripper tower.

Photo 17. PGAS Site Visit. Subunit A differential pressure switch.

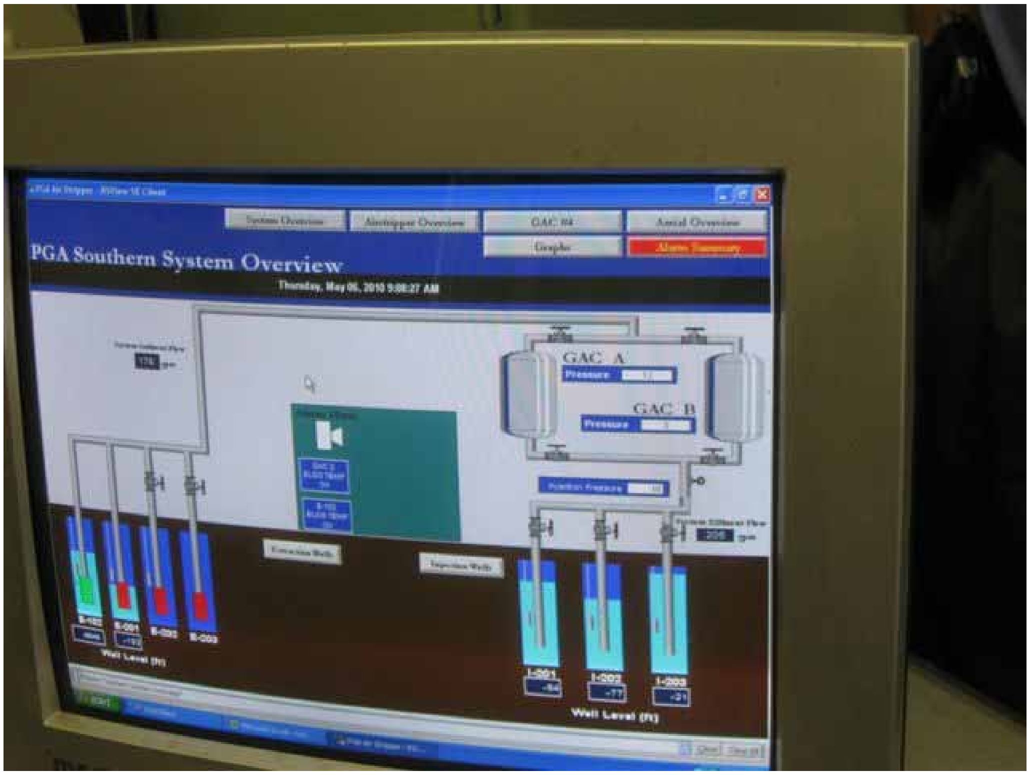

Photo 18. PGAS Site Visit. Subunit A process control Human Machine Interface (Control Room).

Photo 19. PGAS Site Visit. O&M, HASP, and other manuals located at Subunit A compound.

Photo 20. PGAS Site Visit. Control Panel for Subunit A extraction and treatment system.


Photo 21. PGAS Site Visit. Subunit A control room.

Photo 22. PGAS Site Visit. Subunit A control room.

Photo 23. PGAS Site Visit. Subunit A control room.

Photo 24. PGAS Site Visit. Unlabelled container.


Photo 25. PGAS Site Visit. Air stripper blower.

Photo 26. PGAS Site Visit. Piping from Subunit A airstripper to injection wells showing process pumps and motors.

Photo 27. PGAS Site Visit. Subunit A treatment compound showing unmarked drums and decommissioned SVE system.

Photo 28. PGAS Site Visit. Subunit A treatment compound eyewash station.

Photo 29. PGAS Site Visit. Subunit A treatment compound entrance.

Photo 30. PGAS Site Visit. Subunit C treament compound entrance.

Photo 31. PGAS Site Visit. Subunit C extraction well (E-102).

Photo 32. PGAS Site Visit. Subunit C liquid phase carbon vessels.

Photo 33. PGAS Site Visit. Subunit C extraction wellhead.


Photo 34. PGAS Site Visit. Subunit C influent piping into liquid phase carbon vessels.


Photo 35. PGAS Site Visit. Subunit C treatment system effluent piping.

Photo 36. PGAS Site Visit. Variable Frequency Drive for Subunit C extraction well (E-201).


Photo 37. PGAS Site Visit. O&M, HASP, and other manual located at Subunit C compound.


Photo 38. PGAS Site Visit. Radio telemetry device at Subunit C treatment compound.

Photo 39. PGAS Site Visit. Extraction and treatment control building at Subunit C showing VFD, shutoff valve, and flow totalizer.

Photo 40. PGAS Site Visit. Variable Frequency Drive for extraction well E-102.

Photo 41. PGAS Site Visit. Control panel for Subunit C for treatment system.

Photo 42. PGAS Site Visit. Extraction pump for well E-102.

Photo 43. PGAS Site Visit. Subunit C process control building.

Photo 44. PGAS Site Visit. Extraction pump for well E-102.

Photo 45. PGAS Site Visit. Extraction pump for well E-102.

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Appendix G
Five-Year Review Interview Forms

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INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

Name	Title/Position	Organization	Date
Diane Krone	CAG Member	CAG	05/04/10
Thomas Jones	CAG Member	CAG	05/04/10
David Iwanski	Water Resource Manager for COG	City of Goodyear	05/06/10
Jerald A. Postema	Deputy Director of Public Works	City of Goodyear	05/06/10
Jeff Sussman	Remediation Manager for Goodyear Tire & Rubber Co.	Goodyear Tire & Rubber Co.	05/06/10
Rebecca Godley	COP Environmental Section Lead for Aviation Department	City of Phoenix	05/06/10
Thomas Schoaf / Sonny Culbreth	Mayor / Assistant City Manager	City of Litchfield Park	05/07/10
Marilyn DeRosa	Assistant Director of Water Resources	City of Avondale	05/12/10
Julie Riemenscheider	Manager Remedial Projects Section	ADEQ	05/21/10

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 0900	**Date:** 05/04/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** Interviewee's Home	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Diane Krone	**Title:** CAG Member	**Organization:** Western Av CAG
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

When the contamination was first discovered, it was assumed that there was no issue with contaminating the drinking water due to an impermeable layer that was thought to exist between the contaminated shallow aquifer and the lower drinking water aquifer. However, today, it is realized that this assumption was incorrect because drinking water wells have been contaminated.

My overall impression of PGAS is that Goodyear Tire & Rubber Co. is a very responsible party. They have not impacted drinking water wells. They continue to be proactive in the cleanup efforts.

My overall impression of PGAN is that Crane Co. has not been very responsible, much time has been spent in litigation. It seems as though they believe they should not have to clean up the contamination because the previous owners of the property were under government contract. In this whole process, four drinking water wells have now been lost.

Since the drinking water supply has been affected, I do not feel that the environment has been protected at PGAN.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

Very few people in the surrounding communities have enough technical expertise to understand the technical information that has been presented. Such as, if houses are being built above the contaminated aquifer, will the contamination infiltrate the houses? Also, there was concern about the demolition dust that occurred during February through August 2009.

Personally, I am not very knowledgeable about toxicology and the information presented so far has been vague. The recent presentation about perchlorate was very informative and is an excellent example of what should be done for discussing TCE.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

During the CAG meetings, Crane Co. has given presentations, however, it seems at times that they have not been entirely forthright. They appear to be in conflict with EPA, ADEQ, Goodyear, and the other cities, which does not result in cohesiveness. There needs to be a united front to push Crane Co. to be more proactive. The agencies need to stop taking sides and all be on the same side.

As for information provided by the newspapers, there needs to be a technical person to report the issues in order to avoid the printing of misinformation. Also, the city of Goodyear needs to be more forthright with information about the Superfund. I feel that an educated public is an asset and not a liability.

David Iwanski, the Water Resources Manager of the City of Goodyear, is very dedicated to his job and is a person that seems to truly understand the community concerns.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

I read about how ADEQ sued after the December 2006 sulfuric acid (part of the treatment system) spill, which was considered hazardous waste.

Also, I heard at a CAG meeting about the fire department having to be called out during the 2009 demolition.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

The main comment heard from my homeowner alliance was the positive response to the facilities being demolished in a timely manner with little impact to the community at PGAN. There is a concern about the lack of revegetation. It is important to not plow the area but instead mow the weeds that have grown to keep the soil intact and to maintain dust control.

Also, the in-situ pilot conducted and the problems at COG 3 could be related.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

Efforts to contain the plume have been unsuccessful with growth continuing, particularly to the northeast. I am concerned that with so much emphasis on dealing with that area, work at the source might be slighted. Closer to the source, we have a larger contaminated drinking water plume than we had 5 years ago.

7. Have there been any changes in the treatment plant discharge limits or amounts?

I have not been aware of changes that have occurred.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

I do not have enough technical background to know how to improve optimization. However, there can never be enough monitoring of the wells.

10. Do you feel well-informed about the site's activities and progress?

Generally, I feel well-informed even though it seems I need to read between the lines at times. Most of my information comes from the CAG meetings. Since the newsletters have been distributed, I have been receiving 3 copies of each newsletter, which seems to be a waste of money. The contact/mailing list needs to be updated.

11. Do you have any comments, suggestions, or recommendations regarding the site?

The main issue I want addressed is there needs to be a consensus between all the agencies to hold Crane Co. responsible for continued cleanup.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 1000	**Date:** 05/04/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** Starbucks	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Thomas Jones	**Title:** CAG Member	**Organization:** Western Av CAG
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

PGAS seems to be doing a good job.

PGAN is moving very slow. No one seems to know how the plume is moving and no one knew how fast the plume was going to move. It looks like there are two sides, the responsible party and EPA.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

From the lack of people that show up at the community meetings, the community does not seem very concerned.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Information is communicated via the West Valley News, the Goodyear newsletter, as well as the monthly water bills received in the communities north of the I-10.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

The spills and the 2009 demolition do not seem to concern to the general public.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

Activities are not widely known by the majority of the public.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

I was not part of the first Five-Year Review and am not aware of progress being impacted.

7. Have there been any changes in the treatment plant discharge limits or amounts?

I am not aware of any changes in the treatment plant discharge limits or amounts.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

I am not aware of any opportunities to optimize the site.

10. Do you feel well-informed about the site's activities and progress?

The members of the CAG board have been well-informed by EPA. Internet-based information may help to reach more people, however, like with the Palm Valley HOA website, very few people sign up to receive information.

11. Do you have any comments, suggestions, or recommendations regarding the site?

Overall, I feel everyone is doing a good job. I would like to know if dumping is still occurring around the site and if there is an agency that will enforces laws against these types of activities since the plume of PGAN has moved further north than originally expected.

More volunteers are needed for the CAG.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 0915	**Date:** 05/06/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** City of Goodyear Public Works Building	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: David Iwanski	**Title:** Water Resource Manager – COG, City Project Manager for PGAN and PGAS since Jan 2005	**Organization:** City of Goodyear

Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

At PGAS, the cleanup is conducted so that the cleanup activities occur on the airport or in areas that are not easily accessible to the public; hence, the impact to the community is minimal.

At PGAN, the remediation infrastructure is on City-owned property. The cleanup resulted in significant impacts (traffic control and dust control) to neighboring businesses, homeowners, and the City during the construction of the remedy infrastructure.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

While PGAS has had little to no effect on the surrounding community, the remediation activities of PGAN have been a major inconvenience due to the traffic disruptions and the dust control problems during the 2009 demolition.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

For PGAN and PGAS, there are weekly communications via phone or email in which the public works director, assistant city manager, and city manager are briefed. The mayor is also briefed once a month on the activities that are occurring at both PGAN and PGAS. There are also notification protocols that are followed for public outreach when the neighborhoods are impacted by construction. Public notices are sent to the affected neighborhoods well in advance.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

Prior to Unidynamics being demolished at PGAN, there were numerous vandalism and property damage incidents that required the COG police to respond. During demolition in May 2009, the COG police and fire department were onsite. During the summer of 2009, there was a trailer fire at PGAN in which the COG fire department had to respond to as well.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

For any spill incidents, the water operations superintendent, Ruben Veloz, is notified. During the 2009 demolition at PGAN, all inquiries were handled by me. If phone calls reached the Mayor, they were transferred to me.

In May 2008, weed control complaints at PGAN required the Code compliance officer to arrive onsite to supervise weed control efforts performed by Crane Co.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

During storm events (approximately 4 to 5 events a year) at PGAN, there were electrical specific issues which required brief shut down of treatment. Mr. David Iwanski was notified by Mike Hansen, PM for Matrix New World, who oversees operations for the treatment systems.

At PGAS, there was one shut down (24-48 shut down period) due to an issue with the air stripper.

In 2005 and during the first quarter of 2006, some remediated groundwater was sent to the sewer system as a discharge.

In May 2006, the COG-10 well was lost. The city storage tank had to be dewatered and decontaminated. After a lawsuit settlement, the costs were reimbursed by Crane Co.

7. Have there been any changes in the treatment plant discharge limits or amounts?

Capacity of the main treatment system at PGAS has been expanded with the addition of wells EAO-5 and EAO-6 and the three new PGAS wells.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

Within the last three years, QA/QC sample protocols have been adopted to ensure that the integrity of sampling is not compromised.

The City of Goodyear City Council approved bulk water delivery agreements for both PGAN and PGAS for water use as nonpotable beneficial reuse.

Encourage site beautification and greenery of PGAN with consultation of agencies and communities. Plans have been produced by Kevin Brenda with Native Resources International Plants. It is important that all plants used be from the Arizona Department of Water Resources (ADWR) plant list, which includes low-water use native plants.

10. Do you feel well-informed about the site's activities and progress?

I absolutely feel well-informed. The agency quarterly meetings (includes responsible parties, EPA, ADEQ, stakeholders and all of their consultants) are excellent exchanges for information. There are regularly scheduled conference calls, weekly phone calls and emails, and a project tracking matrix. EPA and ADEQ have been very receptive to questions.

11. Do you have any comments, suggestions, or recommendations regarding the site?

In order to spread the information throughout the community, it would be helpful to include PGAN and PGAS information on the city website or set up a weblink.

Personnel shifts in agencies need to be recognized by updating all contact lists.

The main issue is the city does not want to lose another drinking water production well. All measures must be taken to not let another drinking water production well become contaminated.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 1000	**Date:** 05/06/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** City of Goodyear Public Works Building	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Jerald A. Postema	**Title:** Deputy Director of Public Works	**Organization:** City of Goodyear
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

At PGAN, capture of the plume has not occurred as planned. As the plume has continued to spread, additional wells are now at risk that did not appear to be at risk five years ago. COG-11 and COG-20 are now at risk with increases in TCE concentrations. Collectively, agencies need to do a better job administratively to hold Crane Co. responsible.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

The main community concern that I am aware of was the demolition of Unidynamics at PGAN in 2009. The aggressive treatment at PGAS seems to be a success.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

The majority of the communication goes through David Iwanski (Water Resource Manager for City of Goodyear). There is routine communications with the consultant, EPA, ADEQ, and Crane Co. When there are meetings with the agencies, discussions focus on topics such as the best way to monitor the plume, the at-risk wells, and overall hydrology.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

During the 2009 demolition, the fire department responded to a trailer fire. The police department has also responded to vandalism and graffiti that occurred before the 2009 demolition.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

Any incidents related to the site that required a response by our office was handled by David Iwanski. Reports received from Crane Co. were followed up. Our office assumed an oversight role by referencing SOPs to verify work conducted by Crane Co.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

There were four failures at PGAN which resulted in improvements made to the alarm systems. O&M plans were updated to include alarm procedures. During one incident, Maricopa Flood Control came out to EAO5 and county employees sampled the water and media from EAO5. Once they were aware that the water was contaminated, the truck had to be decontaminated.

7. Have there been any changes in the treatment plant discharge limits or amounts?

There is no discharge to any of the waste water facilities.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

I do not know of any opportunities to optimize the treatment system. However, the potable wells should be monitored more frequently during peak seasons, such as mid-summer. This would provide advanced warning when a well could be at risk, like the two wells at PGAS that are currently at risk, COG-11 and COG-20.

10. Do you feel well-informed about the site's activities and progress?

The contact lists for the sites could be improved. There are some communications for which I am not on the contact list. If this list was updated, we could respond faster.

11. Do you have any comments, suggestions, or recommendations regarding the site?

Agencies are not collectively aggressive enough in trying to capture the plume at PGAN, increasing the monitoring of the plume, and understanding the hydrology in the area.

When there are conflicts between PGAN and PGAS, the entity that is responsible needs to be determined. Arguing back and forth continues to interrupt the progress of determining the migration of the plume.

Community benefit could also be enhanced. The community has suffered due to the loss of water, which in turn leads to the purchase of more expensive water to provide for the community's needs. Nonpotable water should be used on community areas to help lessen the blow of high costs. Contaminated wells should be replaced, no exceptions. A new well costs $3.5-4 million, plus conveyance, treatment, etc; this should be paid for by the responsible party. I would not like to see another community go through what Goodyear has gone through with losing three, possibly four, wells. To force treated contaminated water to be used as a potable water supply would not be likely. Also the recommendation for COG-3 that occurred three years ago is not likely.

COG-2 should be converted to an extraction well, and then the water should be reinjected between COG-2 and COG-3. COG-2 is currently a monitoring well for Crane Co. For emergency purposes, pad pours and electricity for COG-3 to be used as a stop gap measure have not been securely approved. All of this should have been installed and up and running within two weeks, which has not occurred. We cannot have another conduit contaminate. The four wells combined provide 4-5 million gallons of water per day. During peak summer months, the demand increases to 11 million gallons of water per day.

The PRPs are pushing back, there is hesitation, and everything continues to fall back while waiting for proper groundwater modeling.

EPA and ADEQ have been very good at following up with concerns.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 1130	**Date:** 05/06/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** Goodyear Airport	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Jeff Sussman	**Title:** Remediation Manager for Goodyear Tire & Rubber Co., PM for PGAS since May 2009	**Organization:** Goodyear Tire & Rubber Co.

Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

Goodyear Tire & Rubber Co continues to make significant progress in cleanup. There are three separate groundwater plumes contaminated with solely TCE. All other contaminants have been cleaned up.

Subunit A: Concentrations are down, there is a 97% uptime of the treatment system, and 200 million gallons of contaminated water is treated through the treatment system each year.

Southern Subunit C: Cleanup began in 1993, there is a high uptime of the treatment system at 98%, which includes scheduled maintenance work. With agency approval, in September 2009, pump and treat began. Three extraction wells have not been operating. In September 2009, a one-year rebound period began. The last monitoring period was August 2009.

Northern Subunit C: The remediation system has been at the source area since 2003-2004. A well at the leading edge of the contamination pumping at 330-350 gallons per minute was implemented.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

The remediation activities are restricted to the airport, which is a secure facility, and areas outside of the airport footprint that are not considered publicly accessible areas. One extraction well is located on private property. The public does not notice these activities and I am not aware of any community concerns due to these operations. Goodyear Tire & Rubber Co has also established good relations with the CAG.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Agency communications include regular phone calls, emails (most common for ease, efficiency, and speed), and quarterly PM meetings. Everything has my review and approval on behalf of Goodyear Tire & Rubber Co. When inspections like the Five-Year Review occur, I spend 3-4 days in the area to meet with COG, COP, airport officials, stakeholders, and anyone else legally needing to communicate with me to maintain an open channel for communication.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

In December 2006, there was a release of sulfuric acid and untreated water containing TCE to which the COG fire department responded. The incident resulted from upgrading the main treatment system in which piping had to be replaced. Temporary measures failed and 50,000 gallons of mostly water spilled.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

Goodyear Tire & Rubber Co. received a notice of violation in December 2006 for the acid spill. Violations included not properly labeled or stored chemicals by RCRA standards. The judgment of the settlement was a $45,000 penalty, which Goodyear Tire & Rubber Co. will pay.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

While there were minor modifications to operations, there were no problems that impacted progress. Normal maintenance included periodic replacement of pumps and cleaning of injection wells.

7. Have there been any changes in the treatment plant discharge limits or amounts?

All contaminated water is reinjected after TCE contamination is treated to non-detect levels. To date, nine billion gallons of water (mixture of Subunit A and C) have been reinjected. In 2006, 166 million gallons from Subunit A and 238 million gallons from Subunit C were reinjected. In 2009, 280 million gallons from Subunit A and 116 million galls from Subunit C were reinjected. This reflects active management and optimization to maximize contaminant removal.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

Goodyear Tire & Rubber Co. is extremely active and is always looking for opportunities to optimize operations. We always try to maximize contamination removal and efficiency. When extraction rates lower, optimization occurs to increase the extraction rates. Sampling frequencies were changed and approved in 2008. We might be able to reduce frequency of the sampling but this suggestion will need to be put in front of the team.

10. Do you feel well-informed about the site's activities and progress?

Most communications are during the site visits and CAG meetings. We are heading towards the ending side of the site. There is always continuous communications via phone and email.

11. Do you have any comments, suggestions, or recommendations regarding the site?

In general, there are no major concerns. On all accounts, there is a well managed, joint effort, and the group functions well technically. We seek feedback from stakeholders and partners. Communication is key.

There are inherent inefficiencies when there needs to be formal communications as part of the record. I would like to see agencies close matters; many issues last for long periods of time. Issues need to be resolved and closed in a more efficient way, in months, not years. PRPs are concerned about administrative costs. Many things are managed best in person but not everything needs to be. There is also frustration with response to comments.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 1345	**Date:** 05/06/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** City of Goodyear Public Works Building	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Rebecca Godley	**Title:** COP Environmental Section Lead for Aviation Department	**Organization:** City Of Phoenix

Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

Goodyear Tire & Rubber Co has proceeded with cleanup, upgraded equipment, continued periodic maintenance on systems to sustain pumping rates, and interacted with agencies and the public by presenting at the CAG.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

I am not aware of any ongoing community concerns regarding the site. There was good communication between airport management, Goodyear Tire & Rubber Co., and the tenants during the indoor air quality sampling at airport buildings.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

The main communications involve the agencies. A consultant conducts an annual file review of Goodyear Tire & Rubber Co. to evaluate any significant issues. There have been no significant issues during the file reviews to date.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

In December 2006, the COP fire department responded to an emergency call reporting an observation of the cleanup activities. This call was reported to ADEQ.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

There have been no complaints.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

I am not aware of any problems.

7. Have there been any changes in the treatment plant discharge limits or amounts?

I am not aware of any changes.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

I do not know of any opportunities for optimization. We communicate regularly with airport staff about airfield access, radio training, etc.

10. Do you feel well-informed about the site's activities and progress?

I feel well informed; the quarterly CAG meetings are helpful.

11. Do you have any comments, suggestions, or recommendations regarding the site?

The contact lists used for email communications need to be updated. I would like to be on the contact lists for decision/direction documents and notice of violations. I did not hear about the notice of violation from Goodyear Tire & Rubber Co. until the press release. I should have been on the contact list and received this notice earlier.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 0815	**Date:** 05/07/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** Litchfield Park City Hall	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Thomas Schoaf/ Sonny Culbreth	**Title:** Mayor/ Assistant City Manager	**Organization:** City of Litchfield Park

Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

The PGAN and PGAS affects on the community cannot be discussed as a combined unit; the effects on the community are dramatically different. PGAN was originally a small area and now has grown to a huge area. PGAS has been fairly successful at cleaning up the contamination and the plume has not gotten out of hand.

Since the last five-year review, communications between the agencies have been more intense. The approach in the letter to Crane Co. about steps that need to be taken was not strong enough. While the letter itself was a tremendous stride forward, it is still not enough. The level of effort the agencies have taken has gone from absolutely inadequate to just inadequate.

This site is now a tragedy which is threatening the drinking water supply of Avondale and Litchfield Park. No one knows where the north edge of the plume or the east boundary is located anymore. The public is seriously concerned. There will be huge public fallout, mainly with the schools, if untreated contaminated water becomes drinking water.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

There is a large concern from the school district that the water to be treated is not to be conveyed under any part of their property. The general public is unaware of the danger to their drinking water supply, specifically the TCE that is underneath all their homes. There was some concern about the indoor air quality tests in the building on Van Buren and Litchfield Rd.

There have been both direct and indirect cost to the City because of the plume's spread. We incur direct costs to hire our own expert, Tom Suriano, for testing of a lake that occurred 3 ½ years ago. This is the reason why treatment plant EA06 was constructed this far north. The sampling of wells to determine if the plume has reached this area continues due to the inadequate responses from EPA and ADEQ. Costs are now being split with the City of Avondale. We have asked Crane Co. when we will be reimbursed for these expenses; however, they continue to say they will not pay anything that EPA has not enforced. Communities impacted by PGAN need their own experts. Crane Co. has been totally irresponsible considering the original small plume is now a large unknown plume. Indirect costs incurred by the Cities are all the staff time needed to deal with the existence of this out-of-control plume.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

At the city level, I receive monthly reports which report the sampling results, TCE and perchlorate results, maps of wells, and the summary of pounds of TCE and perchlorate that have been treated.

I went to Washington D.C. and talked with our congressmen, as well as wrote letters to EPA about this site.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

I am not aware of any such events.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

There have been no specific complaints that required a response by our office.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

While the treatment systems have a high uptime and the individual elements are working, there are not enough individual elements working together to effectively remediate the site overall.

It is important to cleanup Subunit A. There is so much water to cleanup and it will take a long time. More importantly, there are too many conduits that need to be cleaned up.

7. Have there been any changes in the treatment plant discharge limits or amounts?

There is no discharge. I would like to have the discharge from EA06 for the lake and public irrigation.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

There needs to be more sentinel wells and monitoring wells to determine where the plume is located; this will allow for more data points delineating the plume. There needs to be more treatment plants located in areas to keep the plume from growing and to determine if the data have changed. It is disappointing to not see all of the treatment working.

10. Do you feel well-informed about the site's activities and progress?

I am not sure if I am seeing all the data, although the data I do see shows treatment is not doing well. The problem is not getting fixed and as a whole there may not be enough data. I am not sure if we understand fully why the plume is moving. The data is alarming.

Overall, I feel well informed. Communication is not a problem; I understand what the agencies are doing and the agencies seem to know where the City is coming from. The main problem is getting Crane Co. to do anything. Crane Co. continues to state that they will only do the things they are required to do by EPA. Crane Co. even approached local realtors saying that they needed local help to sell some property in order to fund the cleanup.

11. Do you have any comments, suggestions, or recommendations regarding the site?

There needs to be more data and more results. The federal government needs to be more aggressive. The plume has gotten bigger every year for thirty years. This cannot continue to happen. If the current treatment allows the plume to continuously grow year after year, why do we expect the same treatment will make the plume smaller next year? EPA needs to change its approach. Expecting a different outcome from the same actions over and over is one definition of insanity.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 1000	**Date:** 05/12/10
Type: ■ Telephone ☐ Visit ☐ Other **Location of Visit:** N/A	☐ Incoming ■ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Marilyn DeRosa	**Title:** Public Works Assistant Director, Water Resources	**Organization:** City of Avondale
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

A lot of work has been done to assess the site with respect to groundwater. I do not pay attention to the soil contamination or the soil remediation conducted at the site. I am mostly concerned with the movement of the TCE plume at subunit A and C. While there may be an effective soil remediation, I am concerned with the groundwater. There seems to be good planning and implementation of those plans. I am surprised that the extent of the contamination has not been completely delineated in the past year. I appreciate the progress on the cleanup of the source areas, however, the movement of the TCE plume is concerning. I am surprised we haven't captured the edge of the plume. I understand TCE is a nasty contaminant with respect to fate and transport, which makes it difficult to identify the extent of the contamination.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

I am not aware of any effects that the cleanup operations at the Site have had on the community. Avondale has not engaged the community with this project until recently. The first engagement was at the Home Owner's Association (HOA) meeting last week. This is the first time we have been asked to provide remediation infrastructure. Previously, we have only been asked for right-of-ways for monitoring wells, which is much easier to discuss with the community than remediation infrastructure.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

No, the city of Avondale has not had routine communications. We now have a council member on the CAG Board.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

I am not aware of any such events. At agency quarterly meetings, I have heard about minor spills, or when a treatment system briefly went offline.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

There have been no complaints that required a response by our office.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

The attitude of Crane Co. has seemed to impact progress at this site. They do not show up to meetings but send a consultant. They are tight with their money and have not embraced this opportunity to be proud of the work they have done. This is unlike Goodyear Tire & Rubber Co., who appears to take responsibility, is engaged, and is proud of their cleanup efforts.

7. Have there been any changes in the treatment plant discharge limits or amounts?

There is no discharge to the City of Avondale.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

From all accounts, the remediation systems are operating as designed. They are regularly maintained, and sampling is conducted periodically.

10. Do you feel well-informed about the site's activities and progress?

I feel I am getting the information I need from our consultant, Tom Suriano, who was hired in partnership with Litchfield Park. He attends agency quarterly meetings and provides summaries of those meetings. It is too time consuming to go through all of the information to pick out what is actually important to me. If you don't have knowledge of all the variables it is hard to take a position or give recommendations. With Tom, the City of Avondale can take a position. Tom understands where the wells are screened, the sampling history, how they are operated by the owners, the well construction details, etc. Those little pieces of information become important before a position can be made. Before Tom, I didn't have the time or energy to learn all those details.

11. Do you have any comments, suggestions, or recommendations regarding the site?

I did not fully appreciate the community involvement effort by agencies until the Fulton Estates meeting. Now I have suggestions; it is pretty clear that the general public does not understand the Superfund process, toxicology, how conservative the MCLs are, the routes of exposure, and risk analysis. That type of education would be helpful. A map of the area with all the other sites would help point out that this is not just them. This information might give some confidence that the agencies know what they are doing.

Once a year, there is a HOA forum where City issues are discussed. This may be the opportune place where the agencies could talk to all the cities. More people seemed to be involved at this forum. The EPA can contact Pier Simeri at psimeri@avondale.com if they would like to participate in this forum.

I am really concerned that we have not been able to complete the site assessment. We have to determine what the extent of contamination is. Crane Co. is calling the next plan "the last of the wells" plan; this is not appropriate since we don't know the extent of the plume. We keep chasing the plume; however, we still have to complete the Phase II as we develop remediation treatments.

We should be injecting as much water as possible on Dysart Rd. to create a hydrologic curtain. The aquifer is so flat that little mounding would occur.

I am concerned with conduits. COG-3 has no seal and if TCE reaches the gravel pack, an irrigation well at a nearby school is at risk. I do not want to tell the school that there is TCE in their irrigation well, which they use to water their playing fields. The consent decree allows COG-3 to be contaminated with 5 ppb of TCE before a remediation treatment can be put in place. This would result in bad public perception of the project. After two consecutive hits of TCE, I would require them to construct a treatment system to remediate water at the well.

If my supply infrastructure were impacted as severely as the COG supply has been, I would not want to deal with that problem.

INTERVIEW RECORD

Site Name: Phoenix-Goodyear Airport Superfund Site	**EPA ID No.:**	
Subject: Five-Year Review	**Time:** 0815	**Date:** 05/07/10
Type: ☐ Telephone ■ Visit ☐ Other **Location of Visit:** ADEQ	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Catherine Brown	**Title:** Remedial Project Manager	**Organization:** EPA Region 9

Individual Contacted:

Name: Julie Riemenschneider	**Title:** Manager Remedial Projects Section	**Organization:** Arizona Department of Environmental Quality
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. What is your overall impression of the cleanup work conducted at the PGA Site since the period of the first Five-Year Review in 2005?

A lot of work has been done, including upgrading of the extraction systems and installation of additional wells. The plume in PGAN needs to be contained, the plume is being lost from the east and west and to the north. I have concerns with the plume at PGAS as well.

2. From your perspective, what effect has continued cleanup operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

There is an active CAG, which has had the same members for a long time. The CAG members are tired of the spread of the plume. CH2M Hill did a presentation on the spread of the plume so the CAG members know that EPA and ADEQ are working, but their frustration is coming from why it is taking so long. They don't grasp the hydrogeology and they are frustrated with Crane Co.

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Quarterly CAG meetings are attended by the ADEQ project manager of PGAN and PGAS, Western Ave CAG, hydrologists, and myself. Site inspections during the demolition were attended by the RCRA group. There are also technical meetings between cities (Goodyear, Avondale, and Litchfield Park). It would be nice to open up site visits to the public. I understand that safety issues could be a problem, but I think that waivers signed ahead of time might be helpful. It has been a great opportunity to take the CAG as they have learned a lot. I have also learned something new each time I have gone.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism or anything that required emergency response from local authorities? If so, please give details.

I am not aware of any events requiring emergency response from EPA or ADEQ. There was a demolition incident that EPA responded to that was taken care of and reported.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

During demolition, piping spilled orange liquid and there was overflow of the berm around the SVE system. HAZWASTE responded to both incidents, and there was emergency response on one incident. The contractors lacked a contingency plan and Keary Environmental was called in to finish the job correctly.

We receive about 8-9 questions a month from the public regarding PGAN.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe changes and impacts.

Plume capture has been a problem. It is a very tough thing for everyone to get their hands around, we need to somehow work quicker.

7. Have there been any changes in the treatment plant discharge limits or amounts?

ADEQ makes sure we meet all AZPDES requirements. I do have a question as to why the Roosevelt Irrigation District (RID) discharge was a separate agreement.

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

I am not aware of any changes in state environmental standards. As a footnote, ADEQ is looking into the perchlorate issue.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

I do not know of any such opportunities. ADEQ and other regulatory parties are doing what they need to do and everyone has stepped up their pace.

10. Do you feel well-informed about the site's activities and progress?

Yes, I feel well-informed about the site's activities and progress.

11. Do you have any comments, suggestions, or recommendations regarding the site?

EPA and ADEQ need to continue to work together, to get regulated parties to continue to do whatever they can to capture the plume at both PGAN and PGAS.

EPA attended all meetings with the cities. All three cities don't want their drinking water contaminated. It is scary for them to not have clean natural water and have to deal with well head treatment.

ADEQ doesn't have a problem putting DUERs (Declaration of Environmental Use Restriction) on sites; the main issue is that it is hard to get property owners to sign them. DUERs are deed restrictions on a property for life until the site is cleaned. Responsible parties more readily sign these restrictions than private owners. Right now there are DUERs on Luke Air Force Base and Williams Air Force Base and Mountain View Estates (Water Quality Assurance Revolving Fund Site).