ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

UTC Aerospace Systems

2014 Annual Monitoring Report

Former Universal Propulsion Company, Inc. Facility
Phoenix, Arizona

February 27, 2015

ARCADIS

EXPIRES 03-31-16

Michael Nesky

Michael Nesky, PE
Principal Environmental Engineer
ARCADIS U.S., Inc.

Craig Divine, PhD
Principal Hydrogeologist
ARCADIS U.S., Inc.

Kathryn Noonan, PhD, GIT
Staff Geological Specialist
ARCADIS U.S., Inc.

2014 Annual Monitoring Report

Former Universal Propulsion Company, Inc. Facility
Phoenix, Arizona

Prepared for:
UTC Aerospace Systems

Prepared by:
ARCADIS U.S., Inc.
410 N. 44th Street
Suite 1000
Phoenix
Arizona 85008
Tel 602 438 0883
Fax 602 438 0102

Our Ref.:
03994018.0010

Date:
February 27, 2015

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

ARCADIS

EXPIRES 03-31-16

Table of Contents

Acronyms and Abbreviations iv

1. Introduction 1

1.1 Report Summary 1

1.2 Site Description 2

2. Monitoring Network 2

2.1 UPCO Wells 3

2.2 Private Domestic Wells 3

2.3 Soil Vapor Monitoring Well 4

3. Monitoring Activities 4

3.1 Historical Groundwater Investigation Activities 4

3.1.1 Monitoring Wells 4

3.1.2 Facility Monitoring Locations 5

3.1.3 Private Domestic Wells 5

3.1.4 Soil Vapor Monitoring Well 5

3.2 2014 Groundwater Monitoring 5

3.2.1 Administrative Activities 5

3.2.2 Water Level Measurements 5

3.2.3 UPCO Well Sampling 6

3.2.4 Private Well Sampling 6

3.2.5 Soil Vapor Monitoring Well Sampling 6

3.3 Well Installation Activities 7

3.4 Survey 7

3.5 Investigation-Derived Waste 7

4. Data Evaluation 8

4.1 Groundwater Level Measurements 8

4.2 Groundwater Quality Data 8

4.2.1 Perchlorate 9

4.2.2 General Chemistry and Dissolved Metals 10

4.2.3 Total Metals 10

4.2.4 VOCs and 1,4-Dioxane 11

4.3 Soil Vapor Quality Data 11

5. Quality Assurance and Data Verification 11

6. Summary and Future Monitoring Activities 12

7. References 13

Tables

Table1 UPCO Well Information

Table 2 Private Well Information

Table 3 UPCO Wells Sampled and Analyses Performed in 2014

Table 4 2014 UPCO Well Water Levels

Table 5 Private Wells Sampled and Analyses Performed in 2014

Table 6 2014 UPCO Well Perchlorate Results

Table 7 2014 Private Well Perchlorate Results

Table 8 2014 Soil Vapor Monitoring Well Results

Figures

Figure 1 Site Location Map

Figure 2 Site Facility Map

Figure 3 Site Monitoring Well Locations

Figure 4 Groundwater Elevations January 13-21, 2014

Figure 5 Groundwater Elevations February 28, 2014

Figure 6 Groundwater Elevations March 15, 2014

Figure 7 Groundwater Elevations March 31, 2014

Figure 8 Groundwater Elevations May 23, 2014

Figure 9 Groundwater Elevations June 14, 2014

Figure 10 Groundwater Elevations July 7, 2014

Figure 11 Groundwater Elevations September 2-4, 2014

Figure 12 Groundwater Elevations September 15-29, 2014

Figure 13 Groundwater Elevations October 28, 2014

Figure 14 Groundwater Elevations November 27, 2014

Figure 15 Groundwater Elevations December 15, 2014

Figure 16 Perchlorate Concentrations in Groundwater First Quarter 2014

Figure 17 Perchlorate Concentrations in Groundwater Second Quarter 2014

Figure 18 Perchlorate Concentrations in Groundwater Third Quarter 2014

Figure 19 Perchlorate Concentrations in Groundwater Fourth Quarter 2014

Appendices

A Historical UPCO Well Perchlorate Concentrations and Plots

B Well Construction (CD)

C IDW Management Summary

D Historical Water Level Data

E UPCO Well Hydrographs

F 2014 UPCO Well Water Quality Data

G Historical Private Well Perchlorate Data

H 2014 Field Data Summary

I 2014 Data Verification Summaries (CD)

J 2014 Laboratory Reports (CD)

Acronyms and Abbreviations

ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ALTA	American Land Title Association
ARCADIS	ARCADIS U.S., Inc.
ASLD	Arizona State Land Department
AWQS	Arizona Aquifer Water Quality Standard
AZ HWMA	Arizona Hazardous Waste Management Act
bgs	below ground surface
COPC	constituent of potential concern
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethylene or 1,1-dichloroethene
DQO	data quality objective
EVO	emulsified vegetable oil
GWMP	Groundwater Monitoring Work Plan
H+A	Hargis + Associates, Inc.
IDW	investigation-derived waste
LES	Liquid Environmental Solutions
µg/L	micrograms per liter
MEK	2-butanone

mg/L	milligrams per liter
Order	Consent Order No. P-136-04
POE	point of entry
ppbv	parts per billion by volume
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
QAPP	Quality Assurance Project Plan
QC	quality control
SLUP	Special Land Use Permit
TDS	total dissolved solids
TOC	total organic carbon
UPCO	Universal Propulsion Company, Inc.
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1. Introduction

1.1 Report Summary

This Annual Monitoring Report (report) summarizes the monitoring activities conducted in 2014 at the former Universal Propulsion Company, Inc. (UPCO) facility located at 25401 North Central Avenue in Phoenix, Arizona (site). This report is part of a continuing overall site characterization for soil and groundwater pursuant to Part I of the Arizona Hazardous Waste Management Act (AZ HWMA) permit.

This report is supported by the Quality Assurance Project Plan (QAPP; Hargis + Associates, Inc. [H+A] 2004a), the Updated Groundwater Monitoring Work Plan (GWMP; ARCADIS U.S., Inc. [ARCADIS] 2012a), and the QAPP Addendum (ARCADIS 2012b). This report consists of the following:

- site description
- summary of previous groundwater investigations
- summary of 2014 monitoring activities
- list of wells that were sampled, including sample dates and analyses performed
- data evaluation and verification
- table of water level measurements including well identification, date and time of measurement, depth to water below measuring point, and groundwater elevation above mean sea level
- table of analytical data
- hydrographs for the site wells
- maps of groundwater elevation data
- trend graphs of perchlorate concentrations for the site wells
- investigation-derived waste (IDW) documentation

- copies of laboratory reports and data verification summaries

1.2 Site Description

The UPCO operations ceased during the fourth quarter of 2009, and demolition was completed in January 2010. The site is located approximately 2 miles north of the Deer Valley Airport in Phoenix, Arizona (Figure 1). Specifically, the facility was located at the intersection of Central Avenue and Happy Valley Road at 25401 North Central Avenue. The site is within the southeast quadrant of Section 5, Township 4 North, Range 3 East of the Gila and Salt River Baseline and Meridian. The UPCO operations were located on approximately 160 acres of land leased from the State of Arizona and consisted of numerous manufacturing and administrative buildings (Figure 2). A chain-link fence surrounds the former manufacturing areas and restricts general access. Locks secure each gate and well vault to limit access and deter vandalism.

2. Monitoring Network

The following types of wells were utilized for the monitoring program in 2014:

- UPCO monitoring wells, planned remediation wells, and an original facility production well
- private domestic wells
- a nested soil vapor monitoring well

The primary objective of groundwater monitoring is to obtain data to assess groundwater conditions at and near the former UPCO facility. The study area for monitoring in 2014 included the site, private residences along the northern property boundary, and areas approximately ½ mile to the west, south, and east of the property boundary.

The original objective of soil vapor monitoring was to monitor the vertical distribution of constituents of potential concern (COPCs) in soil gas beneath the suspected volatile organic compound (VOC) source area in the former B-Complex area (Figure 2). As explained in Section 6.0, UPCO will request that soil vapor monitoring at the site be discontinued because VOCs have consistently been measured at low concentrations within the nested soil vapor monitoring well.

2.1 UPCO Wells

The locations of the UPCO monitoring wells are shown on Figure 3. Table 1 includes a summary of the locations and well construction details for UPCO monitoring wells, planned remediation wells, and original facility production well PW-1. Additional information regarding drilling and well construction details for the UPCO wells was provided under separate cover in the following reports:

- Phase I Monitoring Well Construction Summary Report (H+A 2004b)
- Phase II Monitoring Well Installation Report (Malcolm Pirnie 2005)
- Phase III Monitoring Well Installation Report (Malcolm Pirnie 2006)
- Final Remedial Investigation Report (ARCADIS 2011a)
- Final 2009 Annual Monitoring Report (Malcolm Pirnie 2010)
- Final 2010 Annual Monitoring Report (ARCADIS 2011b)
- Final 2011 Annual Monitoring Report (ARCADIS 2012c)
- Final 2012 Annual Monitoring Report (ARCADIS 2013a)

2.2 Private Domestic Wells

In 2004, UPCO began collecting groundwater samples from private wells located along Yearling Road in accordance with Consent Order (Order) No. P-136-04. The Order specified that UPCO collect semiannual groundwater samples from private wells located along Yearling Road north of the site for perchlorate analysis for a period of two years. UPCO voluntarily extended the semiannual private well sampling program beyond the first two years, collecting groundwater samples from various private wells according to owner requests and authorization. That Order was terminated and replaced with conditions in the AZ HWMA permit; AZ HWMA Permit Condition III.C.1 requires semiannual private well sampling. Table 2 summarizes available locations and well construction details for private wells that are currently included in the monitoring program. The locations of the private wells are shown on Figure 3.

2.3 Soil Vapor Monitoring Well

In 2008, UPCO began collecting soil gas samples from a nested soil vapor monitoring well (SVMW-1) in the former B-Complex area. The nested soil vapor monitoring well is used to monitor for potential vertical migration of VOCs in soil vapor. The location of SVMW-1 is shown on Figure 3. Table 1 includes a summary of screened intervals for SVMW-1. Additional information regarding drilling and well construction details for the soil vapor monitoring well was provided under separate cover in the Final Remedial Investigation Report (ARCADIS 2011a).

3. Monitoring Activities

3.1 Historical Groundwater Investigation Activities

Previous groundwater investigation activities from 2004 through 2013 are summarized below. Additional information regarding previous activities was provided under separate cover in the following reports:

- Final Remedial Investigation Report (ARCADIS 2011a)
- Final 2010 Annual Monitoring Report (ARCADIS 2011b)
- Final 2011 Annual Monitoring Report (ARCADIS 2012c)
- Final 2012 Annual Monitoring Report (ARCADIS 2013a)
- Final 2013 Annual Monitoring Report (ARCADIS 2014a)

3.1.1 Monitoring Wells

AZ HWMA Permit Condition Part IV.C.9 specifies a groundwater cleanup goal of 14 µg/L for perchlorate. The laboratory reporting limit for perchlorate using United States Environmental Protection Agency (USEPA) Method 314.0 increased from 2.0 µg/L to 3.0 µg/L in 2013 due to a change in laboratory.

Only monitoring wells MW-1, MW-2, MW-5, MW-6, MW-13, MW-19, and MW-20 have had historical perchlorate concentrations greater than the groundwater cleanup goal of 14 µg/L (Appendix A).

3.1.2 Facility Monitoring Locations

The UPCO facility production well (PW-1) and former point of entry (POE) to the potable water system were sampled periodically as part of Maricopa County requirements for water service providers from 2004 through 2009. Sampling at PW-1 resumed in the first quarter of 2011. Perchlorate concentrations at PW-1 and POE have never exceeded the groundwater cleanup goal of 14 µg/L (Appendix A).

3.1.3 Private Domestic Wells

Between 2004 and 2013, perchlorate has been detected by USEPA Method 332.0 in samples collected from the private domestic wells at concentrations up to 3.1 µg/L.

3.1.4 Soil Vapor Monitoring Well

Since 2008, only low levels of VOCs have been detected in each well screen interval.

3.2 2014 Groundwater Monitoring

3.2.1 Administrative Activities

The following administrative activities related to the monitoring program occurred in 2014:

- Executed a new off-site SLUP in January 2014.
- Executed a new on-site SLUP in February 2014.
- Completed a centerline survey and map of the access routes in August 2014 to be submitted with an application to ASLD for right-of-way to access the off-site wells.
- Submitted an application to ASLD on October 31, 2014 for right-of-way access to off-site wells.

3.2.2 Water Level Measurements

In accordance with the Updated GWMP (ARCADIS 2012a), groundwater elevation measurements were collected on a monthly basis from January to December 2014. Depth to water was measured to the nearest 0.01 foot with respect to a surveyed

measurement point at the top of each well using a decontaminated electronic sounding device.

3.2.3 UPCO Well Sampling

Sampling activities occurred during all four quarters of 2014. Project-specific sampling procedures outlined in the Updated GWMP (ARCADIS 2012a) and industry standard methods were used. During 2014, groundwater samples were collected from UPCO groundwater monitoring wells MW-1 through MW-21 and PW-1, as outlined in the Final 2013 Annual Monitoring Report (ARCADIS 2014). In addition, groundwater monitoring well MW-22 and planned remediation wells EW-1, EW-2, IW-1, IW-2, IW-3, RW-1, and RW-2 were sampled in 2014. A list of UPCO wells sampled in 2014, including dates and analyses performed, is provided in Table 3. Water level data collected in 2014 are presented in Table 4.

3.2.4 Private Well Sampling

Private wells incorporated into the groundwater monitoring program were sampled using existing dedicated submersible pumps. Groundwater samples were collected in the first and third quarters of 2014. Sampling of private wells depends on property access from the property owners and the presence of water in the wells; several private wells pump dry. Therefore, samples were obtained contingent upon availability. A list of private wells sampled in 2014, including dates and analyses performed, is included in Table 5.

3.2.5 Soil Vapor Monitoring Well Sampling

Soil vapor monitoring well SVMW-1 was sampled during the first quarter of 2014 from each nested interval. A vacuum pump was used to purge approximately three well volumes at a flow rate of less than 1 cubic foot per minute. A 1-liter Summa canister fitted with a dedicated 1-liter-per-minute flow restrictor was used at each sample interval for time-integrated sample collection. As explained in Section 6.0, UPCO will request that soil vapor monitoring at the site be discontinued because VOCs have consistently been measured at low concentrations within the nested soil vapor monitoring well.

3.3 Well Installation Activities

The installation of monitoring well MW-22 and planned remediation wells EW-1, EW-2, IW-1, and IW-2 was completed in February 2014, the installation of planned remediation well IW-3 was completed in March 2014, and the installation of planned remediation wells RW-1 and RW-2 was completed in August 2014. Well completion details are summarized in Table 1, and as-built well construction diagrams, lithologic logs, and geophysical data are provided in Appendix B.

3.4 Survey

A state registered land surveyor established horizontal and vertical control at each of the new wells installed at the site. The vertical coordinate of the sounding port, top of lid, top of concrete pad, and ground surface was surveyed in the Arizona State Plane Coordinate System (National Geodetic Vertical Datum of 1929), with units of international feet above mean sea level. The measuring point elevation of the PVC sounding port contained in the well seal was measured to the nearest 0.01 foot. The measuring point was marked on the northern side of the port. The horizontal coordinate of the well was surveyed in the Arizona State Plane Coordinate System, Central Zone, North American Datum of 1983 with units of international feet. Table 1 provides the survey information.

3.5 Investigation-Derived Waste

Groundwater monitoring and well installation activities in 2014 generated purge water that was managed as investigation-derived waste (IDW). Purge water was temporarily stored on site in poly tanks. During the first and second quarters of 2014, IDW was transported off site by MP Environmental for disposal at Liquid Environmental Solutions (LES) or Stericycle in Phoenix, Arizona. Purge water with perchlorate concentrations less than 100 µg/L was transported to LES, and purge water with perchlorate concentrations greater than 100 µg/L (i.e., purge water from MW-19 and MW-20) was transported to Stericycle for solidification and final transport to/disposal at Heritage Environmental Services in Coolidge, Arizona. In 2014, 5,544 gallons of non-hazardous purge water were disposed of at LES or Heritage Environmental Services. Documentation for the handling of this IDW stream during 2014 is provided in Appendix C.

During the third and fourth quarters of 2014, purge water was treated and used as part of the treated water reinjection test as stated in the Supplemental Groundwater Pre-Design Study Work Plan (ARCADIS 2013b).

4. Data Evaluation

4.1 Groundwater Level Measurements

Groundwater elevations have been monitored at and near the UPCO facility to evaluate potential gradients. These measurements have been collected on a regular basis at UPCO site-wide wells and private wells located near the north property boundary at 218 East Yearling Road and 520 East Yearling Road using electronic water level equipment. Well locations are shown on Figure 3.

Historical depth to groundwater measurements and groundwater elevations for site wells are summarized in Appendix D. Historical hydrographs are presented in Appendix E. Groundwater elevation maps are provided on Figures 4 through 15.

Based on analysis of site geology and available hydrogeologic information, groundwater underlying the site occurs within two distinct zones, separated by one or possibly several associated subsurface geologic structures (ARCADIS 2011a). Wells completed in bedrock at the site exhibit groundwater elevations approximately 30 feet lower than wells completed in the consolidated sedimentary unit on the west side of the site (Figures 4-15). The difference in groundwater elevation and depth to bedrock between the two zones is potentially an additional line of evidence for faulting along the western side of the site (ARCADIS 2011a).

Overall, groundwater elevations across the site are relatively stable or decreasing. The groundwater gradient on-site in the areas of the former complexes is very flat and represents a groundwater divide between localized northward flow at the north end of the property and the regional southward flow in this area of the basin (Figures 4-15).

4.2 Groundwater Quality Data

The following sections discuss the results of groundwater quality monitoring performed in 2014. The 2014 water quality analytical data for the UPCO wells are summarized in Appendix F. Perchlorate results are provided in Table 6 for the UPCO wells and in Table 7 for the private wells. A table presenting historical perchlorate data for the private wells is provided in Appendix G. Perchlorate concentration trend plots and

historical data for the UPCO wells are presented in Appendix A. Field parameter data collected during the 2014 sampling events are provided in Appendix H. Figures 16 through 19 present perchlorate concentration maps for the first, second, third, and fourth quarters of 2014, respectively.

4.2.1 Perchlorate

Concentrations of perchlorate measured during 2014 were consistent with results collected in previous years, and concentrations of perchlorate in site monitoring wells are generally stable or decreasing (Appendix A). During the 2014 monitoring period, perchlorate was detected in monitoring wells MW-1, MW-2, MW-5, MW-13, MW-19, and MW-20, at concentrations exceeding the groundwater cleanup goal of 14 µg/L. In the first, second, and third quarters of 2014 perchlorate was also detected in monitoring well MW-6 at concentrations above the groundwater cleanup goal of 14 µg/L (Table 6). However, in the fourth quarter 2014, the perchlorate concentration in the sample collected from monitoring well MW-6 was below the reporting limit of 3 µg/L (Table 6). This decrease in perchlorate concentration is likely due to reductive dechlorination resulting from the injection of emulsified vegetable oil (EVO) in September and October 2014 as part of the ongoing EVO injection pilot test described in the Supplemental Groundwater Pre-Design Study Work Plan (ARCADIS 2013b).

During the 2014 monitoring period, all perchlorate concentrations measured in samples collected from private wells were less than the groundwater cleanup goal of 14 µg/L.

Perchlorate was measured in newly installed wells during 2014 at the following concentrations:

- EW-1 – 57 µg/L to 941 µg/L
- EW-2 – 36.8 µg/L to 62.0 µg/L
- IW-1 – 35,000 µg/L to 47,600 µg/L
- IW-2 –<3.0 µg/L to 4.5 µg/L
- IW-3 – 10.6 µg/L to 62.3 µg/L
- RW-1 – <3.0 µg/L

- RW-2 – <3.0 µg/L

Concentrations of perchlorate above the groundwater cleanup goal of 14 µg/L were measured most recently within the area estimated to be approximately 300 feet wide and approximately 2,200 feet long, which extends from the vicinity of IW-1 along the central-eastern property boundary to the vicinity of MW-1 at the southern property boundary (Figure 19). The highest concentrations of perchlorate in groundwater were measured in wells located within the former C-Complex and former D-Complex, particularly within the former Waterbore Area. Concentrations of perchlorate in groundwater measured in wells outside of these areas are lower than the groundwater cleanup goal of 14 µg/L. Concentrations are well-defined near the northern property boundary and were less than the laboratory reporting limit of 3.0 µg/L during 2014. The plume is stable, with perchlorate concentrations in the majority of wells either stable or decreasing (Appendix A).

4.2.2 General Chemistry and Dissolved Metals

General chemistry parameters (alkalinity, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, dissolved organic carbon, total organic carbon, phosphorus, total dissolved solids, total suspended solids, sulfate, and pH) and dissolved metals were collected pursuant to the Supplemental Groundwater Pre-Design Study Work Plan (ARCADIS 2013b), and the results of this work are reported in the December 19, 2014 Supplemental Groundwater Pre-Design Study Summary Report (ARCADIS 2014d). However; this data is included in Appendix F for reference.

4.2.3 Total Metals

Total Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) were measured in UPCO monitoring wells according to the Updated GWMP (ARCADIS 2012a). Results are presented in Appendix F. Concentrations of all metals were less than the applicable Arizona Aquifer Water Quality Standards (AWQS), with the exception of arsenic measured in MW-18. The AWQS for total arsenic is 50 µg/L. Total arsenic concentrations in MW-18 were 56.4 µg/L and 59.2 µg/L in the first and fourth quarters of 2014, respectively.

4.2.4 VOCs and 1,4-Dioxane

Four VOCs were detected at low levels during groundwater sampling activities in 2014 including 1,1-DCA, 1,1-dichloroethylene (1,1-DCE), chloroform, and toluene (Appendix F). Concentrations of VOCs were less than the applicable AWQS, with the exception of 1,1-DCE in PW-1. The AWQS for 1,1-DCE is 7 µg/L, and 1,1-DCE was detected in samples collected from PW-1 at a concentration of 7.1 µg/L during the first quarter of 2014.

1,4-Dioxane was detected at low levels in samples collected from MW-2, MW-20, PW-1, and EW-2 at concentrations up to 16.7 µg/L (Appendix F). An AWQS has not been established for 1,4-dioxane.

4.3 Soil Vapor Quality Data

Soil gas samples were collected from soil vapor monitoring well SVMW-1. The primary COPC, 1,1-DCE was detected at concentrations up to 4,400 ppbv. Other VOCs detected in the soil gas samples, at lower concentrations, included 1,1-DCA, 1,2,4-trimethylbenzene, ethanol, tetrachloroethene, and trichloroethene. Analytical results for soil gas samples are provided in Table 8.

5. Quality Assurance and Data Verification

Analytical data provided by the laboratories were subjected to data review for quality control/quality assurance. A summary of the data verification is presented in Appendix I. Copies of the analytical data reports are provided in Appendix J.

Groundwater monitoring activities followed the quality assurance procedures outlined in the QAPP (H+A 2004a) and QAPP Addendum (ARCADIS 2012b). The project-specific QAPP establishes procedures and guidance for the following:

- data quality objectives (DQOs)
- sample documentation and custody
- sample container requirements
- quality control (QC) procedures

- quality assurance management including data management and data verification/validation procedures

Samples were collected and submitted to the laboratory in a manner that provided data representative of site conditions. Laboratory analyses were conducted according to analytical methods described in USEPA guidance manuals. Field QC samples included field duplicates and trip blanks. Laboratory QC samples included method blanks, laboratory control samples, and matrix spike/matrix spike duplicate samples.

Laboratory deliverables consist of Level II data packages (including a QC summary). Data reported by the laboratory have been verified to meet the DQOs. The results were considered usable for the intended purposes, and the project DQOs specified in the QAPP (H+A 2004a) and the QAPP Addendum (ARCADIS 2012b) were met.

6. Summary and Future Monitoring Activities

The 2014 monitoring program was conducted in accordance with the procedures and methods outlined in the Updated GWMP (ARCADIS 2012a). UPCO revised the monitoring program in 2010 to include the quarterly monitoring requirements for groundwater monitoring well MW-18 and planned monitoring wells MW-16, MW-17, and MW-19. These changes were incorporated in the Updated GWMP (ARCADIS 2012a). UPCO revised the monitoring program again in 2012 to include the quarterly monitoring requirements for groundwater monitoring wells MW-20 and MW-21. These changes were also incorporated in the Updated GWMP (ARCADIS 2012a). The former production well, PW-1, was converted to a monitoring well in September 2011 and will continue to be utilized for site-wide monitoring. Private domestic wells will continue to be monitored on a semiannual basis, in the first and third quarters of 2015.

The proposed 2015 sampling and analysis schedule will be provided under separate cover. Based on data trends measured and reported to date, some of the existing monitoring requirements are unnecessary to successfully monitor the site. UPCO will submit a proposed sampling and analysis schedule for ADEQ review and approval that will include adjustments to monitoring frequencies and a reduced list of analytes to be tested. The revised schedule will include brief justifications for all proposed adjustments to the monitoring and analysis program. UPCO will request that soil vapor monitoring at the site be discontinued because VOCs have consistently been measured at low concentrations within the nested soil vapor monitoring well.

7. References

ARCADIS U.S., Inc. (ARCADIS). 2011a. Final Remedial Investigation Report, Universal Propulsion Company, Inc. June.

ARCADIS. 2011b. Final 2010 Annual Monitoring Report, Universal Propulsion Company, Inc. July 14.

ARCADIS. 2012a. Updated Groundwater Monitoring Work Plan, Universal Propulsion Company, Inc. July.

ARCADIS. 2012b. Quality Assurance Project Plan Addendum, Universal Propulsion Company, Inc. July.

ARCADIS. 2012c. Final 2011 Annual Monitoring Report, Universal Propulsion Company, Inc. February 27.

ARCADIS. 2013a. Final 2012 Annual Monitoring Report, Universal Propulsion Company, Inc. February 28.

ARCADIS. 2013b. Supplemental Groundwater Pre-Design Study Work Plan, Universal Propulsion Company, Inc. May 20.

ARCADIS. 2013c. Supplemental Soil Pre-Design Study Work Plan, Universal Propulsion Company, Inc. November 4.

ARCADIS. 2014a. Final 2013 Annual Monitoring Report, Universal Propulsion Company, Inc. February 21.

ARCADIS. 2014b. Supplemental Soil Pre-Design Study Summary Report, Universal Propulsion Company, Inc. October 6.

ARCADIS. 2014c. Numerical Model Update and Revisions. Universal Propulsion Company, Inc. October 14.

ARCADIS. 2014d. Supplemental Groundwater Pre-Design Study Summary Report, Universal Propulsion Company, Inc. December 19.

Hargis + Associates, Inc. (H+A). 2004a. Quality Assurance Project Plan, Goodrich Universal Propulsion Company, Inc. July 16.

H+A. 2004b. Phase I Monitoring Well Construction Summary Report, Goodrich Universal Propulsion Company, Inc. July 16.

Malcolm Pirnie. 2005. Phase II Monitoring Well Installation Report, Universal Propulsion Company, Inc. January 7.

Malcolm Pirnie. 2006. Phase III Monitoring Well Installation Report, Universal Propulsion Company, Inc. April.

Malcolm Pirnie. 2010. Final 2009 Annual Monitoring Report, Universal Propulsion Company, Inc. December 21.