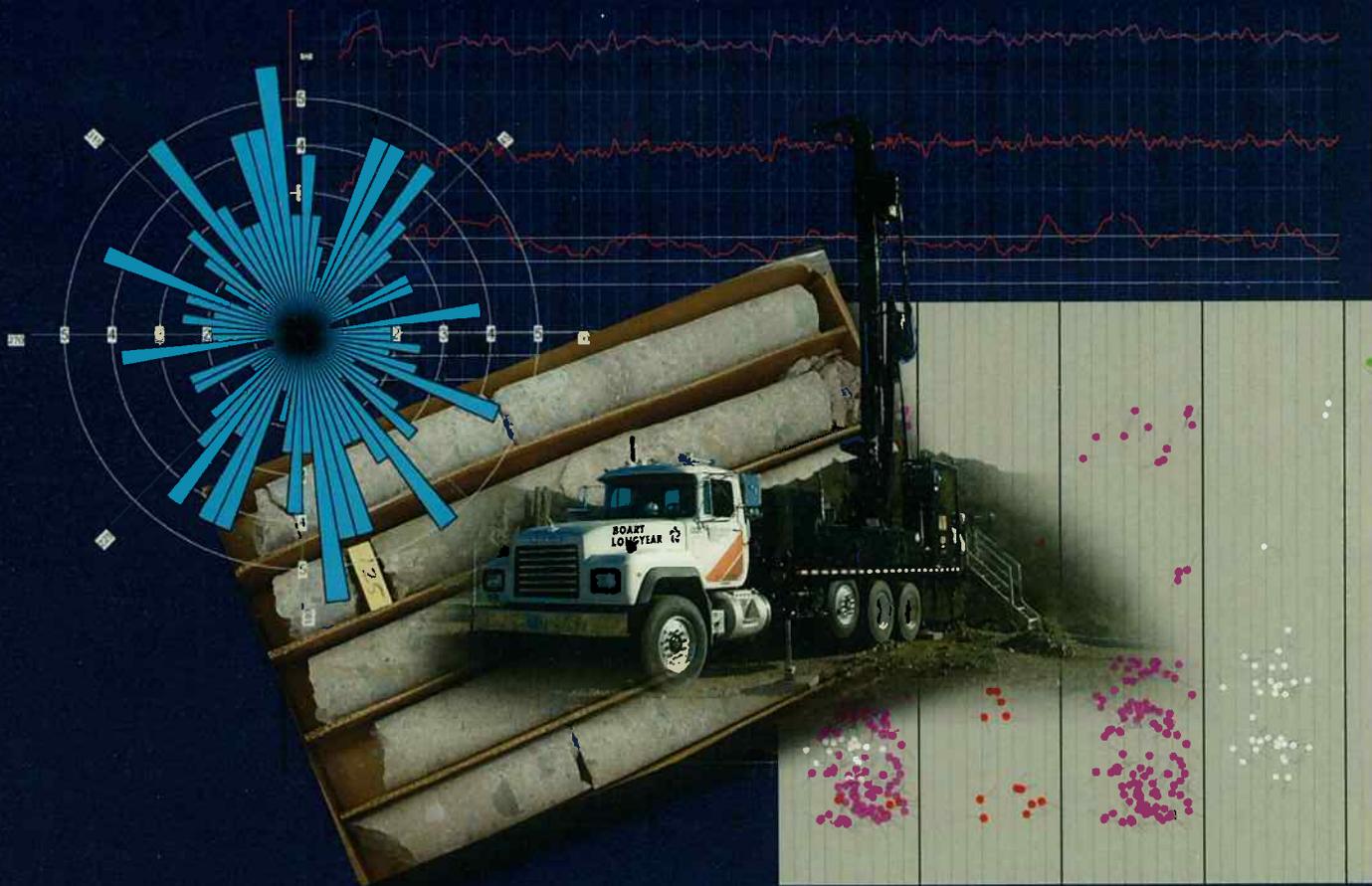


2010 ANNUAL MONITORING REPORT

Universal Propulsion Co. Inc.



July 2011





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July 14, 2011

Mr. Richard Olm, P.E.
Arizona Department of Environmental Quality
Hazardous Waste Permits Unit
1110 West Washington Street
Phoenix, Arizona 85007



Re: Final 2010 Annual Monitoring Report
Universal Propulsion Company, Inc.
Phoenix, Arizona 85085

Dear Mr. Olm:

Please find attached the Final 2010 Annual Monitoring Report for the Universal Propulsion Company, Inc. (UPCO).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluated the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. Karen Mittleider at (602) 243-2338 if you have any questions or need additional information.

Sincerely,

Guy Ogino
Site Leader

cc: Robin Thomas, ADEQ
Anthony Leverock, ADEQ
David Haag, ADEQ
Bruce Campbell, ASLD

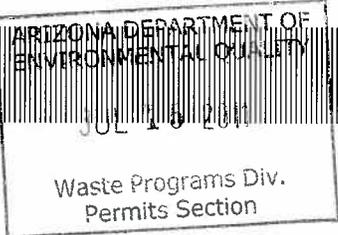
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2010 Annual Monitoring Report

July 2011



Report Prepared By:

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1. Introduction

This Annual Monitoring Report (report) summarizes the monitoring activities conducted at the Universal Propulsion Company, Inc. (UPCO) facility (site) in Phoenix, Arizona during 2010. This report continues to be part of an overall site characterization for soil and groundwater pursuant to Consent Order (Order) No. P-136-04 entered into between UPCO and the Arizona Department of Environmental Quality (ADEQ).

This report is supported by the Remedial Investigation Work Plan (Hargis+Associates, Inc. (H+A), 2004a), Quality Assurance Project Plan (QAPP) (H+A, 2004b), Groundwater Monitoring Plan (Malcolm Pirnie, 2004), Updated Groundwater Monitoring Plan (Malcolm Pirnie, 2008a), Addendum to the Supplemental Groundwater Investigation Work Plan (Malcolm Pirnie, 2009b), and the QAPP Addendum (Malcolm Pirnie, 2009c). This report consists of the following:

- facility description;
- summary of previous groundwater investigations;
- summary of monitoring activities for the year;
- lists 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 UPCO facility groundwater monitor wells;
- maps of groundwater elevation data;
- trend graphs of perchlorate concentrations for the UPCO facility groundwater monitor wells;
- investigation derived waste (IDW) documentation;
- copies of laboratory reports and data verification summaries; and
- recommendations for updates to the monitoring plan.

1.1. Site Description

The UPCO operations were transferred to a facility in Fairfield, California in the fourth quarter of 2009. Demolition of the UPCO facility occurred throughout 2009 and was completed in January 2010. The site is located approximately two miles north of the Deer Valley Airport, Phoenix, Arizona (Figure 1). Specifically, the facility was at the intersection of Central Avenue and Happy Valley Road at an address of 25401 North Central Avenue. The site is within the southeast quarter 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 previous manufacturing areas and restricts general access. Locks secure each gate and well vault to limit access and deter vandalism.

3.2.3. Private Wells Sampling

Private wells incorporated into the groundwater monitoring program were sampled using existing dedicated submersible pumps. Groundwater samples were only collected in the second quarter of 2010 since a site access agreement between UPCO and the State Land Department had not been granted for the fourth quarter to sample the onsite wells. Private wells have historically been sampled concurrently with a quarterly sampling event that includes the onsite monitor wells. A list of private wells that were sampled in 2010, including dates and analysis performed, is included in Table 5. Two private wells that have historically been monitored were not sample in 2010. The resident at 106 West Yearling was reportedly purchasing water due to insufficient well production prior to and during the second quarter 2010 sampling event, therefore a sample was not collected. The private well at 218 West Yearling Road was not sampled during the second quarter after two attempts to reach the resident for well access.

3.2.4. Soil Vapor Monitor Well Sampling

Soil vapor monitor well, SVMW-1, was sampled during the second quarter of 2010 from each nested interval. A vacuum pump was used to purge approximately three well volumes at a flow rate of less than one cubic feet per minute. A one liter Summa canister fitted with a dedicated one liter per minute flow restrictor was used at each sample interval for time-integrated sample collection.

3.3. Well Head Modification Activities

An existing flush grade monitor well head vault at MW-11 was converted to 4-foot above grade monument vault in January 2010 to improve monitor well security after facility demolition activities were complete. The well drop pipe, sounding tube and well pipe were extended to maintain pre-modification pump intake and screened sounding tube depth below ground surface. The revised as-built well construction diagram is provided in Appendix A.

3.4. Survey

A state registered land surveyor established horizontal and vertical control MW-11 (as discussed in Section 3.3). The vertical coordinates of the sounding port, top of casing, and ground surface were surveyed in the Arizona State Plane Coordinate System (NGVD 29) with units of international feet above mean sea level. The measuring point elevation of the PVC sounding tube port contained in the well seal was measured to the nearest 0.01 foot. The measuring point was marked on the north side of the port. The horizontal coordinates of the well were surveyed in the Arizona State Plane Coordinate System,

Central Zone, North American Datum 1983 (NAD 83) with units of international feet. Survey information is provided in Table 1.

3.5. Investigative Derived Waste

Groundwater monitoring activities in 2010 generated purge water that was managed as investigative derived waste (IDW). The purge water was temporarily stored on-site in a poly tank prior to being transported offsite by MP Environmental for disposal at Liquid Environmental Solutions. In 2010, 6,200 gallons of non-hazardous purge water was generated at the site. IDW documentation for 2010 is provided in Appendix B.

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 monitor 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 and pressure transducers. Private well locations are shown in Figure 4.

Historic depth to groundwater measurements and groundwater elevations for site and private wells are summarized in Appendix C. Historic hydrographs are presented in Appendix D. Groundwater elevation maps for 2010 are provided on Figures 5 through 7.

The highest water elevations were observed in late 2004 to early 2005, and the lowest elevations for a majority of the wells were observed in 2009 and 2010. A potential geologic structure (Malcolm Pirnie, 2009a) is located east of the area monitored by MW-6, MW-7, MW-10, and MW-18 and generally on the west side of the UPCO facility. Groundwater elevations on the west side of the structure are approximately 30 feet higher than on the east side of the structure. The wells located east of the potential geologic structure, with the exception of MW-3, showed a nearly static/slightly declining water level trend. The difference between the minimum and maximum groundwater elevations measured in each of these wells in 2010 (i.e., the groundwater elevation decline) varied between 0.09 feet in monitor well MW-9 and 0.73 feet in monitor well MW-12. Monitor well MW-3 continues to show a generally larger decline in groundwater elevation with a groundwater elevation difference of 2.90 feet.

West of the potential geologic structure, groundwater elevations were also declining. However, monitor well MW-6 exhibited a rising trend during 2010. The rise of 5.02 feet in MW-6 may be the result of the inactivity of the facility production well PW-1, higher than normal precipitation in the first quarter of 2010, and a small 2010 data set. The difference between the minimum and maximum groundwater elevations varied by 0.13 and 0.52 feet in monitor wells MW-7 and MW-10, and 0.04 feet in monitor well MW-18. The rising trend previously noted at MW-18 appears to have stabilized.

4.2. Groundwater Quality Data

Tables presenting water quality analytical data for the UPCO monitor wells are summarized in Appendix E. The perchlorate results for the UPCO monitor wells are provided in Table 6. The perchlorate results for the private wells are provided in Table 7. A table presenting historic water quality analytical data for the private wells is provided in Appendix F. Perchlorate concentration trend plots for each UPCO monitor well are presented in Appendix G. Field parameter data collected during the 2010 sampling events is provided in Appendix H. Figures 8 and 9 present perchlorate concentration maps for the First and Second Quarters of 2010, respectively.

4.2.1. Perchlorate

The Arizona Department of Health Services (ADHS) Health Based Guidance Level (HBGL) identified by ADEQ in the Order is 14 $\mu\text{g/L}$ for perchlorate. The laboratory reporting limit using the Order-specified EPA Method 314.0 is 2.0 $\mu\text{g/L}$. During the 2010 monitoring period, perchlorate was detected in monitor wells MW-1, MW-2, MW-5, MW-6, MW-11, and MW-13. Perchlorate was detected in groundwater samples collected from MW-1 at concentrations ranging from 69 $\mu\text{g/L}$ to 78 $\mu\text{g/L}$; from MW-2 at concentrations ranging from 90 $\mu\text{g/L}$ to 94 $\mu\text{g/L}$; from MW-5 at concentrations ranging from 27 $\mu\text{g/L}$ to 32 $\mu\text{g/L}$; from MW-6 at concentrations ranging from 16 $\mu\text{g/L}$ to 19 $\mu\text{g/L}$; from MW-13 at concentrations ranging from 12 $\mu\text{g/L}$ to 22 $\mu\text{g/L}$ and from MW-11 at a concentration of 2.0 $\mu\text{g/L}$.

Perchlorate was not detected at concentrations above the laboratory reporting limit (2.0 $\mu\text{g/L}$) in the remaining UPCO monitor wells.

During the 2010 monitoring period, perchlorate was not detected in the private domestic wells at a concentration above the EPA Method 314.0 laboratory reporting limit of 2.0 $\mu\text{g/L}$.

Groundwater collected from the site wells that historically have not detected perchlorate at concentrations above 2.0 $\mu\text{g/L}$, and each of the private domestic wells, were analyzed for perchlorate using two analytical test methods. The two methods included EPA Method 314.0, which is specified in the Order, and EPA Method 332.0. Two methods were performed for a comparative analysis between different perchlorate analytical testing methods. The results of the perchlorate comparative analyses for the site wells are included in Table 6, and show Method 332.0 concentration values ranging between 0.47 $\mu\text{g/L}$ in monitor well MW-3 and 2.1 $\mu\text{g/L}$ in monitor well MW-11. The results of the

perchlorate comparative analysis for the private wells are included in Table 7, and show Method 332.0 concentration values ranging between 0.58 µg/L and 1.2 µg/L.

4.2.2. VOCs

Two VOCs were detected during 2010 groundwater sampling activities including 1,4-dioxane and trichloroethene. 1,4-dioxane was detected in MW-2 at a concentration of 2.7 µg/L. An Aquifer Water Quality Standard (AWQS) has not been established for 1,4-dioxane. Trichloroethene (TCE) was detected in MW-3 at a concentration of 5.4 µg/L. The AWQS for TCE is 5.0 µg/L. TCE has not been detected in the UPCO monitor wells since groundwater monitoring began in 2004. There were no historical operations in the vicinity of MW-3. The TCE detection will be confirmed during the 2011 monitoring activities. Results for monitor well groundwater quality are provided in Appendix E.

4.2.3. Metals

Arsenic was detected in each of the UPCO monitor wells and ranged in concentration from 0.0014 mg/L to 0.051 mg/L in monitor well MW-18. The AWQS for arsenic is 0.05 mg/L. Barium was detected in each of the UPCO monitor wells and ranged in concentration from 0.0022 mg/L to 0.28 mg/L. The AWQS for barium is 2 mg/L. Chromium was detected in monitor wells MW-1, MW-2, MW-3, MW-5, MW-6, MW-7, MW-8, MW-10, MW-11, MW-12, MW-13, MW-14, and MW-18 and ranged in concentration from 0.0015 mg/L to 0.031 mg/L. The AWQS for chromium is 0.1 mg/L. Lead was detected in monitor wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-8, MW-10, and MW-14, and ranged in concentration from 0.0012 mg/L to 0.0029 mg/L. The AWQS for lead is 0.050 mg/L. Selenium was detected in monitor wells MW-11 and MW-14 and ranged in concentration from 0.0023 mg/L to 0.0027 mg/L. The AWQS for selenium is 0.05 mg/L. No other metals analyzed during the monitoring period were detected above the laboratory detection limits. Results for monitor well groundwater quality are provided in Appendix E.

4.3. Soil Vapor Quality Data

Soil gas samples were collected from soil vapor monitor well SVMW-1 and analytical results are provided in Table 8. The primary COPC, 1,1-DCE, ranged from 330 ppbv at 200 feet bgs to 11,000 ppbv at 100 feet bgs. Acetone ranged from less than 280 ppbv at 100 feet bgs to 740 ppbv at 40 feet bgs. Other VOCs detected in the soil gas samples, at a lower concentration, included, 2-butanone (MEK), tetrachloroethene and trichloroethene. Soil vapor monitoring well results 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, 2004b) and QAPP Addendum (Malcolm Pirnie, 2009c). The project specific QAPP establishes procedures and guidance for the following:

- data quality objectives;
- sample documentation and custody;
- sample container requirements;
- quality control procedures; and
- quality assurance management including, data management and data verification/validation procedures.

Samples were collected and submitted to the laboratory in a manner that provides data that are representative of site conditions. Laboratory analyses were conducted according to analytical methods described in EPA guidance manuals. Field quality control (QC) samples included field duplicates and trip blanks. Laboratory QC samples included method blanks, laboratory control samples (LCS), and matrix spike/matrix spike duplicate (MS/MSD) samples.

Laboratory deliverables consist of Level II data packages (including a QC summary). Data reported by the laboratory has been verified that the data meets the data quality objectives. The results were considered usable for the intended purposes, and the project data quality objectives (DQOs) specified in the QAPP (H+A, 2004b) and QAPP Addendum (Malcolm Pirnie, 2009c) were met.

6. Future Monitoring Activities

The 2010 monitoring program was conducted in accordance with the procedures and methods outlined in the Updated Groundwater Monitoring Plan (Malcolm Pirnie, 2008a). 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. Former production well PW-1 will continue to be utilized for site-wide monitoring well once the well has been converted to a monitor well. Private domestic wells will continue to be monitored on a semi-annual basis, in the first and third quarters of 2011. The shift in the private well monitoring schedule was due to the delay in obtaining the long term site access agreement from the State Land Department. The 2011 sampling and analysis schedule is summarized in Table 10.

7. References

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