FINAL REPORT

ADDITIONAL SITE CHARACTERIZATION WORK PLAN
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Prepared on behalf of:

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and

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Submitted by:

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AMEC Project No. 14-2012-2015

November 19, 2012

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Expires 9/30/2014

November 19, 2012
AMEC Project No. 1420122015

Maricopa County Risk Management
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Attn: Rita Neill, PE

Re: Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, AZ

Transmitted herewith for your submittal to the Arizona Department of Environmental Quality is the subject work plan documenting recent site characterization efforts, the current understanding of the conceptual site model, and a plan to collect additional information supporting development of a Revised Remedial Action Plan for the Maricopa County Cave Creek Landfill.

Please contact the undersigned at 602.733.6000 with any questions or requests for additional information.

Respectfully submitted,

AMEC Environment & Infrastructure, Inc.

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and:

Laura Menken, PG
Project Hydrogeologist

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ELECTRONIC FILES

Disk 1 Laboratory Analytical Reports – Well Installation Activities
Laboratory Analytical Reports – Groundwater Sampling
Laboratory Analytical Reports – Soil Vapor Sampling

LIST OF ACRONYMS AND ABBREVIATIONS

1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2-DCB	1,2-dichlorobenzene
acfm	actual cubic ft per minute
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
AEL	Airtech Environmental Laboratories
AMA	Phoenix Active Management Area
AMEC	AMEC Environment & Infrastructure, Inc.
AMSL	above mean sea level
AWQS	Aquifer Water Quality Standard
BAS	Bryan A. Stirrat & Associates
bgs	below ground surface
BLM	Bureau of Land Management
$CaCO_3$	Calcium Carbonate
CAS	Columbia Analytical Services
CCL	Maricopa County Cave Creek Landfill
cis-1,2-DCE	cis-1,2-dichloroethene
CO	Consent Order
COC	contaminant of concern
COP	City of Phoenix
COS	City of Scottsdale
CSM	conceptual site model
EPA	United States Environmental Protection Agency
ESRV	East Salt River Valley
FID	flame ionization detector
ft	feet
gal	gallon
GCWP	Cave Creek Landfill Groundwater Characterization Work Plan
H_2O	water
HCL	hydrochloric acid
HDPE	high-density polyethylene
HP	horsepower
hrs	hours
IDW	investigation derived waste
in	inches
L/min	liters per minute
Layne	Layne Christensen Company
lbs	pounds
LCRS	leachate collection and recovery system
LCS	low carbon steel
LFG	landfill gas

LIST OF ACRONYMS AND ABBREVIATIONS

MAU	Middle Alluvial Unit
MCAQD	Maricopa County Air Quality Department
MCRM	Maricopa County Risk Management Department
MCWRRM	Maricopa County Waste Resources & Recycling Department
MEK	methyl ethyl ketone (or 2-butanone)
µg/L	micrograms per liter
mg/m^3	milligrams per cubic meter
mLs/min	milliliters per minute
min	minute
MSU	municipal solid waste
NOI	Notice of Intent
OD	outside diameter
P Well	perimeter well
PCE	tetrachloroethene
PDB	passive diffusion bag
PID	photoionization detector
PW	Production Well
RAO	remedial action objective
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
scfm	standard cubic feet per minute
Sch	Schedule
Southwest Exploration	Southwest Exploration Services, LLC.
SVE	soil vapor extraction
SVOCs	semi-volatile organic compounds
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
THF	tetrahydrofuran
trans-1,2-DCE	trans-1,2-dichloroethene
TSD	Treatment, Storage, and Disposal
UAU	Upper Alluvial Unit
USGS	U.S. Geological Survey
V	volt
VOA	volatile organic analysis
Work Plan	Additional Site Characterization Work Plan
Yellow Jacket	Yellow Jacket Drilling Company

1.0 INTRODUCTION

This *Additional Site Characterization Work Plan* (Work Plan) presents a strategy for collecting site characterization information at the closed Maricopa County Cave Creek Landfill (CCL) to support ongoing remedial action planning for trichloroethene (TCE)-impacted groundwater underlying the site. The Work Plan supplements previous remedial investigation work plans prepared to characterize the nature and extent of site contamination, including:

- *Cave Creek Landfill Groundwater Characterization Work Plan* (GCWP) prepared by Bryan A. Stirrat & Associates (BAS) dated August 26, 2005;
- *Addendum to the Cave Creek Landfill Groundwater Characterization Work Plan* (Addendum) prepared by AMEC Environment & Infrastructure (AMEC) dated May 11, 2009; and
- *Focused Work Plan for Groundwater Characterization near the Old Landfill* prepared by Maricopa County Solid Waste Management and dated September 6, 2011.

The activities presented in these documents are complete but further information is required to develop a Revised Remedial Action Plan (RAP) for site implementation. The intent of this Work Plan is to:

- Document the results of recent site characterization efforts to fulfill requirements of the January 2010 Consent Order (CO) (ADEQ, 2010) between Maricopa County and the Arizona Department of Environmental Quality (ADEQ);
- Present the current Conceptual Site Model (CSM) describing the nature and extent of groundwater contamination at CCL;
- Identify data gaps required to adequately develop a Revised RAP pursuant to the CO; and
- Provide a proposed technical approach, scope of work, and schedule to address identified data gaps for ADEQ review and comment.

The following sections summarize relevant background information supporting the review and evaluation of data documented herein. Further background information is presented in the previous remedial investigation work plans identified above.

1.1 Site Description

The CCL site is located in Maricopa County, approximately a half mile south of Carefree Highway and two miles west of Cave Creek Road. Site access is from Carefree Highway and the address is 3955 East Carefree Highway, Phoenix, Arizona. Figure 1 presents a recent site aerial with property boundaries and the estimated extent of past landfill operations.

Landfill Construction. CCL consists of two landfill regions located on adjoining properties. The Old Landfill waste placement area is approximately 35 acres in extent and is located on the 40-acre Bureau of Land Management (BLM) property in the northeast portion of the site. There is limited available information regarding construction of this landfill but boring logs from relatively recent soil vapor well installation activities indicate that the cover is approximately 2 ft (ft) thick and the base of waste (which was placed directly on native soil) is at approximately 17 to 22 ft below ground surface (bgs) (SCS Engineers, 2005). At an average surface elevation of 1,897 ft above mean sea level (AMSL), these depths correspond to elevations of 1,875 ft to 1,880 ft AMSL.

The New Landfill waste placement area is approximately 32 acres in extent and is located on the 74.7-acre property owned by Maricopa County. The New Landfill was constructed in phases and includes cells constructed before and after federal regulations were promulgated that established minimum technical standards and guidelines for the management of nonhazardous solid waste (i.e., Resource Conservation and Recovery Act [RCRA] Subtitle D). The pre-Subtitle D region includes Cell A in the northern portion of the New Landfill and Cell B in the central portion of the New Landfill (see Figure 1; cell boundaries are approximate). Both of these cells are unlined (the base of waste was placed directly on native soil). Cell C, which is about 5.8 acres in extent, is the post-Subtitle D region of the New Landfill; this cell is underlain with a high-density polyethylene (HDPE) liner and includes a leachate collection and recovery system (LCRS). The depth of waste in the New Landfill varies by cell:

- Cell A: Given boring logs for wells installed in the northern portion of Cell A which indicate the depth to the base of the landfill is approximately 38 to 58 ft bgs (SCE Engineers, 2005) and current topographic survey data for the site (which indicates the surface elevation of Cell A currently ranges from approximately 1,899 to 1,903 ft AMSL), the base of the waste is between 1,843 and 1,863 ft AMSL. This range in elevation includes the elevation for the base of the waste reported in the design drawings for the landfill which is 1,850 ft AMSL (Dames & Moore, 1994).

- Cell B: Design drawings for the landfill indicate the base of the waste in Cell B is at approximately 1,820 ft AMSL (Dames & Moore, 1994). According to current topographic survey data for the site, the surface elevation of Cell B ranges from approximately 1,895 to 1,910 ft AMSL which results in a landfill thickness of between75 and 90 ft.

- Cell C: The base of the waste in Cell C is approximately 1,820 ft AMSL per landfill design drawings (Dames & Moore, 1994). There are no wells located in Cell C; however, the surface elevation of Cell C is consistent with Cell B so the landfill thickness in this region of the landfill is expected to be comparable to Cell B.

The thickness of cover in the New Landfill is 3 ft. A landfill gas (LFG) collection system was installed in Cells A and B of the New Landfill but is not currently in operation.

Landfill Operations. CCL began operations in 1965 at the Old Landfill, transitioned to the New Landfill in 1984 and ceased accepting waste in 1998. In the early 1990s, the daily tonnage averaged between 500 and 750 tons per day. The CCL was permitted to accept residential and commercial municipal solid waste (MSU) and other wastes including: appliances, barnyard and

stable waste, demolition material, non-infectious medical waste, domestic animals (large and small), green waste, foods, and inert materials.

Other Site Infrastructure. The remainder of the CCL site consists of the currently operating Maricopa County Cave Creek Waste Transfer Station (directly west of the Old Landfill and north of the New Landfill), a buffer zone located to the north, west and south of the New Landfill, and multiple storm water retention areas located throughout the site. The transfer station is open to the public and receives both refuse and recyclables which are temporarily stored in bins and then removed to appropriate off-site facilities on a regular basis.

A groundwater production well (PW) is located adjacent to the transfer station; this well was installed in 1982 to supply water for fire and dust control purposes. Figure 2 presents the location of PW and numerous groundwater, LFG, and soil vapor monitoring wells installed to support regulatory compliance and site characterization.

The entrance to the CCL site at Carefree Highway is gated and locked during non-business hours. A chain-link fence surrounds the transfer station; other accessible areas are fenced with four-strand barbed wire.

Adjacent Land Use. Adjoining properties include Arizona State Trust Land to the north, west and south of the site and the Dove Valley Ranch Golf Course and residential community to the east of the site. Arizona State Trust Land is undeveloped desert; this land is included in the Phoenix Sonoran Preserve Master Plan as open space (City of Phoenix Parks, Recreation, and Library Department, 1998). A golf course club house and maintenance building are located on golf course property directly south of the CCL access road and east of the New Landfill. Newly constructed single-family homes are located along the eastern toe of the New Landfill in the southern portion of the site.

The City of Phoenix (COP) provides drinking water to these commercial and residential properties using groundwater wells and surface water supplies sourced from outside the immediate vicinity of CCL.

1.2 Involved Parties

Responsibility for CCL site investigation and remediation is shared between two Maricopa County departments. The Maricopa County Waste Resources & Recycling Department (MCWRRM; formerly the Solid Waste Management Department) maintains the closed CCL, performs routine soil vapor and groundwater monitoring, and operates the Cave Creek Waste Transfer Station. The Maricopa County Risk Management Department (MCRM) directs activities conducted to address the CO and has contracted AMEC to investigate environmental impacts of past landfilling operations and support Maricopa County with regulatory compliance. Contact information is provided on the following page:

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1.3 Project Background

Table 1 presents a chronological summary of CCL site history to date, including operational, regulatory and site characterization information. An overview of significant CCL site characterization activities follows:

- In response to the detection of TCE in groundwater at concentrations exceeding the Arizona Aquifer Water Quality Standard (AWQS) of 5 micrograms per liter (μg/L) in samples collected from site well MW-1, Maricopa County entered into a CO in 1999 with ADEQ requiring characterization of the nature and source of site groundwater contamination. Preliminary soil vapor and LFG sampling was conducted in 1999 to evaluate potential site contamination; the concentrations of TCE observed in LFG extracted from the New Landfill (2.2 to 2.7 milligrams per cubic meter [mg/m^3]) were consistent with concentrations typically present in MSW landfills (BAS, 2008). TCE was also detected at trace levels (0.14 mg/m^3) in a shallow soil vapor sample collected from a perimeter well (P well) located southwest of the Old Landfill, in the vicinity of the transfer station. On the basis that low concentrations of TCE were detected in groundwater samples collected from PW in 1985 (only a year after operations began at the New Landfill), Maricopa County's consultant Dames & Moore concluded that the Old Landfill contained the source of TCE groundwater contamination.

- Following installation of soil vapor monitoring wells screened below the Old and New Landfills, soil vapor sampling was conducted in 2004. Results presented in the *Soil Vapor Assessment Report, Cave Creek Landfill* (SCS Engineers, 2005) indicated the presence of relatively low concentrations of TCE, 1,1-dichloroethene (1,1-DCE), and tetrachloroethene

(PCE) beneath the New Landfill. The primary compounds associated with samples collected from beneath the Old Landfill included 1,1-DCE and PCE. The report concluded that mobilized LFG, contaminated with TCE derived from landfill waste, could be the contaminant pathway responsible for groundwater impacts. LFG is produced during the biological degradation of waste placed in landfills and can migrate from unlined landfills both laterally and vertically due to diffusion, pressure gradients, and the permeability of subsurface strata.

- The GCWP prepared by BAS in 2005 further advanced the LFG-groundwater contamination pathway and identified the need for an additional groundwater monitoring well (i.e., MW-3) to define the extent of groundwater impacts. On August 31, 2006, ADEQ issued a letter to Maricopa County accepting the work plan with the provision that additional monitoring wells would need to be installed if MW-3 "…fails its intended purposes of assessment and characterization of the nature and extent of releases." (ADEQ, 2006).

- The GCWP also discussed a video survey that took place in December 2004 at wells MW-1, MW-2, and PW. The video survey was conducted to evaluate well construction and screen conditions after regional water table declines prevented collection of representative groundwater samples in these wells. Video logs indicated groundwater at the time of the video survey was between 676 and 696 ft bgs in MW-2 and PW, respectively. In response to this survey, the casing in PW was perforated with an in-hole perforating tool in January 2005 from 680 to 760 ft below the top of casing (btoc). To accommodate the declining water table, MW-1 and MW-2 were deepened by drilling through the base of these existing wells to 820 and 805 ft bgs, respectively, during January and February 2005.

- In August 2007, Maricopa County attempted to raise the dedicated electrical submersible pump in MW-1 for servicing. During the attempted removal, the pump became firmly lodged inside the well casing, rendering it inoperable. Additional attempts to remove the pump were unsuccessful and as a result, sampling of MW-1 is not possible. The last groundwater sample collected from MW-1 was analyzed in June 2007. The well remains unused, but not abandoned.

- Meetings between ADEQ and Maricopa County on March 24, 2008 and April 8, 2008 resulted in a general consensus that groundwater characterization was not complete and the installation of additional monitoring wells was necessary to adequately delineate the extent of groundwater contamination at the site. In response, the Addendum prepared by AMEC on behalf of Maricopa County was submitted to ADEQ in May 2009. The purpose of the Addendum was to outline a groundwater characterization approach including the installation of test borings and sampling of associated groundwater in advance of monitoring well completion to appropriately locate permanent monitoring wells. The Addendum also included plans for the vertical characterization of groundwater contamination in MW-2 with passive diffusion bag (PDB) samplers and the adjustment of dedicated pump depths in site monitoring wells to support the collection of samples from comparable depths below the water table across the site.

Although the results of many of the activities identified in the Addendum were documented in the *Revised Interim Technical Summary Memorandum* submitted to ADEQ in August 2011

(AMEC, 2011a), this Work Plan includes a comprehensive presentation of recent site characterization efforts including:

- Groundwater well installation activities conducted since the installation of MW-3 (i.e., the wells proposed in the Addendum, a new well located south of the Old Landfill and a supplementary well located south of the New Landfill in a test boring indicating an elevated concentration of TCE during drilling);
- The data derived from ongoing groundwater and soil vapor monitoring activities;
- Deep soil vapor well TSSV-1 installation and sampling; and
- The results of soil vapor extraction (SVE) testing activities described in the *Extended Soil Vapor Extraction Pilot Test Work Plan, Cave Creek Landfill* (AMEC, 2011b).

2.0 DOCUMENTATION OF RECENT SITE CHARACTERIZATION EFFORTS

2.1 Groundwater Well Installation and Sampling

2.1.1 2010-2011 Well Installation Program

To define the lateral extent of TCE impacted groundwater downgradient of the New Landfill, the Addendum identified the advancement of up to six test borings on Arizona State Trust Land, south of Maricopa County property, with completion of up to three monitoring wells in test borings based on the results of groundwater sampling during drilling. Planned test borings included:

- TB-1 and TB-2 located southeast of MW-2;
- TB-3 and TB-4 located southwest of MW-2; and
- TB-5 and TB-6 located downgradient/south of MW-2.

Four of the six proposed test borings were drilled during the 2010-2011 Well Installation Program and include TB-1, TB-2, TB-4, and TB-5. Three of these borings (TB-2, TB-4, and TB-5) were completed as monitoring wells.

2.1.1.1 Test Boring Advancement and Groundwater Sampling

Test borings TB-1, TB-4 and TB-5 were drilled by Layne Christensen Company (Layne) between September and December 2010 (see Figure 2 for boring locations). Yellow Jacket Drilling Company (Yellow Jacket) drilled test boring TB-2 between March and May 2011. All test borings were drilled as pilot borings with a 5-1/2 inch (in) outside diameter (OD) bit using air rotary and mud rotary drilling methods. Air rotary was initially used to drill to the water table at the first boring drilled (TB-5), but issues with borehole collapse required a change to mud rotary to maintain borehole stability. Remaining borings were drilled using mud rotary to approximately 50 ft above the water table, after which air rotary was used to minimize the introduction of drilling fluids into the borehole. The borings were visually logged at 10-ft intervals from cuttings. Appendix A presents boring logs. Additional data such as boring headspace photoionization detector (PID) readings, four gas (oxygen, carbon dioxide, carbon monoxide, and methane) meter readings, mud cake wall thickness, mud viscosity and density, vertical deviation, and drilling characteristics were recorded in the field during drilling. The only significant issues noted during drilling were borehole collapse and the need to control airborne dust generation. Small amounts of Hydrogel were used to stabilize the boreholes as needed. Dust control activities were conducted in accordance with a Maricopa County Air Quality Department (MCAQD) dust control permit.

TB-1 was drilled to 718 ft bgs and TB-2 was drilled to 720 bgs. TB-4 and TB-5 were drilled to 700 ft bgs. During drilling, groundwater levels were measured at 695.00 ft bgs, 695.75 ft bgs, 681.40 ft bgs, and 686.15 ft bgs in TB-1, TB-2, TB-4 and TB-5, respectively.

Groundwater samples were collected from each test boring by airlifting mud and water from the open borehole, allowing groundwater to infiltrate back into the borehole, and then retrieving

approximately 5 gal of groundwater from the top 10 ft of the groundwater table with a decontaminated stainless steel bailer. Collected groundwater was poured directly from the bailer into laboratory-provided volatile organic analysis (VOA) vials preserved with hydrochloric acid (HCl). AMEC submitted ice-preserved samples under chain of custody to Test America in Phoenix, Arizona (Arizona Department of Health Services [ADHS] License Number AZ0728) for volatile organic compound (VOC) analysis by United States Environmental Protection Agency (EPA) Method 8260B.

A groundwater sample was not collected from TB-2 due to borehole caving and dust control issues which necessitated mud rotary drilling into the groundwater table.

TCE concentrations in grab samples collected from TB-1, TB-4, and TB-5 were 16 µg/L, less than 0.50 µg/L, and 2.3 µg/L, respectively. Full laboratory analytical reports for these samples are provided on Disk 1 (Well Installation Activities). After review of these results by Maricopa County and ADEQ, TB-2, TB-4, and TB-5 were completed as monitoring wells. TB-1 was capped and secured for future consideration as a monitoring well.

2.1.1.2 Monitoring Well Installation and Development

Layne installed groundwater monitoring wells MW-4 in TB-5 and MW-5 in TB-4. Yellow Jacket installed MW-6 in TB-2. Figure 2 presents the locations of completed wells. TB-4 and TB-5 pilot borings were over reamed with a 12-1/4 in OD drill bit using reverse circulation mud rotary. Total drill depths for TB-4 and TB-5 were 767 and 768 ft bgs, respectively. The TB-2 pilot boring was over reamed using mud rotary with a 10-5/8 in OD drill bit to 777 ft bgs. Once total depth was achieved for all borings, down-hole geophysics was performed by Southwest Exploration Services, LLC (Southwest Exploration). The logging suite included gamma, caliper, and electric (SP, short and long normal resistivity) logs. Appendix B presents geophysical logs.

MW-4, MW-5 and MW-6 are constructed of 6-in diameter low carbon steel (LCS) casing and are completed as follows:

- MW-4 is screened from 667.5 to 752.7 ft bgs;
- MW-5 is screened from 660.0 to 740.2 ft bgs; and
- MW-6 is screened from 675.0 to 764.4 ft bgs.

The well screens are comprised of vertical 0.125-in slots. Sumps are present at the bottom of the screens. Table 2 summarizes construction information for each well including well casing materials, screened intervals, and corresponding ADWR well numbers. A construction diagram for each monitoring well is included in Appendix C.

Prior to annular material installation, the drillers thinned out the drilling fluid with water to remove mud from the borehole and well screens. Annular materials in MW-4 and MW-5 consist of:

- Gravel pack (3/8-in Tacna Gravel) installed in the screened interval;
- 8-12 mesh Colorado silica sand for the transition seal;

- Hydrated bentonite pellets (Pel-Plug 1/4-in TR30) for the bentonite seal; and
- Cement-bentonite grout from the bentonite seal to the surface.

Annular materials in MW-6 consist of:

- Gravel pack (TSG 3/8-in x 3/16-in) installed in the screened interval;
- 10-20 mesh Colorado silica sand for the transition seal;
- Hydrated bentonite pellets (Pel-Plug 1/4-in pellets TR30) for the bentonite seal; and
- Cement-bentonite grout from the bentonite seal to surface.

Materials were installed via tremie. The gravel pack was surged to prevent bridging prior to installation of the transition and bentonite seals. Continuous tagging of the material was performed throughout installation. Once annular materials were installed, air lifting was performed to flush out the screened interval/gravel pack and remove any residual mud or sediment. The surface of each well was then completed with an above-ground, lockable steel monument and four surrounding concrete bollards to protect the monument.

During surging in MW-6, the surge block was detached from the cable line and fell to the bottom of the well. Yellow Jacket was able to retrieve the surge block; however, retrieval efforts resulted in shifting the well casing down into the borehole by approximately 8 ft from the original installed position. To accommodate this shift, additional blank well casing was added to the top of the well and a perforating tool was used to extend perforations from 675 to 682.5 ft bgs in the blank casing above the installed well screen.

MW-4, MW-5 and MW-6 were developed using the surge, bail and pump method. The wells were surged and bailed until the water in the casing at the bottom of the wells was generally free of sediment. A decontaminated 4-in diameter submersible stainless steel Grundfos development pump with discharge piping was then installed in each well and pumped within the screened interval. Development continued in MW-4 until the water pumped from the well was visually clear of fine sediment and mud. The results of water quality monitoring including pH, conductivity, temperature, and turbidity were used to determine the duration of development at MW-5 and MW-6. Pumping continued until readings stabilized and water clarity was as best as could be attained. Following development, new 4-in diameter submersible stainless steel Grundfos pumps with 1¼-in galvanized steel discharge piping and associated motor leads were installed in each well. Target pump installation depths were within the screened interval and approximately 20 ft below the water table. A free-hanging 1¼-in diameter polyvinyl chloride (PVC) sounding tube, suspended from each well cap was also installed during pump installation activities.

Due to the loss of the surge block in MW-6 during placement of annular material, Southwest Exploration conducted a video log of MW-6 after development and prior to pump installation to verify the integrity of the well screen/casing and document the perforations made by the perforating tool; the log confirmed that the screen and casing had not been damaged during surge block removal efforts.

Maricopa County surveyed MW-4, MW-5, and MW-6 following the completion of pump installation activities. Table 2 summarizes survey information including top of sounder casing elevations used in calculating groundwater elevations.

2.1.1.3 IDW Management

During drilling and well installation activities, investigation derived waste (IDW) consisted of soil cuttings, drilling fluids (i.e., mud and formation water), development water and a negligible quantity of solid waste (e.g., drilling and annular material supply bags).

Soil cuttings were contained in lined roll-off bins and drilling fluids/development water were contained in poly tanks. Soil cuttings generated above and below the groundwater table were segregated in separate roll-off bins. Since the borings were advanced in undeveloped desert, cuttings generated above the water table were characterized based on source as clean fill and immediately transported to Maricopa County CCL property where they were deposited in the buffer zone west of the New Landfill. Cuttings generated below the water table were segregated by boring and temporarily stored until results from groundwater well sampling activities were available. After reviewing the results of associated groundwater well sampling analytical data which indicted that none of the completed wells contained concentrations of contaminants in groundwater exceeding applicable AWQS values, soil cuttings generated below the water table, drilling fluids, and development water were transported to Maricopa County CCL property and deposited in the buffer zone west of the New Landfill. Analytical results for collected groundwater samples are summarized in Appendices E and F; full laboratory analytical reports for these samples are provided on Disk 1 (Groundwater Sampling).

Solid waste was temporarily stored in garbage bags and then disposed of at the Cave Creek Waste Transfer Station as MSW.

2.1.2 2011-2012 Well Installation Program

Following a June 28, 2011 meeting between ADEQ and Maricopa County to discuss site characterization activities, conversion of TB-1 to a permanent monitoring well location was reconsidered. It was believed that this well would be useful in delineating TCE-impacted groundwater in the vicinity of the residential neighborhood east of the New Landfill. The well was identified as MW-7 and added to a planned drilling program to assess whether groundwater downgradient of the Old Landfill is impacted. Maricopa County identified the planned well south of the Old Landfill as MW-8.

2.1.2.1 Monitoring Well Installation and Development

Installation of groundwater monitoring well MW-7 in TB-1 and MW-8 south of the Old Landfill (see Figure 2) was conducted between December 2011 and February 2012. Yellow Jacket drilled both wells using the mud rotary drilling method. TB-1 was over reamed with a 12-3/4 in OD drill bit to 765 ft bgs. The soil boring for MW-8 was drilled using a 15-in OD drill bit to 766 ft bgs. During drilling, the boreholes were logged from cuttings every ten ft to total depth. Only the deepened portion of the MW-7 over reamed borehole was logged during the 2011-2012 Well Installation Program since this boring as TB-1 had already been logged. Appendix A presents

boring logs. Additional data such as boring headspace PID readings, four gas meter readings, mud cake wall thickness, mud viscosity and density, vertical deviation, and drilling characteristics were recorded in the field during drilling. No significant issues based on the results of monitoring were noted.

Once total depth was achieved, Southwest Exploration logged the boreholes using down-hole geophysics prior to well installation activities. The logging suite included gamma, caliper, and electric logs in both MW-7 and MW-8. A sonic log was also conducted in MW-8 to evaluate the depth to groundwater and assist in well screen placement. Based on the sonic log, groundwater was estimated to be at approximately 715 ft bgs. Geophysical logs are included in Appendix B.

MW-7 and MW-8 are constructed of 8.25-in diameter LCS casing and are completed as follows:

- MW-7 is screened from 674.8 to 754.8 ft bgs; and
- MW-8 is screened from 691.5 to 761.5 ft bgs.

The well screens are comprised of vertical 0.125-in slots. Sumps are present at the bottom of the screens. Table 2 summarizes construction information for each well including well casing materials, screened intervals, and corresponding ADWR well numbers. A construction diagram for each monitoring well is included in Appendix C.

Once the well casings were emplaced, the driller thinned out the drilling fluid with water to remove mud from the borehole and well screens. Annular materials were installed via tremie and included:

- Gravel pack (TSG 3/8-in x 3/16-in) installed in the screened interval;
- 8-12 mesh Colorado silica sand for the transition seal;
- Hydrated bentonite pellets (3/8-in coarse grade Holeplug) for the bentonite seal; and
- Cement-bentonite grout from the seal to the surface.

The gravel pack was surged to prevent bridging prior to installation of the transition and bentonite seals. Once annular materials were installed, air lifting was performed to flush out the screened interval/gravel pack and remove any residual mud or sediment. The surface of each well was then completed with an above-ground, lockable steel monument and four surrounding concrete bollards to protect the monument.

MW-7 and MW-8 were developed using the surge, bail and pump method. The wells were surged and bailed until the water in the casing at the bottom of the wells was generally free of sediment. A decontaminated 4-in diameter submersible stainless steel Grundfos development pump with discharge piping was then installed in each well and pumped within the screened interval. The results of water quality monitoring including pH, conductivity, temperature, and turbidity were used to determine the duration of development. Pumping continued until readings stabilized and water clarity was as best as could be attained. Following development, new 4-in diameter submersible stainless steel Grundfos pumps with 2-in galvanized steel pump discharge piping and associated motor leads were installed in each well. Target pump

installation depths were within the screened interval and approximately 20 ft below the water table. A free-hanging 1½-in diameter PVC sounding tube, suspended from each well cap was also installed during pump installation activities.

After installation activities were complete, the pumps were tested to confirm they were functional. The wells were also sampled at this time. Water quality parameters, water level measurements, and flow rates were also recorded. Once stabilization of the parameters was achieved and three well volumes were purged, a groundwater sample was collected from both wells. AMEC submitted ice-preserved samples under chain of custody to Test America in Phoenix, Arizona (ADHS License Number AZ0728) for VOC analysis by EPA Method 8260B. Further discussion regarding these groundwater results is presented in Section 2.1.3.

Maricopa County surveyed MW-7 and MW-8 following the completion of pump installation activities. Table 2 summarizes survey information including top of sounder casing elevations used in calculating groundwater elevations.

2.1.2.2 IDW Management

As in previous well installation programs, soil cuttings were contained in lined roll-off bins and segregated by well and depth interval (above or below the water table). Drilling fluids (i.e., mud and formation water) as well as development water were contained in poly tanks. Since MW-8 was installed immediately adjacent to the Old Landfill, grab samples of cuttings (both above and below the water table) and drilling fluids were collected to determine an appropriate management strategy for the waste (cuttings and liquids associated with MW-7 were also sampled for completeness).

AMEC submitted ice-preserved and methanol-extracted (cuttings only) samples under chain of custody to Test America in Phoenix, Arizona (ADHS License Number AZ0728) for VOC analysis by EPA Method 8260B. Sample results indicated no reportable concentrations of VOCs in cuttings generated from either MW-7 or MW-8. Development water contained low levels of toluene (3.1 µg/L) which is well below the applicable AWQS of 1,000 µg/L for this compound. Full laboratory analytical reports for these samples are provided on Disk 1 (Well Installation Activities). On the basis of these results, all cuttings, drilling fluids and development water were transported to Maricopa County CCL property and deposited in the buffer zone west of the New Landfill.

All solid waste generated during the drilling program was temporarily stored in garbage bags and then disposed of at the Cave Creek Waste Transfer Station as MSW.

2.1.3 Groundwater Monitoring

As presented in Figure 2, the CCL groundwater monitoring well network consists of wells located at CCL and surrounding properties. MW-1 and MW-2 were the first CCL monitoring wells installed and were completed in May 1993 to support landfill permitting. Detection of elevated concentrations of TCE at MW-1 in December 1997 prompted Maricopa County to enter into a CO with ADEQ to characterize the nature and source of site groundwater contamination. In order to adequately evaluate groundwater impacts, ADEQ and Maricopa County agreed that

additional monitoring wells were needed. Maricopa County installed MW-3 to fill a data gap to the east of CCL in 2007 and MW-4 through MW-7 south of the New Landfill from 2010 through 2012 to define the southern extent of the groundwater plume (see Sections 2.1.1 and 2.1.2). MW-8 was installed south of the Old Landfill along the site access road in 2012 to evaluate whether the Old Landfill is contributing to groundwater contamination (see Section 2.1.2). As of August 2007, collection of groundwater samples from MW-1 has not been possible; the well is obstructed by the dedicated well pump which is firmly lodged in the well (multiple attempts to remove the pump have been unsuccessful).

The site groundwater monitoring program currently consists of monthly groundwater level gauging and quarterly groundwater sampling of the CCL monitoring well network. Groundwater gauging is conducted using a water level well indicator in dedicated sounding tubes; all depths to groundwater are referenced from permanent, surveyed measurement points (i.e., the northern rim of the sounding tube) and measured to the nearest 0.01 foot (see Table 2 for survey data).

During quarterly groundwater sampling activities, three well volumes are purged from the wells prior to sampling using dedicated groundwater pumps. Temperature, pH, and specific conductivity measurements are measured to evaluate stabilization during well purging; these measurements are recorded in field documentation. Groundwater samples collected at the conclusion of purging are analyzed for VOCs plus acrolein, acrylonitrile, and 2-chloroethyl vinyl ether by EPA Method 8260B. In addition, samples are analyzed for total dissolved solids (TDS) by SM2540C, metals by EPA 200.7, nitrite by SM4500-NO2B, inorganic anions by EPA 300, and alkalinity as calcium carbonate ($CaCO_3$) by SM2320B. Appendices E and F summarize the results of analysis for compounds present at reportable concentrations in groundwater since 1985. Due to the duration of record, the data are produced by multiple laboratories with varying analyte lists. Laboratory analytical reports for samples collected since 2009 are provided on Disk 1 (Groundwater Sampling).

Purge water generated from quarterly groundwater sampling activities is currently contained during purging in a portable 1,500-gallon (gal) water tank. Management of purge water is based on the analytical data collected during the previous groundwater monitoring event. If the groundwater samples collected from a well indicate that all VOC concentrations are less than applicable AWQS values, the water is used for dust control on Maricopa County CCL property or it is discharged into CCL retention basins. If there is a possibility that any of the AWQS values are exceeded, the purge water extracted from the associated well is transferred from the portable tank into a 5,000-gal tank located on Maricopa CCL property for temporary storage. The contained water is sampled for VOCs by EPA Method 8260B. If results indicate that AWQS values are exceeded, the water is removed by a subcontractor for treatment and permitted discharge to the COP sanitary sewer.

In June of 2009, Maricopa County conducted vertical characterization of VOCs in groundwater via PDB sampling in MW-2. PDBs filled with deionized water were suspended in MW-2 at depths of 695 ft bgs (1,161 ft AMSL), 715 ft bgs (1,141 ft AMSL), and 735 ft bgs (1,121 ft AMSL) on May 21, 2009. On June 9, 2009 (nineteen days later), the PDBs were retrieved and the

contents were analyzed for VOCs by EPA Method 8260B. The depth to groundwater at the time of monitoring was 690 ft bgs.

2.1.3.1 Groundwater Elevation

Appendix D presents available depth to water measurements for all monitored wells from 2001 to date. Table 3 summarizes corresponding groundwater elevation data. Hydrographs depicting changes in groundwater elevation over time are presented in Figure 3. Although there is some variability in the data (particularly in early 2005 when a water level indicator malfunctioned), the hydrographs show a steady decline in groundwater elevations over time due likely to regional groundwater withdrawal activities. From 1993 to September 2012, the average decline in groundwater elevations at CCL was approximately 3.7 to 3.9 ft per year (based on PW and MW-2 data). As of the past two years (September 2010 through September 2012), the rate of decline has slowed to approximately 1.2 ft per year.

2.1.3.2 Groundwater Gradient and Direction

Groundwater elevations at PW, MW-2 MW-3, MW-4, MW-5, MW-6, MW-7, and MW-8 are used to estimate groundwater flow gradient and direction at CCL. These parameters are currently calculated on a monthly basis (following monthly groundwater gauging) using the EPA On-line Tools for Site Assessment Calculation (EPA, 2012). Estimates of groundwater flow direction and gradient based on these calculations are reported in Table 3 along with groundwater elevation data for all monitored wells from 2005 to date (availability of consistent data prior 2005 is limited). Flow direction is measured in a clockwise rotation from north; north is 0 degrees, east is 90 degrees, south is 180 degrees, and west is 270 degrees.

Calculated gradients since 2005 range from 0.002 to 0.009 ft/ft; the average gradient is 0.003 ft/ft. These data indicate the groundwater gradient at the site is relatively flat and does not vary significantly.

From 2005 to date, the calculated groundwater flow direction has ranged from 92 to 266 degrees from north. The average groundwater flow direction during this period is 159 degrees from north. These data indicate that although groundwater flow at the site fluctuates from east to west, the predominant direction of groundwater flow is to the south to southeast. Fluctuations in gradient and flow direction are potentially a response to regional groundwater withdrawals (predominantly from municipal wells located to the east and southeast of the site), large precipitation events, and storm water runoff recharge. Additional discussion is presented in Section 3.1.

Figure 4 presents the interpreted potentiometric surfaces for the monitored water-bearing zone and the associated groundwater gradient and flow directions on December 2011, January 2012, March 2012, and May 2012. The dates selected represent recent data sets over time with the most complete spatial coverage. These include measurements from wells installed as part of the 2010-2011 Well Installation Program. As shown in Figure 4, groundwater flow has been close to due south since January 2012.

2.1.3.3 Groundwater Quality

TCE Concentrations over Time. Pursuant to the CO, TCE is the primary contaminant of concern (COC) in groundwater at CCL; based on the results of groundwater monitoring, this compound is the most prevalent groundwater contaminant at the site. A summary of TCE concentrations in groundwater over time is presented in Table 4. Figure 2 presents the locations of monitored wells.

TCE has been detected in site groundwater since 1985 when sampling of PW began. This well was installed in 1982 for water supply purposes; no data are available prior to this date. Installation of the first groundwater monitoring wells at the site (MW-1 and MW-2) indicated reportable concentrations of TCE in 1997 when relatively routine groundwater monitoring began. TCE concentrations reported in these wells varied significantly from 1997 until 2005 when sustained and increasing TCE concentrations were detected in MW-1. MW-2 indicated a significant and sustained increase in TCE concentrations in 2007. As a result of these observations, wells MW-3 through MW-7 were installed to define the extent of impacted groundwater south of the site. TCE concentrations at four of these wells, MW-3, MW-5, MW-6 and MW-7, remain low. Concentrations at MW-4 are slightly elevated and appear to be increasing. A summary of ranges in TCE concentrations in samples collected from site wells follows:

Well	Minimum TCE Concentration	Date(s) Observed	Maximum TCE Concentration	Date Observed
PW	< 1.9 µg/L	November 1985 to December 1987	464 µg/L	November 2011
MW-1	< 2 µg/L	June 1993, March 1999 and August 1999	75 µg/L	April 2007
MW-2	<2 µg/L	Multiple dates in 1993 and 2000 through 2006	450 µg/L	April 2010
MW-3	<0.5 µg/L	Multiple dates in 2008 to 2010	2.6 µg/L	November 2011
MW-4	4.7 µg/L	May 2011	32.6 µg/L	August 2012
MW-5	<0.5 µg/L	From installation to date	<0.5 µg/L	From installation to date
MW-6	0.9 µg/L	May 2011	2 µg/L	February and May 2012
MW-7	<0.5 µg/L	From installation to date	<0.5 µg/L	From installation to date
MW-8	<0.5 µg/L	From installation to date	<0.5 µg/L	From installation to date

Other Compounds Present in Site Groundwater. In addition to TCE, the following 12 organic compounds and 10 inorganic compounds have been detected in groundwater collected from site monitoring wells since 1985:

1,1-Dichloroethane (1,1-DCA)
1,1-DCE
Benzene
Bromoform
Carbon disulfide
Chlorobenzene
Chloroform
cis-1,2-Dichloroethene (cis-1,2-DCE)
PCE
Toluene
trans-1,2-Dichloroethene (trans-1,2-DCE)
Vinyl chloride
Calcium
Chloride
Fluoride
Iron
Magnesium
Nitrate (as n)
Nitrite
Potassium
Sodium
Sulfate

Significant changes in the concentrations of inorganic compounds that are typically indicative of landfill leachate impacts (e.g., chloride, sulfate, alkalinity etc.) were not apparent in site groundwater. Appendices E and F summarize reportable site groundwater concentrations. Full laboratory analytical reports for samples collected since 2009 are provided on Disk 1 (Groundwater Sampling). Compounds present at concentrations exceeding respective AWQS values are as follows:

COC	Well	Range in Concentration	AWQS
TCE	MW-1, MW-2, MW-4, and PW	<0.5-464 µg/L	5 µg/L
PCE	MW-2 and PW	<0.5-23.7 µg/L	5 µg/L
1,1-DCE	MW-2 and PW	<0.5-15.8 µg/L	7 µg/L
cis-1,2-DCE	PW	<0.5-164 µg/L	70 µg/L
Vinyl Chloride	PW	<0.5-10.3 µg/L	2 µg/L

The maximum concentrations reported above are all associated with a single sampling event and well: a sample collected from PW on November 2011 during the Extended SVE Pilot Test. Although elevated concentrations of TCE, PCE, and 1,1-DCE have been detected during other sampling events, cis-1,2-DCE and vinyl chloride have not been detected in groundwater at concentrations exceeding their respective AWQS values in any other samples collected from the site. The Extended SVE Pilot Test included a short period of vapor extraction from PW in the screened interval above the water table which may have contributed to elevated concentrations of VOCs in groundwater due to upwelling and/or the discharge of SVE condensate into the well. A more detailed discussion of this event and its effect is presented in Section 2.3.2.

Excluding the November 2011 sample collected from PW, PCE and 1,1-DCE have only been detected at concentrations exceeding the respective AWQS values in MW-2. In this well, concentrations of PCE first exceeded the AWQS of 5 µg/L in April 2010; 1,1-DCE was first detected above the AWQS of 7 µg/L in May 2011. While concentrations of these compounds have fluctuated above and below the respective AWQS values since these dates, levels remain elevated.

VOC Concentration Variation with Depth. Appendix E summarizes the results of PDB sampling conducted at MW-2 in 2009. TCE concentrations in samples collected approximately 5 ft, 25 ft, and 45 ft below the top of the groundwater table were 190/150 µg/L, 170 µg/L, and 99 µg/L, respectively (duplicate samples were collected at 5 ft below the top of the groundwater table). These data suggest that TCE concentrations are highest near the vadose zone/groundwater interface and decrease with depth. Other VOCs present in PDB samples included 1,1-DCE, cis-1,2-DCE, and PCE but concentrations were significantly lower and no trend with depth was evident. It is notable that concentrations reported in PDB samples were not generally consistent with quarterly monitoring data collected via pumping the well with dedicated groundwater extraction pumps. TCE concentrations were lower and cis-1,2-DCE concentrations were higher in PDB samples.

Further discussion of the nature and extent of impacted groundwater is provided in Section 3.2.1.2.

2.2 Soil Vapor Well Installation and Monitoring Activities

2.2.1 2009 Soil Vapor Survey

2.2.1.1 Shallow Soil Vapor

AMEC conducted shallow soil vapor monitoring in early December 2009 to evaluate the distribution of VOCs at the site and provide additional data useful in locating a planned deep soil vapor monitoring well. Each well was purged of three vapor volumes prior to sampling with analysis of samples collected in laboratory-supplied Summa canisters by EPA Method TO-15. Appendix G, H and I summarize associated results and Disk 1 (Soil Vapor Sampling) presents full laboratory analytical reports. Data compiled from previous shallow soil vapor activities conducted in 2004, 2005, and 2008 by SCS Engineers (via EPA Method 8260B) are presented in these appendices for reference (data are identified by date).

VOC data collected in 2009 suggest that concentrations vary with location and depth at the site:

- In former LFG extraction wells located in the New Landfill (identified by the prefix of GW), TCE concentrations ranged from 1 to 1.9 mg/m^3.
- P Well sampling was conducted at P-02 (south of the New Landfill) and P-18 (west of the New Landfill). Concentrations of TCE ranged from 1.6 mg/m^3 at P-02-S to 2.4 mg/m^3 at P-18-D.
- Soil vapor monitoring below the base of the Old and New Landfills (ODP-01 through ODP-4 and NDP-01 and NDP-02, respectively) revealed relatively significant concentrations of TCE. The highest TCE concentrations were indicated at depth below the New Landfill. TCE was detected at 95 mg/m^3 in NDP-01-D. This well is the most northern New Landfill well (see Figure 2). The highest TCE concentration detected in the Old Landfill was 21 mg/m^3 at ODP-01-D (this well is located in the northeast quadrant of the Old Landfill).

2.2.1.2 Deep Soil Vapor

Prior to installation of the planned deep soil vapor monitoring well, AMEC collected deep soil vapor samples in May 2009 from the screened interval above the water table in groundwater wells MW-2 and PW. These wells both have significant diameters and are screened at depths greater than 630 ft bgs. To promote the collection of representative samples from these wells, the sounding tubes and dedicated pumps in these wells were removed and temporary well packers (TAM International Part No. 550-LW-01) were installed to isolate soil vapor sampling locations. Installation details are as follows:

Well	Screened Interval	Top of Packer Assembly*	Depth to Water
MW-2	630 – 805 ft bgs	670 ft bgs	690 ft bgs on 5/19/09
PW	680 – 810 ft bgs	683 ft bgs	708 ft bgs on 5/20/09

* The length of the dual packer assembly was approximately 8 to 10 ft.

Each well was purged of five well volumes prior to sampling with analysis of samples collected in laboratory-supplied Summa canisters by EPA Method TO-15. Results are presented in

Appendix G, H and I and Disk 1 (Soil Vapor Sampling) presents full laboratory analytical reports. Concentrations of TCE ranged from 0.110 mg/m^3 at MW-2 to 180 mg/m^3 at PW. Review of these data indicate that despite elevated groundwater concentrations at MW-2, deep soil vapor TCE concentrations appeared to be higher in the vicinity of PW, located in the northern portion of the site.

2.2.2 Soil Vapor Well Installation and Sampling

Nested soil vapor monitoring wells TSSV-1-S, TSSV-1-M, and TSSV-1-D were installed to evaluate the concentration of VOCs in the deep vadose zone below the existing vapor monitoring network at the site in 2009. The wells were designed to serve as future soil vapor extraction wells, as required. Prior to the installation of these wells, the screened interval of the deepest soil vapor wells was 130 to 140 ft bgs.

2.2.2.1 TSSV-1 Installation

The drilling contractor, Layne, began drilling the boring for the TSSV-1 soil vapor monitoring wells in the northeastern corner of the transfer station on December 16, 2009. Caving issues were immediately encountered using air rotary with an open hole. On December 19, 2009, drilling was suspended so that the drilling method could be re-evaluated. On January 12, 2010, Layne recommenced drilling using Stratex with advance casing to keep the borehole open. The boring was visually logged every ten ft from cuttings. Lithology, boring headspace PID readings, four-gas meter readings, and drilling characteristics were recorded on boring logs during drilling activities. Appendix A presents boring logs.

The borehole was drilled to a total depth of 610 ft bgs. Well construction activities began on January 21, 2010. Three nested 2-in diameter Sch 80 PVC soil vapor monitoring wells with 0.100-in slotted screen were installed in the boring. Screened intervals were completed as follows:

- Shallow zone (TSSV-1-S) – 150 to 200 ft bgs;
- Middle zone (TSSV-1-M) – 350 to 400 ft bgs; and
- Deep zone (TSSV-1-D) – 549 to 599 ft bgs.

The deep zone well was screened a sufficient height above the groundwater table to limit groundwater upwelling during planned soil vapor extraction activities.

Installed annular materials included:

- Gravel pack (3/8-in x 3/16-in) placed within the screened intervals;
- Hydrated 1/4-in bentonite pellets for the bentonite seal placed between the screened intervals; and
- Cement-bentonite grout placed between the bentonite seals and from the top of the top bentonite seal to ground surface.

TSSV-1 was completed with a 12-in flush-mounted well monument recessed in a 3 by 3 by 4-ft concrete pad. Sample ports were installed at each wellhead and marked appropriately to designate the associated screened interval. Maricopa County surveyed the location of TSSV-1 following completion of well installation activities. Table 2 summarizes survey information including top of casing elevations used in calculating soil vapor monitoring elevations.

During drilling and well installation activities, soil cuttings were contained in lined roll-off bins. The bins were emptied in the buffer zone west of the New Landfill.

2.2.2.2 Initial TSSV-1 Sampling

After installation of TSSV-1 in northeast corner of the transfer station, AMEC sampled TSSV-1 on February 23, 2010. Each well port was purged for a minimum of three well volumes at approximately 15 liters per minute (L/min). During purging, field readings were collected using a flame ionization detector (FID) and four gas meter approximately every five minutes during purging. The samples were collected in Summa canisters and submitted under chain of custody to Air Toxics, Ltd. for analysis of VOCs using Test Method TO-15 and analysis for methane, carbon dioxide and oxygen using Modified ASTM D-1946.

VOC analytical results are summarized in Appendix G, H and I and indicate that TCE concentrations ranged from 74 mg/m^3 in TSSV-1-D to 130 mg/m^3 in TSSV-1-S. Other compounds present at comparable concentrations included cis-1,2-DCE in TSSV-1-D at 240 mg/m^3. Disk 1 (Soil Vapor Sampling) presents the full laboratory analytical report.

Analytical results for evaluated gases are summarized below:

- Methane concentrations increased with depth ranging from 0.013% by volume at TSSV-1-S to 1% by volume at TSSV-1-D;
- Oxygen concentrations decreased with depth ranging from 5.3% by volume at TSSV-1-D to 16% by volume at TSSV-1-S; and
- Carbon dioxide concentrations increased with depth ranging from 2.4% by volume at TSSV-1-S to 14% by volume at TSSV-1-D.

These results indicate that significant soil vapor concentrations of TCE are present at depth in the region between the Old and New Landfills and that biologically mediated reductive dechlorination of TCE is occurring at depth and/or that these activities have occurred in the past in the landfills and associated indicators of reductive dechlorination and reduced conditions (i.e., cis-1,2-DCE, methane and carbon dioxide) have migrated as vapors to depth.

2.2.3 2012 Eastern Perimeter Well Sampling

In early 2012, AMEC collected supplementary vapor samples from P-3, P-6, P-7, P-8, P-9 and P-10 to evaluate concentrations of VOCs along the eastern CCL property boundary (see Figure 2). These 3-in diameter wells are currently used for routine LFG monitoring which is conducted on a quarterly basis in accordance with 40 CFR §258.23. P-10 is the most northern well and P-3

is the most southern well in the north-south alignment (P-5 is inaccessible and was not sampled). Well construction details used in purge calculations are presented in Table 2 (depths are approximate; limited construction information regarding these wells is available). All the wells are equipped with sealed well caps and dedicated, air-tight valves.

Decontaminated three-way valves (supplied by the laboratory) and new ¼-in inside diameter (ID) tubing were used to construct purging and sampling assemblies for each well. Prior to sample collection, AMEC purged the wells of two calculated well volumes at a rate of 5 L/min using an electric vacuum pump. An in-line rotameter was used to measure the flow of the pump. Readings from a PID calibrated in the field with isobutylene and a four gas meter were collected from the sample flow after purging, but prior to sampling. PID readings ranged from 0 ppmV at P-3 to 7.9 ppmV at P-9. The concentrations of carbon monoxide, hydrogen sulfide, and methane were all 0% by volume while the concentrations of oxygen at all sampled locations were fairly consistent at an average value of 20.6% by volume.

AMEC collected P Well soil vapor samples in laboratory-supplied 1-Liter (L) Summa canisters equipped with critical orifice assemblies that regulated flow during sampling to approximately 200 milliliters per minute (mLs/min). The vacuum of each canister was measured with a vacuum gauge supplied by the laboratory prior to connecting the canister to the sampling assembly. To conduct leak detection testing, the sampling assemblies were exposed to a commercial dusting product containing 1,1-difluoroethane during sampling at each location (all samples were evaluated for 1,1-difluoroethane for this purpose; this compound was not detected in any of the collected samples). The soil vapor samples were submitted under chain of custody to Airtech Environmental Laboratories (AEL) which is an ADHS-licensed laboratory (No. AZ0740). The samples were analyzed using EPA Method TO-15 for VOCs.

Appendix G, H and I summarize soil vapor sample analytical results and Disk 1 (Soil Vapor Sampling) presents full laboratory analytical reports. P Well sampling conducted in 2012 indicates that:

- A wide range of VOCs are present at trace levels in the eastern boundary P wells including acetone, benzene, 2-butanone (MEK), chloroform, 1,1-DCE, Freon-11, Freon-12, Freon-113, hexane, PCE, TCE, toluene, 1,2,4-trimethylbenzene, and o-xylene.

- During the 2012 sampling events, the most prevalent contaminant was PCE (concentrations ranged from 0.0054 to 1.8 mg/m^3) which was detected in all evaluated samples except P-3. The highest VOC concentration observed was TCE at P-9 (59 mg/m^3) which is completed to 51 ft bgs. The only other well with a reportable concentration of TCE was P-10 (0.752 mg/m^3) which is located in the vicinity of P-9 but is completed to 20 ft bgs. These data indicate that soil vapor TCE concentrations are higher at depth and significantly abated at shallower depths.

- Data collected at P-9 and P-10 suggest that elevated TCE concentrations in shallow soil gas are present directly south of the transfer station and adjacent to the New Landfill. The TCE concentrations observed at these wells are consistent with the TCE concentrations detected during 2009 and 2011 shallow vapor well monitoring conducted below the Old and New Landfills. As shown in Appendix G, TCE concentrations in the ODP and NDP wells screened

from 80 to 90 ft bgs ranged from 1.9 mg/m^3 to 60 mg/m^3 (this screened interval is comparable in elevation but approximately 10 to 15 ft deeper than the sampling elevation of P-9).

2.3 Soil Vapor Extraction Testing

Two SVE tests have been conducted at the site to date. A One Day Preliminary SVE Test was conducted to gather data for planning future testing and an Extended SVE Pilot Test was conducted to evaluate whether extended extraction from test wells would provide insight into the nature and extent of deep soil vapor contamination at the site. The following sections present an overview of test conditions and associated results with inferences regarding site characterization and soil vapor extraction at the site.

2.3.1 One Day Preliminary SVE Pilot Test

2.3.1.1 Description of Test Operations

AMEC conducted the One Day Preliminary SVE Test on June 16, 2010 using a trailer-mounted SVE blower system (two 7.5-HP ROTRON blowers plumbed in parallel), portable generator, and treatment vessel filled with 1,000 pounds (lbs) of vapor-phase granular activated carbon (V-GAC). The blower system was rated to supply a maximum flow rate of 300 standard cubic ft per minute (scfm) and a maximum vacuum of approximately 95 in of water column (in-H_2O). All extracted soil vapors were treated using V-GAC prior to discharge to the atmosphere.

Tested SVE wells included the three 2-in diameter TSSV-1 deep soil vapor wells (i.e., TSSV-1-S, TSSV-1-M, and TSSV-1-D) and PW (an 8-inch diameter groundwater well); see Figure 2 for test well locations. Corresponding screened intervals are as follows:

- TSSV-1-S is screened from 150 to 200 ft bgs (1,681 to 1,731 ft AMSL);
- TSSV-1-M is screened from 350 to 400 ft bgs (1,481 to 1,531 ft AMSL);
- TSSV-1-D is screened from 549 to 599 ft bgs (1,282 to 1,332 ft AMSL); and
- PW is screened from 680 to 810 ft bgs but the depth to water on the day of testing was 709 ft bgs (under static conditions) – therefore the tested screened interval was no greater than 680 to 709 ft bgs (1,071 to 1,201 ft AMSL).

Testing consisted of an initial 10-minute (min) vacuum test to assess the maximum vacuum achievable by the SVE system, followed by independent step testing at various vacuums in TSSV-1 and PW. Testing began in TSSV-1; the three TSSV-1 wells were manifolded into in a single extraction line to allow for extraction from all three TSSV-1 wells simultaneously at the same system vacuum. The maximum achievable vacuum in this configuration was 30 in-H_2O. Step testing included testing at system vacuums of 10, 20, and 30 in-H_2O for 1.5 hrs at each vacuum (a total of 4.5 hrs). Maximum vacuum and corresponding flow data for each TSSV-1 screened interval were evaluated after step testing by closing valving on the manifold and extracting vapor from each well individually. Following completion of TSSV-1 step testing, an

initial maximum vacuum test was performed with PW. SVE from PW achieved a maximum vacuum of 26 in-H_2O. Step testing conducted with PW evaluated vacuums of 8.6, 17, and 26 in-H_2O for 1 hr, 0.5 hrs and 1 hr, respectively.

During testing, field parameter monitoring was conducted at 30-min intervals and included:

- Applied vacuum in the test well(s) and induced vacuum in surrounding shallow soil vapor monitoring wells (as measured by Magnehelic gauges);
- The flow rate of extracted vapor (as measured using a pitot tube/Magnehelic gauge system integral to the trailer-mounted blower assembly);
- VOC concentrations in extracted vapor (as measured using a handheld PID calibrated with isobutylene); and
- Oxygen concentrations in extracted vapor (as measured using a four gas multimeter).

Table 5 summarizes operational data collected during testing and Appendix J presents collected field parameter data.

Samples of the extracted vapor from each of the extraction points were collected in laboratory-supplied 1-L Summa canisters at the beginning of the first step test and just prior to the end of each corresponding step test (a total of 20 samples). An ambient blank vapor sample was also collected. The vapor samples were submitted via the Columbia Analytical Services (CAS) Phoenix, AZ laboratory to their Simi Valley, California laboratory (ADHS License No. AZ0694) for analysis of VOCs using EPA Method TO-15. Table 6 summarizes the results of laboratory sample analysis. Appendix G, H and I present collected soil vapor data more comprehensively and Disk 1 (Soil Vapor Sampling) presents the full laboratory analytical report.

Following completion of testing activities, a sample of the V-GAC was collected for waste profiling purposes. AMEC submitted the sample to Test America in Phoenix, Arizona (ADHS License No. AZ0728) for Toxicity Characteristic Leaching Procedure (TCLP) VOCs by EPA Method 1311/8260B. No VOCs were detected in the extracted leachate from the V-GAC sample at concentrations exceeding laboratory reporting limits; Disk 1 (Soil Vapor Sampling) presents the full laboratory analytical report.

2.3.1.2 Test Results

Notable results of the One-Day Preliminary SVE Test are as follows:

- Maximum achieved vacuums with corresponding flow rates in TSSV-1-S, TSSV-1-M, and TSSV-1-D were 156 actual cubic ft per minute (acfm) at 42 in-H_2O, 62 acfm at 56 in-H_2O, and 55 acfm at 56 in-H_2O, respectively. When the TSSV-1 wells were manifolded together, flow rates for the same applied vacuum indicated preferential flow to the shallow well. Given the similar construction of these wells and negligible losses due to friction over the 150 to 350-ft pipe runs between screened intervals on a relative basis, these results suggest an increase in compaction of the alluvial vadose zone formation with depth.

- Vacuum readings conducted at shallow vapor monitoring wells surrounding the SVE test well(s) ranged from less than 0 (i.e., pressure) to 0.07 in-H_2O measured as vacuum (at ODP-3 during extraction from TSSV-1). Since this reading is negligible and was observed during testing at the lowest vacuum without a corresponding increase in induced vacuum with increasing applied vacuum, this reading is not indicative of lateral influence. Vacuum readings conducted at PW during maximum vacuum extraction at TSSV-1 ranged from 0.5 to 0.6 in-H_2O measured as vacuum; these readings are also very small in magnitude but may indicate a slight pneumatic connection between TSSV-1 and PW. These wells are located about 325 lateral ft away from each other but PW is screened approximately 80 ft deeper. Readings obtained at the TSSV-1 wells during extraction from PW do not readily corroborate this conclusion. In general, it appears that the screened intervals of surrounding test wells were not appropriately located to effectively evaluate radius of influence (ROI) during the One Day Preliminary SVE Test.

- The primary VOCs present at all evaluated deep soil vapor intervals were TCE (at 32 to 310 mg/m^3), trichlorotrifluoroethane or Freon-113 (at 2.9 to 140 mg/m^3), 1,1-DCE (at 0.29 to 37 mg/m^3), and PCE (at 1.2 to 30 mg/m^3). The maximum concentration of each of these compounds was greatest at TSSV-1-D except for Freon-113 which was observed at the greatest concentration at TSSV-1-S. Other VOCs present predominantly at depth included methylene chloride, 1,2-dichlorobenzene (1,2-DCB), 1,1-dichloroethane (1,1-DCA) and the reductive dechlorination byproducts of TCE biodegradation: cis-1,2-DCE and vinyl chloride.

- Tetrahydrofuran (THF) and methyl ethyl ketone (MEK) were both observed in initial samples collected during TSSV-1 step testing but concentrations decreased to non-reportable concentrations with continued soil vapor extraction. Most VOC concentrations increased over the course of testing. Both THF and MEK are less volatile than the other reported VOCs; the presence of these compounds during initial extraction and then absence of these compounds over significant duration of extraction may suggest a phase-based mass transfer limitation at the intervals tested (i.e. THF and MEK contamination may also be present in a phase other than vapor).

2.3.2 Extended SVE Pilot Test

2.3.2.1 Test Preparation and Process Equipment Description

Extended SVE Pilot Test preparation activities included air permitting of planned operations, site infrastructure improvements, and process equipment installation. On the basis of One Day Preliminary SVE Pilot Testing, AMEC designed a vapor treatment system for the Extended SVE Pilot Test that included both V-GAC and Hydrosil (potassium permanganate impregnated media) for control of extracted VOCs. SVE and the associated vapor treatment system were permitted in accordance with MCAQD rules and regulations. The permit number is 980398.

Since the anticipated duration of the test was three months, a chain-link fenced treatment compound was constructed at the TSSV-1 wellhead, in the northeast corner of the transfer station area. Single phase 240 volt (V) electrical service was supplied by installing below grade 2-in diameter Sch 80 electrical conduit between the transfer station building and the treatment compound. A phase converter was used to supply three phase service to the process blower. A

new process piping run (approximately 400 ft in total length) connecting PW with the treatment compound was also installed; the run consists of both above grade 4-in diameter Sch 40 PVC pipe (from the wellhead to the transfer station building) and below grade 4-in diameter Sch 80 PVC pipe (from the transfer station building to the treatment compound). Above grade piping was sloped back toward PW; below grade piping was sloped toward a below grade sump located at the treatment compound.

Within the treatment compound, an above grade process air manifold connecting PW with the 2-in diameter TSSV-1-S, TSSV-1-M, and TSSV-1-D wells was constructed of 4-in diameter Sch 40 PVC pipe with appropriate valving to isolate flow from each well. The manifold was plumbed to a condensate knockout tank equipped with a manual dilution air valve and liquid level floats to control operation of a condensate water transfer pump connecting the knockout tank to an adjacent 2,000-gal condensate storage tank. A 4-in diameter Sch 40 piping run located downstream of the knockout tank (installed for flow measurement) was connected with 4-in diameter hoses to two V-GAC vessels (each filled with 2,000 lbs of carbon) configured in series followed by one vessel filled with 1,500 lbs of Hydrosil (HS-600). A 25-horsepower (HP) Sutorbuilt Model No. 6HP process blower rated to supply 500 scfm was connected downstream of the Hydrosil vessel with a 4-in diameter hose (i.e., the carbon and Hydrosil vessels operated under vacuum). The blower discharged through a silencer to atmosphere. Process control valving included the manual dilution valve on the knockout tank noted above to introduce ambient air into the process flow and a recirculation valve on piping in parallel with the process blower to reduce process flow while maintaining maximum system vacuum. The system air permit required that the influent VOC concentration to the treatment system be 200 ppmV or less; the manual dilution valve was used to introduce ambient air to the influent process flow when VOC concentrations, as measured using a PID, exceeded this value. Samples collected from wellheads were not diluted since the dilution air was introduced under vacuum at the knockout tank, downstream of the individual wellheads.

Dedicated instrumentation on the system included vacuum gauges located at each wellhead, immediately before the knockout tank, and immediately before the process blower. A temperature gauge and pitot tube/Magnahelic gauge flow measurement system were located on process blower discharge piping. Sample ports were located at each wellhead, between the knockout tank and carbon/Hydrosil vessels (i.e., the treatment system influent), between each of the treatment system vessels, and after the Hydrosil vessel (i.e., the treatment system effluent).

2.3.2.2 Description of Test Operations

Startup of the Extended SVE Pilot test began on November 16, 2011 and included the following test wells and durations of extraction:

- From November 16, 2011 through November 28, 2011 extraction occurred concurrently from PW and TSSV-1-S (282 hrs);
- From December 5, 2011 through December 15, 2011 extraction occurred from TSSV-1-S (245 hrs);

- From January 16, 2012 through February 20, 2012 extraction occurred from TSSV-1-M (818 hrs); and

- From February 20, 2012 through February 29, 2012 extraction occurred from TSSV-1-D (214 hrs).

The total duration of the test was 1,559 hrs (approximately 65 days). Periods of suspended operation during the test were primarily for carbon change out activities (V-GAC run times were variable due to the different intervals tested). Although restarted on December 5, 2011 after a carbon changeout, extraction from PW was suspended after monitoring due the receipt of quarterly groundwater monitoring results indicating elevated concentrations of TCE, cis-1,2-DCE, 1,1-DCE, PCE, and vinyl chloride in groundwater sampled from PW (see Appendix E for the analytical results for the sample collected from PW on November 22, 2011). A follow up sample collected from PW in December 2011 indicated a return to pretest VOC concentrations in groundwater extracted from PW.

During the test, AMEC conducted field monitoring including:

- Applied vacuum in the test well(s) and at various locations within the process flow (as measured by Magnehelic gauges);

- Induced vacuum in surrounding shallow soil vapor monitoring wells (as measured by Magnehelic gauges);

- Individual wellhead and influent flow rates (as measured using a TSI VelociCalc anemometer inserted into associated process piping) - an influent flow monitoring pipe of sufficient length was not installed until December 6, 2011;

- SVE blower discharge flow rate (as measured using a dedicated pitot tube/Magnehelic gauge system);

- SVE blower discharge temperature (as measured using a dedicated temperature gauge);

- SVE blower/treatment system hours (as measured using a dedicated hour meter);

- SVE blower and phase converter amperage (as measured using dedicated amp meters);

- VOC concentrations in extracted vapor at individual wellheads, the vapor treatment system influent, downstream of the lead carbon vessel, downstream of the lag carbon vessel, and the vapor treatment system effluent (as measured using a handheld PID equipped with a 10.6 electron volt [eV] lamp calibrated with isobutylene);

- Carbon monoxide, methane, hydrogen sulfide, and oxygen concentrations in extracted vapor at individual wellheads and the treatment system influent (as measured using a four gas meter);

- The settings of all process control valves; and

- The volume of condensate in the knockout tank and the condensate storage tank.

Table 5 summarizes operational data collected during testing and Appendix K presents collected field parameter data.

Vapor samples collected from the individual wellheads and from various points in the process stream were collected in laboratory-supplied 1-L Summa canisters and submitted under chain of custody to AEL in Phoenix, Arizona (ADHS License No. AZ0740). The samples were analyzed using EPA Method TO-15 for VOCs. Table 6 summarizes wellhead sample VOC analysis results and Table 7 summarizes the VOC analysis results of vapor treatment performance samples. Appendix G, H and I include a more comprehensive presentation of collected soil vapor data while Disk 1 (Soil Vapor Sampling) presents full analytical laboratory reports.

Carbon changeout activities were performed as necessary based on the results of PID monitoring and vapor sampling for laboratory analysis at various locations within the vapor treatment system process flow. The air permit defined breakthrough as less than a 90% VOC treatment efficiency. Carbon changeouts occurred on the following dates:

- December 1, 2011 (lead and lag vessels) – run time was 281 hrs (11.7 days); and

- January 20, 2012 (lead and lag vessels) – run time was 318 hrs (13 days).

On January 20, 2012, a third carbon vessel was delivered to the site to reduce the frequency of carbon changeout mobilizations. This vessel was intended to be rotated into service after breakthrough in the lead carbon vessel; however, it initially operated in series after the lead and lag vessels from January 20, 2012 through January 27, 2012. This vessel was placed in service as a lag vessel after removing the lead vessel and moving the lag vessel into the lead position on February 20, 2012.

Based on the total volume of V-GAC used during the Extended SVE Pilot Test (14,000 lbs) and the total duration of SVE with V-GAC treatment (1559 hrs or 65 days), the carbon usage rate was approximately 215 lbs per day.

During the first carbon changeout on December 1, 2011, a composite sample of the V-GAC removed from the lead and lag vessels was collected for waste profiling purposes. AMEC submitted the sample to Test America in Phoenix, Arizona (ADHS License No. AZ0728) for TCLP VOCs by EPA Method 1311/8260B. TCE was detected in extracted leachate from the V-GAC sample at a concentration of 0.62 mg/L which exceeds the toxicity characteristic limit for TCE of 0.5 mg/L (the full analytical laboratory report is presented on Disk 1 with Soil Vapor Sampling data). On this basis, all carbon removed from treatment operations during the Extended SVE Pilot Test was profiled as hazardous waste and transported from the site under hazardous waste manifest to the US Ecology Beatty, Nevada facility for further processing in accordance with their Treatment, Storage, and Disposal (TSD) facility permit.

2.3.2.3 Test Results

Notable results of the Extended SVE Pilot Test are as follows:

- At approximately twice the applied vacuum achieved during the One Day Preliminary Pilot Test (100 in-H_2O), flows extracted from test wells increased to maximums of 242 scfm in TSSV-1-S, 96.7 scfm in TSSV-1-M, 60.5 scfm in TSSV-1-D, and 230 scfm in PW (see Table 5). These increases in flow were relatively small and suggest that additional increases in vacuum will not significantly increase flow extracted from these wells (see vacuum-flow plots presented in Appendix K; One Day test flow data are reported in acfm while Extended SVE test flow data are reported in scfm). As demonstrated by the magnitude of flow extracted from PW (from which extracted flows were greater than TSSV-1-D even though PW is screened deeper) well construction (i.e., well casing diameter, slot size, and annular material selection) considerably impacts the quantity of flow extracted from vapor wells.

- Observed VOC concentrations were significantly greater in the Extended SVE Pilot Test than in the One Day Preliminary Pilot Test (see Table 5). While all concentrations increased, this disparity was most notable at depth. At TSSV-1-D, TCE concentrations were higher than at any vapor monitoring location sampled at the site to date (2,600 mg/m^3) and an order of magnitude greater than the highest TCE concentration observed at this well during the One Day Preliminary Pilot Test (310 mg/m^3). The increase may be attributable to a corresponding increase in concentrations since the previous test was conducted but could also be associated with the increased duration and rate of extraction used during the Extended SVE Pilot Test. These factors can affect how representative extracted concentrations are of the formation in the immediate vicinity of the well screen and/or within the ROI of the well. It is possible that when wells are completed at deeper intervals, impacts on concentrations due to the duration and rate of extraction are more pronounced. The VOC concentrations in grab samples collected on November 8, 2011 provide evidence that representativeness may be an issue during short-term sampling of deep soil vapor wells. As shown in Table 6, VOC concentrations in samples collected on November 8, 2011 from TSSV-1-D (after three well volumes were purged) were generally lower than in samples collected during the continuous extraction conditions of either the One Day Preliminary Pilot Test or the Extended SVE Pilot Test. In the shallower wells (TSSV-1-S and TSSV-1-M), VOC concentrations in grab samples collected on November 8, 2011 were relatively more consistent with those observed during the One Day Preliminary Pilot Test.

- Concentrations of VOCs in extracted vapors from each interval increased with the duration of extraction (see Table 6 and the TCE concentration-extraction duration and TCE concentration–extraction volume plots in Appendix K). TCE concentrations observed at TSSV-1-S increased from 460 to 910 mg/m^3 and appeared to stabilize after approximately 200 hrs (8 days) of extraction (approximately 2.4 million cubic ft of soil vapor extracted). At TSSV-1-M, concentrations increased from 446 to 753 mg/m^3 and appeared to stabilize after approximately 350 hrs (14 days) of extraction (approximately 2.0 million cubic ft of soil vapor extracted). TCE concentrations at TSSV-1-D increased from 1,300 to 2,600 mg/m^3 and did not stabilize over the 214 hours (8 days) this well was tested (approximately 0.72 million cubic ft of soil vapor extracted). The differing durations prior to stabilization are likely an

effect of the varying extraction rates (and resulting volumes extracted) at each well. However, stabilization may also be impacted by non-homogeneity of VOC concentrations in the subsurface. With continuous extraction, mobilization of vapors from farther regions surrounding the extraction well can occur. If higher or lower concentrations are located some distance from the well but within the ROI of extraction, wellhead concentrations may change in response to the migration of these concentrations towards the extraction well.

- Induced vacuum measurements at select wells located in the vicinity of test wells were conducted to assess lateral ROI during extended SVE. The results of monitoring are presented in Appendix K. Measurements ranged from 0.25 in-H_2O measured as pressure at NDP-1D to 2 in-H_2O measured as vacuum at ODP-3D. The 2 in-H_2O reading is likely not indicative of influence because all other readings conducted from this well on November 16, 2011 through November 23, 2011 (during continuous extraction from TSSV-1-S) were negligible. The reading may be anomalous or the result of diurnal pressure-vacuum fluctuations in soils. Vacuum readings conducted at PW on February 20 and 29, 2012 while extraction occurred from TSSV-1-M and TSSV-1-D ranged from 1.2 to 1.5 in-H_2O measured as vacuum. The magnitude of these readings is insufficient to demonstrate a pneumatic connection between the wells. As observed during the One Day Preliminary SVE Pilot Test, it appears that the screened intervals of surrounding test wells were not appropriately located to effectively evaluate ROI during the Extended SVE Pilot Test.

- Vacuum was measured during extraction from TSSV-1-M and TSSV-1-D at non-extraction TSSV-1 wells on February 7, 20, and 29, 2012 to assess vertical influence. Readings ranged from 0.08 in-H_2O to greater than 2 in-H_2O measured as vacuum; however no consistent pattern of influence was discernable. These data are inconclusive.

- In the absence of adequate observation well data (which are typically used to calculate air permeability from field data), estimates of air permeabilities were inferred using plots of vacuum versus applied flow obtained during testing (see Appendix K) and the results of equations describing the theoretical relationship between flow and applied vacuum for a range of reasonable values for ROI (pursuant to Johnson et al., 1990). Results are summarized as follows:

Assumed ROI	Estimated Permeability at TSSV-1-S	Estimated Permeability at TSSV-1-M	Estimated Permeability at TSSV-1-D
30	4E-8 to 1E-7 cm^2	2E-8 to 3E-8 cm^2	1E-8 to 2E-8 cm^2
100	5E-8 to 1E-7 cm^2	2E-8 to 4E-8 cm^2	1E-8 to 3E-8 cm^2
200	5E-8 to 2E-7 cm^2	3E-8 to 5E-8 cm^2	2E-8 to 3E-8 cm^2
Corresponding Soil Type	*Fine to Medium Sand*	*Fine Sand*	*Fine Sand*

As indicated by this analysis, estimated permeabilities decreased with depth. These estimated permeabilities generally correspond to the permeability of fine sand (1E-8 cm^2 to 1E-7 cm^2 or approximately 1 to 10 darcys).

- Based on average extraction rates and VOC concentrations, the quantity of TCE, 1,1-DCE, and PCE mass extracted during the Extended SVE pilot was substantial. As presented in

Table 5, over 700 lbs of TCE were removed from the subsurface and mass extraction rates did not attenuate over the duration of testing. This suggests that a considerable quantity of mass is located in the deep soil vapor underlying the site. Although there is limited information regarding the extent of VOC-impacted vapor based on this test, the highest quantity of mass extracted and associated mass extraction rates were from TSSV-1-S and PW. The quantity of mass extracted from TSSV-1-D was lower because of the relatively low extraction rates achieved from this well.

- As noted in the description of test operations, extraction from PW only occurred for 282 hrs in mid November 2012 because quarterly groundwater sampling indicated the presence of significantly elevated concentrations of VOCs in the groundwater while the well was undergoing SVE. It is possible that the abrupt increase was unrelated to extraction activities. However, if SVE in the well screen above the water table at PW did result in increased groundwater VOC concentrations, it may be attributable to either localized upwelling of the water table into a VOC-impacted region of the vadose zone or the discharge of VOC-impacted condensate into the well from SVE operations (SVE piping is sloped back to the well). Based on the results of resampling in December 2012, the effect was limited in extent and transient.

- The elevated VOC concentrations observed during the Extended SVE Pilot Test significantly increased the frequency of required carbon changeouts relative to planned carbon usage rates. The calculated carbon usage rate derived from the One Day Preliminary SVE Pilot Test was 29.5 lbs per day and was based on a volumetric air flow rate of 720,000 cubic ft per day (500 cfm). The average carbon usage rate observed over the duration of the Extended SVE Pilot Test was 215 lbs per day and the average volume of air treated was 240,000 cubic ft per day (167 cfm). Table 7 presents Design Influent Concentrations based on One Day Preliminary SVE Pilot Test data with the results of influent sample data from the Extended SVE Pilot Test for comparison. It is interesting to note that some compounds observed at significant concentrations during the One Day Preliminary SVE Pilot Test were not routinely observed at reportable concentrations during the Extended SVE Pilot Test (e.g., chloroform, MEK, and THF).

- As shown in Table 7, the V-GAC treatment system effectively removed VOCs from extracted soil vapors during the Extended SVE Pilot Test, despite the elevated concentrations of VOCs observed. Calculated total VOC treatment efficiencies ranged from 94.9% to 99.8% which exceeded the air permit requirement of 90%. Use of Hydrosil in the third treatment vessel after lead and lag carbon vessels effectively controlled vinyl chloride vapors throughout the duration of the test. Effluent vinyl chloride concentrations ranged from less than 0.010 to 1.3 ppmV. For the only sampling date on which vinyl chloride was detected in the influent process stream (February 29, 2012), the calculated treatment system efficiency for vinyl chloride was 94.3%.

- PID measurements were conducted to evaluate influent VOC concentrations in the field and breakthrough in V-GAC treatment vessels (in accordance with the requirements of the air permit). Table 7 presents the PID field screening data with the results of corresponding sample analyses. In general, PID field screening was effective in estimating VOC

concentrations. However, during extraction from TSSV-1-D, PID monitoring greatly underestimated the total quantity of VOCs in the influent stream (see influent data corresponding to the February 29, 2012 sample date). This low bias in select PID data may be associated with elevated concentrations of methylene chloride, vinyl chloride, methane and/or carbon monoxide in extracted vapors from TSSV-1-D. The elevated methylene chloride concentration could have contributed to the disparity in results since the ionization energy for this compound (11.32 eV) is higher than the rating on the PID lamp used during field monitoring (10.6 eV). The elevated vinyl chloride concentration could have impacted result agreement because the published correction factor for vinyl chloride is 2.0 for a 10.6 eV lamp (i.e., for a PID evaluating vinyl chloride but calibrated with isobutylene, the result is multiplied by 2.0 to estimate the corresponding concentration of vinyl chloride; Rae Systems, Inc., 2010). The methane and carbon monoxide present in the influent process flow (which were measured in the field at concentrations of up to 2.3% and 13% by volume, respectively) could have contributed to a lower PID reading by scattering and absorbing the ultraviolet rays used in the PID to ionize the gas being analyzed (a phenomenon known as 'quenching'; Chou, 1999). Thus, the composition of the soil vapor extracted from TSSV-1-D appears to have adversely impacted agreement between field and laboratory analytical data which was not apparent until after laboratory data were received.

- Maximum concentrations of cis-1,2-DCE and vinyl chloride at TSSV-1-D were 1,400 mg/m^3 and 59 mg/m^3, respectively. These concentrations are significant and together with the elevated methane concentrations (suggesting highly reduced conditions) that were also detected at TSSV-1-D (2.3% by volume) are indicative of microbially mediated reductive dechlorination of TCE. Reductive dechlorination is an electron transport process that occurs under anaerobic conditions and results in the production of successively less chlorinated daughter products from highly chlorinated compounds such as PCE and TCE (i.e., PCE transforms into TCE, TCE transforms into cis-1,2-DCE, cis-1,2-DCE produces vinyl chloride, and vinyl chloride becomes ethene). TCE and the daughter products serve as electron acceptors during the metabolism of an electron donor (carbon source) that the microorganism uses for growth. It is not clear whether the daughter products observed at depth were produced at depth or only within the landfills (cis-1,2-DCE has been detected in shallow soil vapor samples); however, for this process to occur, an electron donor would need to be present and appropriate environmental conditions for anaerobic microbial growth would be required (e.g., the absence of competing electron acceptors, adequate moisture, neutral pH, etc.). Within the landfill, electron donors resulting from the decay of waste would likely be present within the waste and/or in associated landfill leachate. In the arid soils found in Arizona alluvial deposits, electron donors would be less prevalent at depth unless landfill leachate was present. The detection of methane at depth suggests that reductive dechlorination could be occurring at depth (perhaps at the groundwater vadose zone interface) since this gas is less dense than air and would likely be less subject to density-driven vertical migration to significant depth.

3.0 CURRENT CONCEPTUAL SITE MODEL

This CSM is an evolving representation of the site environmental setting and associated processes controlling the transport, migration and potential impacts of contamination (in soil, soil vapor, and groundwater) to receptors near CCL. Development and refinement of the CSM will help identify investigative data gaps in the characterization process and can ultimately support remedial decision making. As an evolving model, the CSM will be modified as needed to continually evaluate the relationship between sources of contaminants, migration pathways, and receptors as new data become available.

Although this CSM is intended to be comprehensive, the presented information is generally summarized from previous reports (i.e., the GCWP and Addendum). Where new information has been collected to update the CSM, a more significant level of detail is documented herein.

3.1 Environmental Setting

The site lies within the Basin and Range Physiographic Province in Central Arizona. In this area, the mountains are generally comprised of crystalline rock separated by broad alluvial valleys. Mountains represent upthrown fault blocks from which sediments have been eroded and deposited in the basins below. In the centers of these basins, depth to bedrock can exceed 10,000 ft bgs.

3.1.1 Topography

Site topography has been altered for the landfill and drainage areas; the highest cover elevation is approximately 1,910 ft. Topography at the site outside the cover/retention areas ranges from an elevation of approximately 1,842 ft AMSL to 1,881 ft AMSL.

3.1.2 Climate

Climate in the Cave Creek area is semi-arid with hot summer and mild winters (Corkhill et al, 1993). Average temperatures range from 76 to 102 degrees Fahrenheit, with the coolest temperatures in December and warmest temperatures in July (Weather.com, 2012).

Average annual precipitation ranges from 7 to 8 in, with greater amounts occurring at higher elevations. The majority of regional precipitation typically occurs during summer monsoons which consist of brief high intensity storms, typically creating significant overland flow (July through September). Less intense, longer precipitation events also occur during winter months (December through March) (Corkhill et al, 1993). The Phoenix area and much of the State of Arizona has been in a drought since 1996 (Rascona, 2004). Precipitation in the vicinity of CCL from late 2005 to 2012 is presented in Figure 5.

3.1.3 Land Use

Section 1.1 presents information regarding land use at CCL and adjacent properties. In summary, the CCL property includes two closed landfill regions (referred to in this report as the Old Landfill and the New Landfill). Undeveloped desert which is planned for preservation

borders CCL to the north, west and south. A private golf course and residential development borders CCL to the east. Residential structures are located within 100 ft of the eastern toe of the New Landfill.

3.1.4 Surface Water Hydrology

Cave Creek is located approximately 400 ft northwest of the site (see Figure 1) and is the only significant natural surface water body located within a one-mile radius of the CCL. Cave Creek is generally dry and only flows in response to local rain events. U.S. Geological Survey (USGS) Station Number 09512280 monitors the rate of flow and elevation in Cave Creek; it is located approximately 7 miles north of the CCL property (AMEC, 2009). Streamflow in Cave Creek reported from Station Number 09512280 for late 2005 through 2012 is provided in Figure 5 (USGS, 2012). It should be noted that Cave Creek receives surface water flow from multiple braided washes that drain the region surrounding CCL following significant precipitation events. One of these natural washes is located directly south of the New Landfill on Arizona State Trust Land (see Figure 2).

Four retention basins are present on the CCL property to retain all site runoff and site intercepted runon (see Figure 1). Prior to development of the site as a landfill, a natural wash conveyed surface flow through the region that is now the New Landfill (a remnant of this wash is identifiable to the west of the New Landfill in Figures 1 and 2). Development to the east of the landfill has significantly altered natural drainage channels and reduced the quantity of storm water runon to the CCL site.

In addition to the site retention basins, multiple ponds (construction unknown) are present at the golf course located to the east of CCL.

3.1.5 Regional Hydrogeology

CCL is located in the East Salt River Valley (ESRV) sub-basin of the Phoenix Active Management Area (AMA) established by the Arizona Department of Water Resources (ADWR). As discussed in BAS (2005), ESRV stratigraphy consists of a thick sequence of alluvial and lacustrine valley deposits. These units are identified by the ADWR (2006) as the Upper Alluvial Unit (UAU), the Middle Alluvial Unit (MAU), and the Lower Alluvial Unit (LAU). The UAU is comprised mainly of unconsolidated gravel, sand, and silt deposited in alluvial channel, terrace, and floodplain deposits (Corell and Corkhill, 1994). The MAU is comprised mainly of clay, silt, mudstone and gypsiferous mudstone with some interbedded sand and gravel. Near the margins of the alluvial basins, and in the area of CCL, the MAU consists mainly of sand and gravel and is reported as difficult or impossible to distinguish from other units (ADWR, 2006). The LAU is subdivided into two parts in the area of the CCL: The lower part is composed of evaporite deposits (gypsum and anhydrite) interbedded with sand, gravel, and basaltic rocks. The upper part is composed of semi-consolidated sand, gravel and silt.

3.1.5.1 Regional Groundwater Use

Since the 1960s, groundwater in the CCL area has been developed as potable and non-potable water sources, with the largest increase in production starting in the mid to late 1980s. As

indicated in the Addendum, the COP and City of Scottsdale (COS) have pumped municipal supply wells to supplement drinking water supplies approximately two miles east and southeast of the site.

To supplement the analysis of regional groundwater extraction use for domestic/public water supply, a list of wells registered with ADWR since March 2009 (the listing presented in the Addendum) is provided in Table 8. The area of interest was limited to those wells located within a 3-mile radius of CCL. Figure 6 displays the location of both exempt and non-exempt registered wells within a 3-mile radius of the site (ADWR, 2012). A well is considered "exempt" if it has a maximum pump capacity of 35 gal per min; these wells are typically used to withdraw groundwater for domestic purposes, including watering less than two acres of grass or garden. Exempt wells must be registered with ADWR but are subject to fewer requirements than non-exempt wells which have a pump capacity greater than 35 gallons per minute. The following was noted in the update of the ADWR well registry for the area of interest:

- In December 2009, COP Well 281 (ADWR Number 55-524599) reached the end of its useful life and was replaced by COP 9A-Well 300 (ADWR Number 55-218928) which is located approximately 1.5 miles east of the CCL. COP 9A-Well 300 is to serve as a dual purpose well that can recharge potable supplies through direct injection into the aquifer and pump/distribute stored supplies during peak demand to supplement water supplies in northeast Phoenix (i.e., the well is an Aquifer Storage and Recovery [ASR] well). The COP City Council awarded a contract for installing a pump/motor and constructing the infrastructure associated with the new well on April 18, 2012 (COP, 2011 and 2012).

- Two new exempt domestic supply wells were identified approximately 2.5 miles southeast of CCL (ADWR Numbers 55-219460 and 55-912638).

- Two Notice of Intent (NOI) applications were filed with ADWR for new exempt domestic supply wells located approximately 1 mile east and 2.5 miles south of CCL (ADWR Numbers 55-911959 and 55-220996, respectively). State-imaged records indicate ADWR issued letters to both applicants stating the proposed well locations were situated within the Phoenix AMA and according to Arizona Revised Statutes § 45-464(C) the wells cannot be drilled because they are located within 100 ft of an operating water supply and distribution system of a designated water provider. No additional records were immediately available regarding the status of these applications with ADWR.

3.1.5.2 Regional Groundwater Flow

Prior to the development of COP and COS groundwater well fields (circa 1978) the predominant direction of groundwater flow in the vicinity of CCL was to the southwest (Littin, 1979). With the development of regional groundwater sources, the water table elevation has decreased significantly, more than 100 ft in COP wells since the 1980s. As a result of the increase in groundwater production, the predominant flow of groundwater has shifted to the southeast toward the regional pumping center. Annual Pumpage (1984 to 2010) from COP and COS wells located east to southeast of CCL is presented in Figure 7. The following is indicated from the reported annual pumpage:

- The highest rates of annual groundwater withdrawal in the CCL region for public water supply were reported in 1999 at more than 5,000 acre-ft per year (AF/year) with more than 60 percent being groundwater production from COP wells.

- Maximum individual pumpage was from COS Well 65 (55-518789) in 2002 at a rate of 2,333 AF/year. In 2010, only 241 AF/year was reported for the annual pumpage from this well. No pumpage records exist for this well prior to 1991.

- The lowest rates of annual groundwater withdrawal in the CCL region for public water supply were reported in 1984 at approximately 250 AF/year.

Groundwater wells in this region are intended to be used to supplement water supplies in northeast Phoenix during high demand periods. In an attempt to recover some aquifer storage, the COP has implemented a program to recharge potable supplies through direct injection into the aquifer.

3.1.6 Site Hydrogeology

Subsurface geology beneath CCL is typical for the ESRV and for the Phoenix area. Geology has been interpolated in the area surrounding CCL due to the large amount of undeveloped land present in the region and the lack of deep lithologic interpretative data. According to ADWR (2006), the bottom elevation of the UAU ranges from approximately 1,600 to 1,500 ft AMSL, the bottom of the MAU ranges from approximately 1,200 to 1,000 ft AMSL, and the bottom of the LAU ranges from approximately 1000 to 800 ft AMSL at the site. As discussed above, in the area of CCL, the MAU is difficult to distinguish from other units; for this reason the local lithology is generalized and referred to as undifferentiated alluvial deposits.

Three hydrostratigraphic profiles were generated to depict the significant depth of the vadose zone at the site and present the relative depths of site monitoring locations to both natural and constructed site features. The lines of cross section are identified on Figure 8. Generalized Hydrostratigraphic Cross Sections A-A' and B-B' are illustrated on Figure 9 and represent the subsurface from west to east at the Old Landfill and from north to south along the east side of the New Landfill. Figure 10 displays the Generalized Hydrostratigraphic Cross Section C-C' which depicts the subsurface from west to east at the southern portion of the New Landfill.

3.1.6.1 Vadose Zone

Geology. Stratigraphic data collected during visual logging of cuttings and geophysical logging of site borings (prior to monitoring well installation) indicate the vadose zone consists of unconsolidated alluvial deposits (sands, gravels, cobbles, and boulders) with little to essentially no clay content. The deposition is highly heterogeneous but a relatively thin zone of increasing finer-grained materials (layered silts and fine sands) at depths of 200 to 250 ft bgs, or approximately 1,650 to 1,600 ft AMSL in elevation, is indicated in the southern portion of the site. In the northern portion of the site, a similar zone occurs at a shallower depth, approximately 110 ft bgs or about 1,780 ft AMSL. This slight change in grading may indicate the transition from the UAU to the MAU.

Permeability. Based on the composition of the unconsolidated alluvial deposits, the formation is likely characterized by high permeabilities. The results of soil vapor extraction testing (of screened intervals ranging from 150 to 600 ft bgs) suggest that the air permeability of deep sediments is on the order of 1E-8 cm^2 to 1E-7 cm^2 (1 to 10 darcys).

Depth to Groundwater. The groundwater elevation at the CCL ranges from approximately 1,158 to 1,206 ft AMSL (see Table 3). Based on ADWR (2006) estimates, the entire UAU and a significant portion of the MAU is unsaturated at CCL. In the vicinity of CCL, the vadose zone is approximately 650 to 700 ft thick based on water levels collected at site monitoring wells between 2001 and 2012.

3.1.6.2 Saturated Zone

Aquifer Hydraulic Properties. The ability of the aquifer to transmit water at CCL is estimated based on materials encountered during drilling and regionally documented information. The saturated zone, at depth, consists of fine to very coarse grained unconsolidated sediments deposited in an alluvial environment. This depositional environment yields a highly heterogeneous aquifer making it difficult to fully define transport properties. Based on values reported in the literature, the aquifer hydraulic conductivity may range from 1 to 200 ft per day (ft/day) and the specific yield ranges from 7 to 12 percent (Freihoefer et al 2009).

Inflow. The primary source of recharge in the basin occurs from the infiltration of precipitation runoff from the surrounding mountains, the infiltration of urban stormwater runoff, and underflow from adjacent basins of higher altitudes. In addition, the COP has implemented an ASR program to artificially recharge groundwater through aquifer injection of surplus potable water.

Outflow. Prior to groundwater development in the early 1960s, the aquifer system was considered to be at equilibrium. However, as discussed in Section 3.1.5, aquifer outflows have increased substantially since the 1960s, causing a deficit in the hydrologic budget and contributing to significant declines in groundwater elevations at the site over time. In addition to groundwater withdrawals, outflow from the aquifer also occurs as potential evapotranspiration (PET). PET is variable in the Salt River Valley; depending on the density of riparian corridors and phreatophyte growth, estimates of PET decreased from 48,000 AF/year to 25,000 AF/year between 1983 and 2006 due to loss of riparian habitat and declines in the regional water table (Corkhill et al. 1993 and Freihoefer et al 2009).

3.2 Nature and Extent of Contamination

3.2.1 Distribution of Impacts

The results of soil vapor and groundwater sampling at the site indicate that both are impacted with VOCs that likely originated from one or both of the landfills. The following sections summarize the distribution of VOC contamination in soil vapor and groundwater, respectively.

3.2.1.1 Soil Vapor

Soil vapor concentrations of VOCs vary with location and depth at the site. There is a fair amount of data collected from 2004 to date at shallow vapor monitoring wells. However, the current ability to assess the extent of impacted soil vapor at depth is limited by the location and construction of available monitoring wells used to collect soil vapor samples from below 150 ft bgs.

Shallow Soil Vapor. Soil vapor samples have been collected from within the New Landfill, below both of the landfills, and at perimeter monitoring wells located throughout the site (see Figure 2 for well locations). A summary of shallow soil vapor data is as follows:

Location	Depth (ft bgs)	Maximum [TCE]	Maximum [1,1-DCE]	Maximum [cis-1,2-DCE]	Maximum [PCE]	Maximum [Freon-113]	Maximum [Toluene]
Below the Old Landfill*	80 to 140	21 mg/m^3 (ODP-01-D)	380 mg/m^3 (ODP-01-D)	0.72 mg/m^3 (ODP-02-D)	14 mg/m^3 (ODP-01-D)	120 mg/m^3 (ODP-01-D)	0.12 mg/m^3 (ODP-02-S/ ODP-02-D)
Within the New Landfill	12 to 77	1.9 mg/m^3 (GW-13)	0.52 mg/m^3 (GW-08)	25 mg/m^3 (GW-08)	2.2 mg/m^3 (GW-13)	0.24 mg/m^3 (GW-08)	46 mg/m^3 (GW-013)
Below the New Landfill*	80 to 140	95 mg/m^3 (NDP-01-D)	3.4 mg/m^3 (NDP-01-D)	3.5 mg/m^3 (NDP-01-S)	9.6 mg/m^3 (NDP-01-D)	170 mg/m^3 (NDP-02-D)	7.7 mg/m^3 (NDP-01-D)
P Wells	20 to 55	59 mg/m^3 (P-09)	1.3 mg/m^3 (P-09)	0.66 mg/m^3 (P-05)	1.8 mg/m^3 (P-09)	15.3 mg/m^3 (P-09)	0.60 mg/m^3 (P-09)

*Note: The base of the Old Landfill is located at approximately 17 to 22 ft bgs. The base of the New Landfill is located at approximately 38 to 80 ft bgs.

Appendix G, H and I present individual sample results by location and date sampled. VOC soil vapor data associated with shallow soils indicate:

- Chlorinated VOC concentrations generally increase with depth. The highest concentrations of chlorinated VOCs (except cis-1,2-DCE) were observed in the deeper intervals of wells completed below the landfills. Concentrations within the New Landfill were lower. This trend of increasing concentrations with depth is also observed in the region surrounding the landfill (as monitored by the P wells); the highest concentrations of chlorinated VOCs (except cis-1,2-DCE) were indicated in P-09, which is completed at 51 ft bgs. VOC concentrations at P-8 and P-10, which are completed at 20 ft bgs and located approximately 300 ft south and north of P-09 respectively, were comparatively negligible.

- The highest concentrations of chlorinated VOCs appear to be located in the vicinity of the Old Landfill or the northern portion of the New Landfill. This observation is particularly apparent in P well data collected from P-09 and P-22. P wells are located in the vicinity of the landfills but not directly within or below the landfills and can monitor the lateral migration of soil vapors from landfills. Soil vapor samples collected from P-09 and P-22 (which are both completed to approximately 50 ft bgs and located at or near the transfer station) contained the highest concentrations of TCE of all the P wells monitored.

- There appear to be different chemical profiles of VOCs associated with each of the site landfills. The predominant chlorinated VOC in samples collected from all but one of the Old Landfill monitoring well locations (i.e., ODP-03) is 1,1-DCE. However, PCE and more recently TCE are more significant at ODP-03 (located in the southwestern portion of the Old Landfill). Concentrations of TCE and/or associated reductive dechlorination byproducts (e.g., cis-1,2-DCE) are the predominant chlorinated VOCs in samples collected from within or under the New Landfill.

- There are other VOCs and semi-volatile organic compounds (SVOCs) present in shallow soil vapor samples collected from the site. Numerous Freons, petroleum hydrocarbons, and common solvents (e.g., acetone and MEK) are present. Freon-113 and toluene have been detected at the greatest concentrations and with the most prevalence. Toluene concentrations are highest within the New Landfill.

These results suggest that contaminant-impacted soil vapors originating in the landfills dispersed both laterally and vertically at some time in the past and that currently, the highest soil vapor concentrations in shallow soils are present in the northern portion of the site.

Deep Soil Vapor. Deep soil vapor has been evaluated in the Transfer Station area (between the two landfills at TSSV-1 and PW) and at the southern edge of the site (south of the New Landfill in MW-2). A summary of deep soil vapor data is as follows:

Location	Depth (ft bgs)	Maximum [TCE]	Maximum [1,1-DCE]	Maximum [cis-1,2-DCE]	Maximum [PCE]	Maximum [Freon-113]	Maximum [Toluene]
At TSSV-1-S, in the deep vadose zone	150 to 200	913 mg/m^3	8.34 mg/m^3	0.170 mg/m^3	27.1 mg/m^3	421 mg/m^3	<7.54 mg/m^3
At TSSV-1-M, in the deep vadose zone	350 to 400	752 mg/m^3	5.56 mg/m^3	47.5 mg/m^3	36.6 mg/m^3	199 mg/m^3	<7.54 mg/m^3
At TSSV-1-D, in the deep vadose zone	549 to 559	2,620 mg/m^3	262 mg/m^3	1,230 mg/m^3	237 mg/m^3	245 mg/m^3	0.730 mg/m^3
At PW, directly above the water table	varies	752 mg/m^3	24.2 mg/m^3	285 mg/m^3	37.3 mg/m^3	107 mg/m^3	<1,890 mg/m^3
At MW-2, directly above the water table	693 to 708*	0.11 mg/m^3	<0.005 mg/m^3	0.0057 mg/m^3	<0.0086 mg/m^3	0.053 mg/m^3	0.050 mg/m^3

* Note: Monitoring depths are approximate; samples were collected below a packer system installed within the screened interval of a groundwater monitoring well.

Appendix G, H and I present individual sample results by location and date sampled. VOC soil vapor data collected from deep soils indicate:

- There are significant concentrations of chlorinated VOCs in the deep vadose zone and concentrations generally appear to increase with depth. Based on available data, the highest concentrations of VOCs observed to date (in either the shallow or deep vadose zone) are present between 549 and 559 ft bgs at TSSV-1D. Concentrations detected above the water table at PW (around 700 ft bgs) are lower but comparably elevated.

- The VOC detected at the greatest concentration in soil vapor is TCE. The VOC with the next highest concentration is cis-1,2-DCE which is a reductive dehalogenation daughter product of TCE. 1,1-DCE is present in soil vapor at depth but the highest concentration of this compound detected at the site was in shallow soil vapor, under the Old Landfill (at ODP-01-D).

- Deep vadose zone soil vapor concentrations appear higher in the northern portion of the site (near TSSV-1 and PW) than in the southern portion of the site (at MW-2). Although MW-2 is not a soil vapor monitoring well, concentrations obtained by sampling vapors under a packer system installed in the screened interval of this groundwater monitoring well were comparatively negligible.

Deep soil vapor data suggest that contamination from the landfills has migrated vertically and laterally resulting in a dispersed plume at depth that principally contains TCE and associated reductive dehalogenation daughter products; 1,1-DCE, PCE, and Freon-113 are also present at elevated concentrations. Despite the limited amount of data collected in the southern portion of the New Landfill, deep soil vapor results indicate that the northern portion of the site (near the Old Landfill and in the northern portion of the New Landfill) is more impacted with contaminated soil vapor than the southern portion of the site.

3.2.1.2 Groundwater

Although other VOCs are present in groundwater underlying the site, TCE is the primary COC impacting groundwater quality at CCL based on the magnitude of concentrations present and the relatively low AWQS for this compound (5 μg/L). Appendix E and F summarize the results of analytes detected at reportable concentrations in site groundwater.

Lateral Distribution of Contamination. TCE concentrations and groundwater elevations at wells with the longest period of record (i.e. PW, MW-1, MW-2, MW-3, and MW-4) are shown on Figure 11. As presented, reportable concentrations of TCE in groundwater are quite variable but have generally increased with the falling regional water table. The clearest association between TCE concentrations and groundwater levels is apparent at PW (which is located hydraulically upgradient of the New Landfill) and at MW-1 and MW-2 (which are located hydraulically downgradient of portions of both landfills). At PW, TCE concentrations have been detected at low levels since 1985 but began increasing in 1997 and reached a maximum of approximately 150 μg/L in 2008 (excluding data collected during the Extended Soil Vapor Extraction Test). TCE concentrations began increasing at MW-1 in 2005 and at MW-2 in 2007. The highest concentrations of TCE in groundwater observed at the site to date (without consideration of concentrations at PW during the Extended Soil Vapor Extraction Test) were at MW-2 which peaked in April 2010 (at 450 μg/L) and declined thereafter. Given deep soil vapor data that indicates TCE concentrations are higher in the northern portion of the site than at MW-2, this

distribution of TCE in groundwater over the most recent 15-year period (from 1997 to 2012) suggests that interaction between contaminated soil vapor at depth with groundwater in a region north of MW-1 and MW-2 resulted in observed groundwater contamination in the past and migrated with groundwater flow to MW-2

The relative contribution of the Old Landfill and the New Landfill to groundwater impacts observed at MW-2 is less clear. Evidence that the Old Landfill contributes the bulk of VOC mass detected in groundwater at MW-2 includes:

- The dates when the Old and New Landfills operated (i.e., from 1965 to 1984 and 1984 to 1998, respectively) compared to when TCE was first observed in PW (1985);
- The magnitude of groundwater impacts at PW and the location of this well hydraulically upgradient of the New Landfill; and
- The presence of significant concentrations of contaminated soil vapor at depth immediately adjacent to the Old Landfill at TSSV-1.

Evidence that the New Landfill contributes the bulk of the VOC mass detected in groundwater at MW-2 includes:

- The predominance of TCE and associated daughter products both in soil vapor in/under the New Landfill and impacted groundwater (1,1-DCE which is predominant in soil vapor under the Old Landfill is not a primary contaminant in groundwater);
- The limited extent of groundwater contamination located hydraulically downgradient of the Old Landfill (particularly at MW-3 and MW-8); and
- Notable increases in groundwater TCE concentrations at PW, MW-1, and MW-2 in the period after 1997, when operations had been ongoing at the New Landfill for more than 13 years.

In any case, both landfills likely contribute in some part to groundwater impacts and distinctions between the two landfills are currently only relevant in terms of targeting impacted regions for treatment.

The extent of TCE in groundwater downgradient of the New Landfill has been defined to the 5 µg/L AWQS using the existing monitoring network (see Figure 12). As of August 2012 (the most recent monitoring data collected as of the date of this report), TCE concentrations ranged from less than 5 µg/L in MW-5, MW-6, MW-7, and MW-8 to 105 µg/L in MW-2. Since installation of MW-4, concentrations have increased from 5.2 µg/L in November 2010 to 32.6 µg/L in August 2012. This increase in concentrations downgradient of the site began around August 2011 and indicates a potential for offsite migration of low levels of TCE in groundwater south of the New Landfill. Concentrations are anticipated to decrease in the future at MW-4 based on the currently decreasing TCE concentrations observed upgradient at MW-2.

Vertical Distribution of Contamination. Depth-specific sampling was conducted at MW-2 in 2009 to further evaluate the nature and extent of groundwater contamination. Concentrations

ranged from 190 µg/L at approximately 5 ft below the groundwater table to 99 µg/L at 45 ft below the groundwater table. This stratification in TCE concentrations with depth, which results in a relatively thin layer of elevated concentrations at the top of the aquifer, suggests that groundwater contamination is influenced by mass transfer interactions that occur at the groundwater/vadose zone interface. Vertical stratification of TCE concentrations in groundwater with depth has important implications for groundwater monitoring and analysis of associated data. The appendices in this report presenting analytical data indicate an elevation that either the sampling pump or the PDB was set at. The depth of the sampling pump below the groundwater table during each monitoring event is noted in Appendix D.

3.2.2 Transport Mechanisms

Based on the available site history, collected data, and results of SVE testing, the following potential mechanisms may be influencing contaminant transport at the site:

- Volatilization of contaminants present in waste, landfill leachate and/or impacted soil to LFG and soil vapor;
- Vapor-phase convective transport of contaminated LFG/soil vapor both laterally and vertically from the landfill due to pressure, temperature, concentration and/or density gradients (vapor transport is affected by soil permeability; changes in soil permeability due to permeable strata or increasing compaction can promote or impede transport, respectively);
- Dissolution of contaminants present in LFG/impacted soil vapor into groundwater at the vadose zone/groundwater table capillary fringe;
- Aqueous-phase advective transport of contaminated groundwater in the capillary fringe to the saturated aquifer due to drainage of soil water from a falling groundwater table;
- Aqueous-phase advective transport of contaminated leachate and contaminated LFG condensate (due to cooling in regions surrounding the landfill) both laterally and vertically from waste/impacted soil via precipitation/surface water infiltration through the vadose zone to groundwater (infiltration through the waste placed in the landfills is expected to be less significant after operations ceased and the landfill cover was installed);
- Adsorption of contaminated leachate and/or condensate to soil with subsequent remobilization via volatilization and desorption due to infiltration; and
- Migration (via advection, diffusion/dispersion, etc.) of contaminants present in groundwater with groundwater flow.

A graphical depiction of the CSM, including these potential transport mechanisms, is provided in Figure 13. Given the limited amount of infiltration due to the arid climate and absence of any notable indication of leachate impacts in groundwater, vapor phase transport mechanisms are likely to be dominant at CCL.

A remedial action objective (RAO) screening model developed by Walter and Geddis (2002) was used to evaluate whether the concentrations present in deep soil vapor are sufficient to appreciably impact groundwater quality at CCL. This analytical transport model estimates a soil vapor concentration present at the vadose zone/groundwater table interface (C_{RAO}) over a source area of length (L) that can result in a vertically averaged groundwater concentration ($C_{z,t}$) at the end of the source length that complies with groundwater remediation goals (e.g., the AWQS). In addition to standard parameters used to characterize groundwater transport and contaminant mass transfer, the model is capable of incorporating a value for infiltration flux (the rate of percolation through the vadose zone that reaches the aquifer or its equivalent due to capillary fringe dewatering as the water table declines) and a mixing zone thickness (the length of submerged screen in a compliance well located at the downgradient edge of the source area) into the calculations. For CCL, soil vapor concentrations above the water table over the length of the New Landfill were estimated using maximum and current observed TCE concentrations at MW-2 from September 2010 to 2012. Model parameters representative of site conditions were as follows:

Model Input Parameter	Symbol Used in Model	Assumed Parameter Value	Basis for Parameter Value
Horizontal Groundwater Flow Velocity	v_x	0.135 ft/day	Calculated based on the average observed groundwater gradient at the site in 2012 (0.0027 ft/ft), the hydraulic conductivity estimated by Dames & Moore, 1994 for the site (15 ft/d), and the assumed porosity (0.30).
Soil bulk density	ρ_D	1.68 g/cm^3	Estimated bulk density for sand and gravel (Maidment, 1993).
Porosity	ϕ	0.30	Assumed porosity for sand and gravel (Domenico and Schwartz, 1998).
Fraction of Organic Carbon	f_{OC}	0.001	Observed value for sand (Maidment, 1993) which is within the observed range for arid soils (Walter and Geddis, 2002).
Infiltration Flux	q_z	1.80 in/yr	Equivalent infiltration rate due to a declining water table (per Walter and Geddis, 2002) calculated using MW-2 water level data from September 2010 to September 2012 and an assumed specific yield of 0.20 (Fetter, 1994); the rate of percolation/infiltration through the vadose zone to the water table was neglected.
Source Length	L	2,800 ft	The longitudinal length of the New Landfill
Mixing Zone Thickness	b	118 ft	The submerged screen length of MW-2 as of September 2012
Tortuosity	τ	0.20	Walter and Geddis, 2002
Longitudinal Dispersivity for Infiltration	α_{ZZ}	10 cm	Professional judgment based on values summarized by Gelhar et al, 1992
Transverse Dipersivity for Horizontal Flow	α_{ZX}	0.10 cm	Professional judgment based on values summarized Gelhar et al, 1992
Aqueous Molecular	D_0	1.04 E-5 cm^3/sec	For TCE (University of California at Davis, 1994)

Diffusion Coefficient			
Dimensionless Henry's Law Coefficient	H_D	0.335	For TCE (EPA, 2012; Temperature dependence evaluated by the OSWER Method at 20 deg C)
Organic Carbon-Water Partition Coefficient	K_{OC}	126	For TCE (Maidment, 1993)
Concentration of TCE in groundwater Upgradient of the Source Area	C_o	0 µg/L	Assumed ambient concentration upgradient of the source area was zero.
Target Vertical Average Compound Concentration	$C_{z,t}$	450 µg/L (maximum) 105 µg/L (recent)	Maximum and recent (August 2012) TCE concentrations at MW-2

Calculated soil vapor concentrations (C_{RAO}) for these scenarios were 620 mg/m^3 (based on the maximum groundwater concentration of 450 µg/L at MW-2) and 140 mg/m^3 (based on the recent groundwater concentration of 105 µg/L at MW-2). Although soil vapor concentrations directly above the water table under the New Landfill have yet to be established (the maximum concentration to date observed at 140 ft bgs under the New Landfill is 95 mg/m^3), the maximum TCE concentrations observed at TSSV-1D (2,620 mg/m^3) and above the water table at PW (752 mg/m^3) in soil vapor suggest that sufficient mass is present at depth to result in observed concentrations with only an equivalent infiltration rate due to the declining water table considered. As it is unlikely that the entire length of the New Landfill is impacted with elevated soil vapor concentrations (given observed soil vapor concentrations at MW-2), it is interesting to note that if the source length (L) is divided in half (1,400 ft), calculated soil vapor concentrations are 1,200 mg/m^3 and 280 mg/m^3, respectively, which are still within the range of values observed in deep soil vapor at the site.

Based on the significant concentrations of TCE present in soil vapor at depth and variable concentrations of TCE in groundwater that show some correlation with a declining regional water table, migration of contamination from the landfills to depth as a dispersed soil gas plume with dissolution of contaminants into groundwater at the capillary fringe and drainage of soil water from a falling groundwater table appear to be the predominant contaminant transport mechanisms resulting in impacts to groundwater at the site. Given this CSM, concentrations at MW-2 are anticipated to continue to vary in the future with both the magnitude/location of the impacted soil gas plume and the rate at which the water table declines.

3.2.3 Identification of Potential Receptors

Water supply wells, particularly those used for municipal supply, are likely the primary potential receptors of contamination at the site. Regional groundwater withdrawals appear to impact the direction of groundwater flow at CCL; if attenuation mechanisms controlling the fate and transport of TCE present in groundwater from the site are not sufficient or the quantity of mass released to groundwater over time is significant, TCE may migrate to these potential receptors.

3.3 Data Gaps

On the basis of the current CSM, data gaps that should be filled to support Revised RAP development are summarized by medium below:

Groundwater Data Gaps

- Although the nature and extent of impacted groundwater downgradient of CCL is currently defined, the rate of groundwater VOC transport in this vicinity is unknown and assessment of the potential for off-site contaminant migration is incomplete. To support development of RAP alternatives, further evaluation of site groundwater contaminant transport mechanisms is needed. Additionally, a quantitative assessment is required to estimate the rate of groundwater extraction necessary to contain the width of the contaminant plume.

- Ongoing regional groundwater extraction activities and the use of nearby aquifer storage and recovery wells by the COP and COS have the potential to impact groundwater plume migration at CCL. To date, regional groundwater extraction has influenced groundwater flow directions at the site and has likely contributed to the longterm decline in the groundwater table observed at the site. Although these regional operations have been identified, the extent of both current and future impacts from operations on contaminant transport is unknown.

- Natural attenuation of TCE in groundwater is anticipated to be a component of the long-term remedy selected for the site. Based on the results of soil gas monitoring and SVE testing, reductive dehalogenation has occurred at the site and may contribute to future TCE attenuation. It is unknown whether reductive dehalogenation is occurring solely within the landfill and/or at depth and whether conditions are present to promote complete conversion of TCE to ethene in the groundwater.

Soil Vapor Data Gaps

- The most significant data gap impacting selection of an appropriate remedy for the site is a clear understanding of the nature and extent of deep VOC-impacted soil vapor underlying the site. The considerable VOC mass present in soil vapor at depth likely serves as an ongoing source of contamination to groundwater. Thus, any remedy that addresses groundwater without addressing soil vapor will not remediate the groundwater within a reasonable timeframe. Reliable information regarding the concentration of VOCs at significant depth (i.e., greater than 140 ft bgs) is currently only available at TSSV-1 and PW, both of which are located in the same vicinity (the waste transfer station area). This information is insufficient to estimate how much contaminant mass is present in the subsurface and how that mass is distributed in the deep vadose zone.

- Extended SVE testing has identified an issue with how representative short-term grab sampling is for deep soil vapor characterization using existing vapor well construction. Due possibly to the large well casing volumes associated with these deep wells and the rates used in testing, concentrations do not appear to stabilize during continuous extraction until significant volumes have been removed. Although stabilization of TCE concentrations was

observed in TSSV-1-S and TSSV-1-M during extended SVE testing, the duration of how long extraction must occur to achieve stabilization is not well defined for the deepest well tested. At TSSV-1-D, TCE concentrations were increasing when the Extended SVE Pilot Test was concluded.

- Given the nature of contaminants and inherent permeability of site soil, SVE is expected to be a component of the final remedy selected for the site. A good understanding of site-specific parameters that impact the design of an effective system is currently limited. To date, both radial and vertical influence have not been adequately evaluated due primarily to a lack of appropriately screened observation wells during SVE testing. There is some information regarding compaction of the alluvium with depth and relative impacts on extraction rates but there is limited quantitative information regarding bulk porosity, soil moisture, and organic content as collection of intact soil samples at depth has not been possible to date.

- For the long-term remedy selected for the site, assessment of an appropriate SVE vapor treatment technology will not be straightforward. The V-GAC treatment technology used during pilot testing is generally a presumptive approach to address chlorinated compounds in extracted vapor at low concentrations. However, at the high concentrations observed during the Extended SVE Pilot Test, carbon usage rates were significant and the carbon had to be removed as hazardous waste. On this basis, technology selection will need to be based on numerous factors including the concentration of target contaminants, estimated extraction flow rates, the required duration of extraction, the composition of other compounds present in extracted vapors, and the availability of support infrastructure (e.g., utilities). To compound the complexity of this assessment, interim testing of significant duration will likely be required to further characterize the nature and extent of soil vapor underlying the site and implementation of a treatment technology prior to long-term remedy development would control project costs.

- As indicated above, it is currently unknown whether reductive dehalogenation is occurring solely in the landfills and/or at depth. If this microbially mediated process is occurring at depth, a carbon source is serving as the electron donor and may be present in landfill leachate that has migrated to depth. The impact of this potential pathway on groundwater contamination is undefined.

4.0 WORK REQUIRED TO SUPPORT RAP DEVELOPMENT

4.1 Objective and Approach

As identified in Section 3.3 (Data Gaps), additional site characterization information is required to adequately develop and select a long-term remedy to address groundwater impacts at CCL. The objective of the additional site characterization activities identified in this Work Plan is to fill, to the extent practicable, data gaps necessary to prepare a Revised RAP.

The most significant data gap impacting selection of an appropriate long-term remedy for the site is a clear understanding of the nature and extent of VOC-impacted deep soil vapor underlying the site. To this end, additional soil vapor monitoring wells will be installed and tested while groundwater monitoring is conducted to promote ongoing evaluation of groundwater impacts. In keeping with the approach presented in the *Extended Soil Vapor Extraction Pilot Test Work Plan* prepared by AMEC in 2011, application of a known and effective treatment technology (i.e., SVE) will also continue during additional site characterization activities. This approach will address groundwater impacts underlying CCL by removing contaminant mass from the subsurface and provide feedback regarding technology effectiveness while advancing development of the Revised RAP.

Desktop studies will be conducted in parallel with field program planning to evaluate SVE treatment technologies and assess groundwater flow and contaminant transport at the site. Details regarding these studies and planned field programs are presented in the following sections. A schedule for implementation of additional site characterization activities is presented in Section 4.5.

4.2 Planned Desktop Studies

4.2.1 Soil Vapor Treatment Technology Evaluation

As indicated by the Extended SVE Pilot Test, treatment of extracted soil vapors using V-GAC is effective in controlling VOC emissions from soil vapor extraction operations at the site. However, high concentrations of TCE in deep soil vapor can result in a significantly high rate of carbon usage and disposal of the carbon as hazardous waste may be required. To ensure that the most appropriate and cost-effective SVE treatment technology is selected for both initial testing of planned deep soil vapor wells and the long-term site remedy, a Cost-Benefit analysis of treatment technology alternatives will be conducted in advance of additional soil vapor monitoring well installation. At a minimum, evaluated treatment technologies will include:

- V-GAC;
- Thermal oxidation with a scrubber system; and
- Vapor condensation.

Each of these treatment technologies is anticipated to be effective in treating extracted vapors at the site so the driving evaluation criteria will be cost and ease of implementation (i.e.,

required lead time, permitting, and flexibility). The evaluation will include development of a treatment technology description with associated infrastructure requirements and costs for a preliminary equipment configuration to address a common design basis. The design basis will be derived from data collected during the Extended SVE Pilot Test and include:

- Concentrations of target contaminants;
- An estimated extraction flow rate; and
- The composition of other compounds present in extracted vapors that may adversely impact treatment processes (e.g., Freon-113 and methane).

To adequately compare these systems, evaluation of comparative costs over time will be required (i.e., both capital and operational costs will be developed). A sensitivity analysis involving assessment of a range of contaminant concentrations and extraction flow rates will also be necessary to evaluate how flexible a given system is in treating vapors from various test locations.

Following the completion of this evaluation, a report will be prepared for ADEQ review and comment. This report will be the basis for design of an SVE treatment system used in initial SVE testing, continued SVE operations during Revised RAP development, and possibly long-term soil vapor remediation at the site.

4.2.2 Groundwater Transport Modeling

As identified in the groundwater data gaps section, issues related to the potential migration of contamination from the site require further assessment. With respect to RAP preparation, a more robust analysis of groundwater flow and contaminant transport rates at the southern site boundary is necessary to select an appropriate groundwater remedial strategy. Groundwater transport modeling will be conducted to support this analysis. Questions to be investigated include the following:

- Given a reasonable estimation of the potential extent of the groundwater contamination source area:
  - What mechanisms are dominating contaminant transport in groundwater at the site (i.e. advection, dispersion, etc.)?
  - What is the current rate of groundwater plume migration underlying the source area?
- What is the current rate of groundwater plume migration from the site at the southern site boundary?
- Is the migration of groundwater contamination currently controlled by the rate of natural attenuation?

- If offsite groundwater contaminant migration is not controlled by natural attenuation, what rate of groundwater extraction is necessary to contain the leading edge of the groundwater contamination plume?

- What is the most effective and/or efficient groundwater extraction configuration?

- What would the impact of groundwater extraction (i.e., the localized lowering of the water table around the pumping well) be on the rate of contaminant transport into groundwater from contaminated soil vapor?

- How long would leading edge groundwater extraction be required if contaminated soil vapor is adequately controlled and the contaminant source reduced?

- What is the impact of off-site groundwater extraction operations on groundwater plume migration?

Groundwater modeling will include construction a basic, 1-layer numeric groundwater model using readily available, existing data for the site area. Boundary conditions will be utilized to simulate the effects of nearby groundwater production/recharge on site groundwater conditions. Model development will occur in phases to promote adequate regulatory review and concurrence:

- Phase 1: Model definition and technical approach development. This phase of development will include information gathering, documentation of the proposed technical approach to model construction, and identification of basic model inputs and initial modeling goals.

- Phase 2: Model construction and calibration. This phase will include construction of the model to address initial modeling goals, a sensitivity analysis to evaluate controlling input parameters that impact groundwater extraction rates in particular (such as boundary conditions), and calibration of the model with available site data. A capture zone analysis with particle tracking will be used to visualize capture zones during assessment of required extraction rates for plume containment. Any remaining goals that were not addressed during this phase will be identified for evaluation during model refinement.

- Phase 3: Model refinement. This phase will build upon the model developed in Phase 2 and will likely address questions that are more temporal in nature (e.g., how long will extraction be required?). Additionally, if supplemental information resulting from planned field investigations is available (e.g., the nature and extent of the soil vapor plume that serves as the source of contamination to groundwater), these data will be considered during model refinement for additional calibration, as necessary.

At the completion of each phase, a technical memorandum will be prepared for ADEQ review and comment that summarizes the results of modeling activities performed. A data gap analysis will be performed during each phase of model development and the results will be documented in the respective technical memoranda.

4.3 Planned Field Programs

4.3.1 Soil Vapor Well Installation and Testing

4.3.1.1 Vapor Well Installation

A minimum of three new soil vapor monitoring well installations will be completed prior to Revised RAP development. Due to the depths involved, the unconsolidated alluvial sediments present at the site, and issues encountered during drilling of TSSV-1, a Well Planning Evaluation was recently submitted to ADEQ for review. The evaluation includes a review of applicable drilling strategies, the capabilities of local drilling firms, and associated well installation costs.

Minimum soil vapor well requirements are as follows:

- Well installations will include at least three nested soil vapor wells in the same borehole with screened intervals located at elevations similar to TSSV-1 to allow for the collection of comparable data during SVE testing and vapor plume evaluation;
- Wells will be installed in boreholes drilled without mud or stabilizing additives (as practicable) to promote use of the wells for SVE (dust control during drilling will need to be addressed);
- Wells will be a minimum of two inches in casing diameter to promote use of the wells for SVE;
- Screened casing slot size and annular fill materials will be similar to TSSV-1 to promote relative assessment of collected SVE data; and
- If wells are completed within the footprint of landfills, the wells must be drilled and constructed in a manner that will protect site workers from any hazardous conditions within the landfill during drilling and must limit the potential for the nested well installation to serve as a conduit for contaminants present in the landfill to further impact groundwater (either during drilling or after well completion).

In addition to the minimum requirements identified above, the following secondary requirements were considered during the Well Planning Evaluation:

- If possible, the selected drilling strategy will allow for the collection of intact soil samples to assess soil properties at depth; and
- If possible, the well design will include a small diameter groundwater well for use with PDBs or dedicated groundwater sampling tool (e.g., BarCad) to allow for the collection of groundwater samples at planned soil vapor well locations.

The Well Planning Evaluation documents a conceptual well design incorporating these requirements and will serve as a task-specific work plan for well installation activities. Following

ADEQ concurrence with the Well Planning Evaluation, contracting of the driller and well/dust control permitting will be conducted.

Figure 14 presents the planned locations of the three initial nested well locations (TSSV-2, TSSV-3, and TSSV-4) and a potential fourth nested well location (TSSV-5) that will be considered during the drilling program. The purpose of each planned well is as follows:

- TSSV-2 will be located approximately 250 ft east of existing well TSSV-1 (near P-23) to support assessment of radial influence during SVE testing.

- TSSV-3 will be located near the approximate boundary of Cells A and B in the New Landfill, along the known extent of refuse. This well installation will be located about 1,700 ft south of PW and 1,200 ft north of MW-2 to evaluate the southern extent of soil vapor impacts as well as provide additional information supporting groundwater quality across the extent of the New Landfill. The location is in a region that can readily be contoured for drill rig access.

- TSSV-4 will be located in the northern portion of the New Landfill, near NDP-01, to assess the western extent of soil vapor impacts, beneath the New Landfill.

- If installed, TSSV-5 would be located approximately 450 ft east of TSSV-2 to assess the eastern extent of soil vapor impacts, near the Old Landfill.

Following installation of TSSV-2 through TSSV-4, a passive soil gas study will be conducted at all completed wells and intervals (including TSSV-1). It is not anticipated that active purging of the wells will occur prior to the passive study due to the logistics associated with the required duration of extraction and treatment of vapors. If conducted, the results of the passive soil gas study would be used to determine whether TSSV-5 should be installed and/or if the planned location identified in Figure 14 is appropriate.

The results of well installation activities and the passive soil gas study will be summarized in monthly site status reports and presented in detail in the Revised RAP.

4.3.1.2 Initial Vapor Well Testing

Following completion of the Soil Vapor Treatment Technology Evaluation, SVE and treatment system equipment required for testing will need to be permitted (as applicable), procured and installed at the site in the TSSV-1 treatment compound. These activities will likely be conducted concurrent with the well installation program so that when the wells are installed, testing can begin.

Each completed well will be subject to a soil vapor test comparable to the Extended SVE Test conducted at TSSV-1 (i.e., each well will serve as the SVE test well and surrounding wells will be used to evaluate influence). SVE will be conducted from the individual intervals in each test well for a minimum of 8 days to yield data that are similar to the Extended SVE Pilot Test. For all wells except TSSV-3, extracted vapors will be piped to the TSSV-1 treatment compound for processing. Testing of TSSV-3 will likely require use of a generator-operated blower and V-GAC/Hydrosil treatment system at the TSSV-3 wellhead. Due to this configuration, the duration

of testing may not be comparable to the other wells and will generate carbon that will have to be profiled to determine if it is hazardous waste.

The primary objectives of vapor well testing will include:

- Collection of representative concentrations of VOCs in extracted soil vapor to delineate the nature and extent of the soil vapor plume and refine the CSM;
- Estimation of the horizontal and vertical pneumatic conductivity of vadose zone soils to refine the CSM and support remedial design;
- Evaluation of radial and possibly vertical influence of SVE operations conducted at the site in the deep vadose zone to support remedial design; and
- Mass removal.

The results of testing will be summarized in monthly site status reports and presented in detail in the Revised RAP.

4.3.2 Soil Vapor Extraction Operations

If the treatment technology selected for the site is operational prior to the installation of new soil vapor wells, SVE operations in TSSV-1 will resume during the interim period between well installation and new well testing. Following new well testing, extraction from at least one of the site soil vapor wells will be conducted on a routine basis while Revised RAP development progresses. Selection of the well or wells to be extracted from will be based on the results of initial vapor well testing. The objective of operations will be contaminant mass removal from the subsurface. Summary results of ongoing SVE operation will be presented in site status reports on a quarterly basis (based on the calendar year) and will include:

- Identification of the well or wells extracted from;
- Rates and duration of extraction;
- An estimate of mass removed during operations; and
- A narrative description of any significant issues encountered during operation.

4.3.3 Groundwater Monitoring

Monthly groundwater elevation monitoring and quarterly groundwater sampling will continue during implementation of the additional site characterization activities presented in this Work Plan. To further assess groundwater data gaps presented in Section 3.3, the following supplementary activities will also be conducted:

- If feasible, new soil vapor monitoring wells will include a small diameter groundwater well to allow for the collection of passive groundwater samples at planned well locations. These

wells are located between PW and MW-2 and should significantly progress the understanding of contaminant distribution in groundwater under the New Landfill.

- Field parameter monitoring during routine groundwater well purging will be expanded to include use of a flow-through cell with measurement of redox potential (i.e., E_h), dissolved oxygen, pH, and conductivity; the stabilized readings will be added as a new class of data to the project database. These readings will aid in the assessment of reductive dechlorination currently occurring at the site.

- Total organic carbon, dissolved organic carbon, ethene, ferric and ferrous iron, and Freon-113 will be added to the groundwater monitoring program for a minimum period of six quarterly monitoring periods.

The results of ongoing groundwater monitoring will continue to be summarized in monthly site status reports and will be presented in detail in the Revised RAP.

4.4 Development of the Revised RAP

As identified in previous sections, the results of the Soil Vapor Treatment Technology Evaluation and Groundwater Transport Modeling will be documented in separate reports submitted for review by ADEQ prior to preparation of the Revised RAP. These reports will form the basis for the development of remedial alternatives for the site.

Given the CSM, soil vapor extraction is likely to be developed as a remedial technology to address the significant VOC mass present in impacted soil vapor. In addition to how extracted vapors will be treated, the Revised RAP will have to define the areal extent and what depth intervals will be targeted for treatment.

For contaminated groundwater, the following remedial alternatives will be evaluated:

- Monitored Natural Attenuation (MNA);

- Leading edge containment of the groundwater contaminant plume via groundwater extraction with wellhead treatment; and

- In situ treatment of contaminated groundwater at the leading edge of the groundwater plume (likely with chemical oxidation and/or a well recirculation technology).

If the rate contaminant migration can be reasonably controlled by the rate of contaminant natural attenuation, Monitored Natural Attenuation (MNA) of TCE in groundwater will likely be developed as a remedial approach to address impacted groundwater. In this instance, the Revised RAP will have to consider alternative monitoring programs that adequately demonstrate that the TCE groundwater plume is stable. If a more expedited groundwater remediation strategy is required, leading edge containment of the groundwater contaminant plume will be implemented.

4.5 Project Schedule

Given the significant amount of data that is required to adequately prepare a Revised RAP, an aggressive project schedule has been developed to progress the project while continuing removal of mass from the subsurface. Estimated time frames for planned activities, a description of associated reporting, and documentation milestones are summarized below:

Activity	Estimated Time Frame	Associated Documentation	Documentation Milestone
Vapor Well Installation Planning	August 2012 – October 2012	Well Planning Evaluation Technical Memorandum	October 15, 2012
Soil Vapor Treatment Technology Evaluation	August 2012 – November 2012	Soil Vapor Treatment Technology Report	November 30, 2012
Vapor Well Installation Activities	October 2012 – April 2013	Monthly Status Reports Revised RAP	Not Applicable
Groundwater Transport Modeling	November 2012 – June 2013	Phase 1 Modeling Report Phase 2 Modeling Report Phase 3 Modeling Report	December 21, 2012 March 15, 2012 June 28, 2012
Vapor Well Initial Testing	May 2013 – August 2013	Monthly Status Reports Revised RAP	Not Applicable
SVE Operations*	September 2013 - Ongoing	Monthly Status Reports Revised RAP	Not Applicable
Groundwater Monitoring	Ongoing	Monthly Status Reports Revised RAP	Not Applicable
Revised RAP Development	September 2013 – February 2014	Revised RAP	February 28, 2013

Notes: * If the selected soil vapor treatment system can be constructed and permitted prior to new well Initial Testing, extraction from TSSV-1 will be conducted on an interim basis.

It should be emphasized that site characterization projects progress based on results of investigations that are difficult to fully anticipate during future work planning. There is inherent uncertainty regarding subsurface conditions, contamination extent, and conditions that are outside the control of those involved in conducting site characterization activities. These factors have the potential to adversely impact the project schedule.

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TABLES

Table 1. Site History — Cave Creek Landfill, Maricopa County

Date	Event	Significance
1965 to 1984	County operation of the Old CCL on land leased from the BLM; this landfill closed in 1984.	Defines the period when waste was placed in the Old CCL.
1982	County leases New CCL property from the ASLD.	Allows for expansion of landfill operations.
1984 to 1998	County operation of the New CCL; the New CCL ceases accepting waste in 1998.	Defines the period when waste was placed in the New CCL.
October 1982	Installation of the Production Well.	Change in site infrastructure. The Production Well was installed to supply water for fire and dust control purposes.
September 1985	Intermittent groundwater sampling from Production Well begins; TCE detected in September and October 1985 and is not detected again until May 1998.	First indication of TCE contamination underlying the landfill.
1990	County purchases the New CCL property and landfill buffer areas (includes retention areas).	Change in property ownership and expansion of site.
1992	City of Phoenix annexes the site.	Defines period when the property is located within City boundaries.
1993	Installation of MW-1 and MW-2	Initiation of the site groundwater monitoring program.
April 1994	Installation of landfill perimeter soil gas monitoring wells (P Wells)	Initiation of the site landfill gas monitoring program.
September 23, 1994	Restrictive Covenant placed on landfill property at the County's request.	Administrative restriction placed on site use.
September 1995	Installation of supplemental P Wells.	Expansion of the site landfill gas monitoring program in response to elevated methane concentrations in select P Wells.
Circa 1996	Initiation of LFG collection system operation.	Change in site operations.
1997	Southern portion of New CCL lined.	Change in site infrastructure.
December 1997	TCE detected in groundwater from MW-1 at concentrations exceeding the applicable AWQS.	Impetus for Consent Order.
1998	County constructs transfer station in northern portion of the site.	Change in site infrastructure.
August 15, 1999	County enters into Consent Order (CO) with ADEQ to characterize the nature and source of groundwater contamination.	Impetus for additional groundwater monitoring and assessment of regional sources of TCE contamination.
1999	Soil gas samples collected from LFG collection system and select P wells evaluated for chlorinated VOCs.	TCE detected at concentrations typically observed in MSW landfills (400-500 ppbV); 26 ppbV TCE detected in one P well located in the southwestern portion of the site.
January 2000	Water table drops below the screened interval in MW-1.	Collection of water samples from MW-1 no longer possible.
June 2002	Water table drops below the pump intake in MW-2.	Water samples collected from MW-2 with bailer after this date.
November 2004	Characterization of shallow soil gas in existing P wells, the Old CCL (via the installation of ODP-1 through ODP-4) and the New CCL (via the installation of NDP-1 and NDP-2).	TCE, DCE, and toluene detected in select P Wells (predominantly in the vicinity of the Transfer Station/Production Well) and the New CCL at low concentrations.

Table 1. Site History — Cave Creek Landfill, Maricopa County

Date	Event	Significance
January 20, 2005	Extension of Production Well perforations deeper into the aquifer.	Significant change in Production Well construction.
February 2005	Deepening of MW-1 and MW-2.	Significant change in MW-1 and MW-2 construction.
June 28, 2005	County enters into a CO with ADEQ to characterize and remediate contaminated groundwater.	Requires submittal of a groundwater characterization work plan and a well drilling plan; implementation and documentation of the work plan; notification of offsite impacts, as applicable; submittal of a remedial action plan; discussion of planned corrective measures in a public meeting; implementation of the remedial action plan; and status reporting.
August 25, 2005	County submittal of the *Cave Creek Landfill Groundwater Characterization Plan* (Work Plan).	Identifies plan to install MW-3 and presents a CSM.
July 2007	LFG collection system shut down.	Change in site operations.
August 2007	MW-1 becomes obstructed during an attempt to raise the dedicated submersible pump.	No data collected from MW-1 after this date.
December 2007	Installation of MW-3.	Expansion of site groundwater monitoring program.
January 2008	Sampling of landfill vapor monitoring locations.	TCE detected at low concentrations in samples collected from the New CCL; concentrations are slightly higher than observed in 2004/2005.
November 5, 2008	County submittal of the *Cave Creek Landfill Groundwater Remedial Action Plan* (RAP).	Documents an approach to address contamination based on a groundwater transport model. Remedial approach includes: operation of the LFG collection system; expansion of the LFG system if necessary; regular monitoring; installation and pumping of a new down-gradient pumping well; and installation of an irrigation system to manage purge water.
May 11, 2009	County submittal of the *Addendum to the Cave Creek Landfill Groundwater Characterization Plan* (Addendum).	Identifies activities supporting downgradient and lateral groundwater contaminant plume definition through the installation of test borings and monitoring wells, vertical characterization of contamination at MW-2 with passive diffusion bag samplers, and adjustment of the pump depth at MW-3.
May - June 2009	Vertical water quality profiling of groundwater at MW-2.	TCE concentrations decrease with depth from the soil-water interface.
June 25, 2009	Pump depths in PW, MW-2 and MW-3 adjusted per the Addendum.	Pumps placed at a consistent depth below the water table for more comparable data.
January 19, 2010	ADEQ issues a Revised CO.	Requires implementation of the Work Plan and Addendum; the submittal of documentation describing the results of implementation activities; submittal of a Revised RAP; and monthly status reports.

Table 1. Site History — Cave Creek Landfill, Maricopa County

Date	Event	Significance
October 2010 - May 2011	Installation of MW-4, MW-5, and MW-6.	Expansion of site groundwater monitoring program; definition of the downgradient extent of groundwater impacts.
August 16, 2011	County submittal of *Revised Interim Technical Summary Memorandum* .	
September 6, 2011	County submittal of the *Focused Workplan for Groundwater Characterization Near Old Landfill* .	Presents a plan for evaluating whether the Old CCL is a significant source of groundwater contamination via the installation of MW-8.
November 2011 - February 2012	Installation of MW-7 and MW-8	Expansion of site groundwater monitoring program.
November 2011 - February 2012	Extended Soil Vapor Extraction Pilot Test	Elevated concentrations of TCE detected in deep soil gas.
January and March 2012	Select P wells along the eastern perimeter of the New CCL sampled.	Low concentrations of TCE detected.

Notes:

Addendum = Addendum to the Work Plan
ADEQ = Arizona Department of Environmental Quality
ASLD = Arizona State Land Department
AWQS = Aquifer Water Quality Standard
BLM = Bureau of Land Management
CCL = Cave Creek Landfill
CO = Consent Order
DCE = Dichloroethene
LFG = landfill gas
MSW = Municipal Solid Waste
ppbV = parts per billion by volume
RAP = Remedial Action Plan
SWICU = Solid Waste Inspection and Compliance Unit
TCE = Trichloroethene
Work Plan = CCL Groundwater Characterization Plan

Table 2. Well Construction Summary

Cave Creek Landfill, Maricopa County

WellName	Location Type	Use	ADWR ID	Northing	Easting	TOC (ft amsl)	Total Well Depth (ft)	Date Installed	Casing Diameter	Top Screen Depth (ft bgs)	Bottom Screen Depth (ft bgs)	Top Screen Elevation (ft amsl)	Pump Intake Depth (ft bgs)	Pump Intake Elevation (ft amsl)	Comment
GW-01	Gas Well	LFG Extraction	-	12268590.1	1337521.7	1,900.0*	57	1/6/1998	6 inch	18	54	1,882.0	-	-	-
GW-02	Gas Well	LFG Extraction	-	12268409.9	1337532.0	1,900.0*	43	1/6/1998	6 inch	12	40	1,888.0	-	-	-
GW-03	Gas Well	LFG Extraction	-	12268251.0	1337519.8	1,900.0*	49	1/7/1998	6 inch	13	45	1,887.0	-	-	-
GW-04	Gas Well	LFG Extraction	-	12268104.9	1337522.8	1,900.0*	47	1/7/1998	6 inch	13	45	1,887.0	-	-	-
GW-05	Gas Well	LFG Extraction	-	12267952.1	1337522.2	1,900.0*	49	1/7/1998	6 inch	13	45	1,887.0	-	-	-
GW-06	Gas Well	LFG Extraction	-	12267796.0	1337520.8	1,900.0*	62	1/8/1998	6 inch	23	59	1,877.0	-	-	-
GW-07	Gas Well	LFG Extraction	-	12267642.0	1337517.3	1,900.0*	53	1/8/1998	6 inch	14	50	1,886.0	-	-	-
GW-08	Gas Well	LFG Extraction	-	12267485.1	1337515.9	1,900.0*	51	1/11/1998	6 inch	14	48	1,886.0	-	-	-
GW-09	Gas Well	LFG Extraction	-	12267335.3	1337516.7	1,900.3	51	1/11/1998	6 inch	14	47	1,886.3	-	-	-
GW-10	Gas Well	LFG Extraction	-	12267174.1	1337440.0	1,900.1	63	1/12/1998	6 inch	21	61	1,879.1	-	-	-
GW-11	Gas Well	LFG Extraction	-	12267164.9	1337582.5	1,902.0*	53	1/12/1998	6 inch	13	49	1,889.0	-	-	-
GW-12	Gas Well	LFG Extraction	-	12267025.9	1337509.6	1,910.0*	70	1/14/1998	6 inch	39	69	1,871.0	-	-	-
GW-13	Gas Well	LFG Extraction	-	12267107.3	1337775.9	1,903.0*	47	1/13/1998	6 inch	12	44	1,891.0	-	-	-
GW-14	Gas Well	LFG Extraction	-	12266978.9	1337874.1	1,900.0*	53	1/13/1998	6 inch	16	60	1,884.0	-	-	-
GW-16	Gas Well	LFG Extraction	-	12266887.9	1337683.8	1,910.0*	78	1/13/1998	6 inch	37	77	1,873.0	-	-	-
GW-18	Gas Well	LFG Extraction	-	12266844.9	1337273.8	1,896.0*	71	1/16/1998	6 inch	30	70	1,866.0	-	-	-
GW-19	Gas Well	LFG Extraction	-	12266843.4	1337418.4	1,904.0*	71	1/14/1998	6 inch	37	70	1,867.0	-	-	-
GW-20	Gas Well	LFG Extraction	-	12266981.6	1337324.4	1,902.0*	71	1/18/1998	6 inch	36	70	1,866.0	-	-	-
GW-21	Gas Well	LFG Extraction	-	12267132.5	1337294.0	1,900.0*	76	1/18/1998	6 inch	41	75	1,859.0	-	-	-
GW-22	Gas Well	LFG Extraction	-	12267268.8	1337308.5	1,902.0*	70	1/19/1998	6 inch	34	69	1,868.0	-	-	-
GW-23	Gas Well	LFG Extraction	-	12267414.9	1337319.3	1,902.0*	72	1/20/1998	6 inch	36	71	1,866.0	-	-	-
GW-24	Gas Well	LFG Extraction	-	12267567.6	1337316.1	1,902.0*	70	1/21/1998	6 inch	34	69	1,868.0	-	-	-
GW-25	Gas Well	LFG Extraction	-	12267714.2	1337319.6	1,901.0*	70	1/21/1998	6 inch	34	69	1,867.0	-	-	-
GW-26	Gas Well	LFG Extraction	-	12267866.0	1337317.2	1,901.0*	65	1/22/1998	6 inch	29	64	1,872.0	-	-	-
GW-27	Gas Well	LFG Extraction	-	12268020.0	1337317.9	1,901.0*	68	1/27/1998	6 inch	32	67	1,869.0	-	-	-
GW-28	Gas Well	LFG Extraction	-	12268171.2	1337316.1	1,900.0*	55	1/27/1998	6 inch	19	54	1,881.0	-	-	-
GW-29	Gas Well	LFG Extraction	-	12268313.2	1337318.0	1,900.0*	68	1/27/1998	6 inch	34	68	1,866.0	-	-	-
GW-30	Gas Well	LFG Extraction	-	12268459.0	1337328.8	1,899.0*	50	1/28/1998	6 inch	15	49	1,884.0	-	-	-
GW-31	Gas Well	LFG Extraction	-	12268613.4	1337393.5	1,899.0*	51	1/28/1998	6 inch	16	50	1,883.0	-	-	-
MW-01	Groundwater	Monitoring	55-538298	12266392.1	1337954.6	1,895.6	820	5/1/1993	6 inch	660	820	1,235.6	740	1,155.6	Originally installed at 695 ft bgs; moved to 740 ft bgs (at bottom of pump) on 3/2/2005
MW-02	Groundwater	Monitoring	55-538299	12265834.6	1337667.8	1,856.0	805	5/1/1993	6 inch	630	805	1,226.0	714	1,142.0	Originally installed at 675 ft bgs; moved to 704 ft bgs (at bottom of pump) on 3/1/2005; moved to 714 ft bgs on 6/26/2009
MW-03	Groundwater	Monitoring	55-216293	12266250.8	1338492.4	1,866.6	830	12/13/2007	6 inch	679	799	1,187.6	724	1,142.6	Originally installed at 777 ft bgs; moved to 724 ft bgs on 6/25/2009
MW-04	Groundwater	Monitoring	55-912575	12265550.6	1337418.6	1,850.0	768	10/26/2010	6 inch	667.5	752.7	1,182.5	718	1,132.0	-
MW-05	Groundwater	Monitoring	55-912728	12265413.1	1336562.3	1,845.2	767	12/15/2010	6 inch	660	740.2	1,185.2	701	1,144.2	-

Table 2. Well Construction Summary

Cave Creek Landfill, Maricopa County

WellName	Location Type	Use	ADWR ID	Northing	Easting	TOC (ft amsl)	Total Well Depth (ft)	Date Installed	Casing Diameter	Top Screen Depth (ft bgs)	Bottom Screen Depth (ft bgs)	Top Screen Elevation (ft amsl)	Pump Intake Depth (ft bgs)	Pump Intake Elevation (ft amsl)	Comment
MW-06	Groundwater	Monitoring	55-912942	12265265.5	1337945.3	1,860.8	776.9	5/16/2011	6 inch	683	763	1,177.8	720	1,140.8	-
MW-07	Groundwater	Monitoring	55-914001	12265730.9	1337907.8	1,859.7	765	2/8/2012	8.25 inch	674.8	754.8	1,184.9	718	1,141.7	-
MW-08	Groundwater	Monitoring	55-913859	12268813.7	1338954.8	1,889.2	766.5	1/9/2012	8.25 inch	691.5	761.5	1,197.7	736	1,153.2	-
NDP-01-D	Soil Vapor	Monitoring	-	12268409.9	1337429.5	1,902.0*	142	11/2/2004	1 inch	130	140	1,772.0	-	-	-
NDP-01-S	Soil Vapor	Monitoring	-	12268409.9	1337429.5	1,902.0*	142	11/2/2004	1 inch	80	90	1,822.0	-	-	-
NDP-02-D	Soil Vapor	Monitoring	-	12267960.5	1337410.2	1,902.0*	142	11/4/2004	1 inch	130	140	1,772.0	-	-	-
NDP-02-S	Soil Vapor	Monitoring	-	12267960.5	1337410.2	1,902.0*	142	11/4/2004	1 inch	80	90	1,822.0	-	-	-
ODP-01-D	Soil Vapor	Monitoring	-	12269714.1	1338988.7	1,903.0*	142	11/9/2004	1 inch	130	140	1,773.0	-	-	-
ODP-01-S	Soil Vapor	Monitoring	-	12269714.1	1338988.7	1,903.0*	142	11/9/2004	1 inch	80	90	1,823.0	-	-	-
ODP-02-D	Soil Vapor	Monitoring	-	12269726.2	1338440.4	1,897.0*	142	11/10/2004	1 inch	130	140	1,767.0	-	-	-
ODP-02-S	Soil Vapor	Monitoring	-	12269726.2	1338440.4	1,897.0*	142	11/10/2004	1 inch	80	90	1,817.0	-	-	-
ODP-03-D	Soil Vapor	Monitoring	-	12269132.9	1338392.7	1,892.0*	142	11/12/2004	1 inch	130	140	1,762.0	-	-	-
ODP-03-S	Soil Vapor	Monitoring	-	12269132.9	1338392.7	1,892.0*	142	11/12/2004	1 inch	80	90	1,812.0	-	-	-
ODP-04-D	Soil Vapor	Monitoring	-	12269133.2	1338927.4	1,897.0*	142	11/13/2004	1 inch	130	140	1,767.0	-	-	-
ODP-04-S	Soil Vapor	Monitoring	-	12269133.2	1338927.4	1,897.0*	142	11/13/2004	1 inch	80	90	1,817.0	-	-	-
P-02-D	Soil Vapor	Monitoring	-	12266004.1	1337644.9	1,850.2	50	4/1/1994	1 inch	-	-	-	-	-	-
P-02-S	Soil Vapor	Monitoring	-	12266004.1	1337644.9	1,850.2	20	4/1/1994	1 inch	-	-	-	-	-	-
P-03	Soil Vapor	Monitoring	-	12265924.6	1337995.0	1,857.8	53.5	4/1/1994	1 inch	-	-	-	-	-	-
P-05	Soil Vapor	Monitoring	-	12266631.4	1337882.9	1,865.0*	50	4/1/1994	1 inch	-	-	-	-	-	-
P-06	Soil Vapor	Monitoring	-	12267299.4	1337997.2	1,868.0	20	4/1/1994	1 inch	-	-	-	-	-	-
P-07	Soil Vapor	Monitoring	-	12267723.6	1338011.1	1,870.0	55	4/1/1994	1 inch	-	-	-	-	-	-
P-08	Soil Vapor	Monitoring	-	12268038.1	1338013.6	1,867.0	20	4/1/1994	1 inch	-	-	-	-	-	-
P-09	Soil Vapor	Monitoring	-	12268342.5	1338013.0	1,872.0	51	4/1/1994	1 inch	-	-	-	-	-	-
P-10	Soil Vapor	Monitoring	-	12268638.2	1338017.3	1,877.0	20	4/1/1994	1 inch	-	-	-	-	-	-
P-11	Soil Vapor	Monitoring	-	12269094.2	1337999.1	1,880.0*	50	4/1/1994	1 inch	-	-	-	-	-	-
P-12	Soil Vapor	Monitoring	-	12269061.5	1337656.8	1,879.0*	20	4/1/1994	1 inch	-	-	-	-	-	-
P-13-D	Soil Vapor	Monitoring	-	12268848.5	1337563.7	1,876.0*	55	4/1/1994	1 inch	-	-	-	-	-	-
P-13-S	Soil Vapor	Monitoring	-	12268848.5	1337563.7	1,876.0*	20	4/1/1994	1 inch	-	-	-	-	-	-
P-13-xD	Soil Vapor	Monitoring	-	12268960.5	1337487.0	1,877.0*	55	9/1/1995	1 inch	-	-	-	-	-	-
P-13-xS	Soil Vapor	Monitoring	-	12268960.5	1337487.0	1,877.0*	30	9/1/1995	1 inch	-	-	-	-	-	-
P-17-D	Soil Vapor	Monitoring	-	12267841.5	1337209.9	1,882.0*	20	4/1/1994	1 inch	-	-	-	-	-	-
P-17-S	Soil Vapor	Monitoring	-	12267841.5	1337209.9	1,882.0*	55	4/1/1994	1 inch	-	-	-	-	-	-
P-17-xD	Soil Vapor	Monitoring	-	12267843.6	1337001.0	1,865.0*	55	9/1/1995	1 inch	-	-	-	-	-	-
P-17-xS	Soil Vapor	Monitoring	-	12267843.6	1337001.0	1,865.0*	30	9/1/1995	1 inch	-	-	-	-	-	-
P-18-D	Soil Vapor	Monitoring	-	12267469.2	1337201.4	1,886.0*	50	4/1/1994	1 inch	-	-	-	-	-	-
P-18-M	Soil Vapor	Monitoring	-	12267469.2	1337201.4	1,886.0*	20	4/1/1994	1 inch	-	-	-	-	-	-
P-18-S	Soil Vapor	Monitoring	-	12267469.2	1337201.4	1,886.0*	5	4/1/1994	1 inch	-	-	-	-	-	-
P-18-xD	Soil Vapor	Monitoring	-	12267481.4	1336982.3	1,859.4	55	9/1/1995	1 inch	-	-	-	-	-	-

Table 2. Well Construction Summary

Cave Creek Landfill, Maricopa County

WellName	Location Type	Use	ADWR ID	Northing	Easting	TOC (ft amsl)	Total Well Depth (ft)	Date Installed	Casing Diameter	Top Screen Depth (ft bgs)	Bottom Screen Depth (ft bgs)	Top Screen Elevation (ft amsl)	Pump Intake Depth (ft bgs)	Pump Intake Elevation (ft amsl)	Comment
P-18-xS	Soil Vapor	Monitoring	-	12267481.4	1336982.3	1,859.4	30	9/1/1995	1 inch	-	-	-	-	-	-
P-19-D	Soil Vapor	Monitoring	-	12267130.9	1337180.2	1,876.0*	20	4/1/1994	1 inch	-	-	-	-	-	-
P-19-S	Soil Vapor	Monitoring	-	12267130.9	1337180.2	1,876.0*	55	4/1/1994	1 inch	-	-	-	-	-	-
P-19-xD	Soil Vapor	Monitoring	-	12267145.4	1336969.1	1,854.0*	55	9/1/1995	1 inch	-	-	-	-	-	-
P-19-xS	Soil Vapor	Monitoring	-	12267145.4	1336969.1	1,854.0*	30	9/1/1995	1 inch	-	-	-	-	-	-
P-20	Soil Vapor	Monitoring	-	12266556.0	1337120.4	1,860.0*	50	9/1/1995	1 inch	-	-	-	-	-	-
P-22	Soil Vapor	Monitoring	-	12268790.6	1337988.7	1,879.0*	50	4/1/1994	1 inch	-	-	-	-	-	-
P-23	Soil Vapor	Monitoring	-	12268837.7	1337856.4	1,880.0*	20	4/1/1994	1 inch	-	-	-	-	-	-
P-25	Soil Vapor	Monitoring	-	12268761.9	1337754.8	1,879.0*	55	4/1/1994	1 inch	-	-	-	-	-	-
PW	Groundwater	Monitoring	55-503913	12268740.0	1337742.0	1,881.4	820	10/1/1982	8 inch	680	810	1,201.4	729	1,152.4	Originally installed at 750 ft bgs; moved to 729 ft bgs on 6/25/2009
TSSV-01-D	Soil Vapor	Monitoring	-	12269018.5	1338002.8	1,881.0	610	1/22/2010	2 inch	549	599	1,332.0	-	-	-
TSSV-01-M	Soil Vapor	Monitoring	-	12269018.5	1338002.8	1,881.0	610	1/22/2010	2 inch	350	400	1,531.0	-	-	-
TSSV-01-S	Soil Vapor	Monitoring	-	12269018.5	1338002.8	1,881.0	610	1/22/2010	2 inch	150	200	1,731.0	-	-	-

Notes: LFG - Landfill Gas
ft - Feet
ft bgs - Feet below ground surface
ft amsl - Feet above mean sea level
* - Casing elevation interpreted from topographic data

Table 3. Groundwater Elevation, Gradient, and Flow Direction

Cave Creek Landfill, Maricopa County

Sample Date	Groundwater Elevation by Well (ft amsl)									Gradient (feet/foot)	Flow Direction (degrees from North)
	PW	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08		
4/12/2001	1,205.9	-	1,176.0	-	-	-	-	-	-	-	-
5/23/2001	1,206.4	-	1,176.0	-	-	-	-	-	-	-	-
9/21/2001	1,206.4	-	1,198.0	-	-	-	-	-	-	-	-
10/2/2001	1,203.4	-	1,181.0	-	-	-	-	-	-	-	-
1/28/2002	1,199.4	-	1,181.0	-	-	-	-	-	-	-	-
3/22/2002	1,199.4	-	1,181.0	-	-	-	-	-	-	-	-
4/30/2002	1,199.4	-	-	-	-	-	-	-	-	-	-
9/23/2002	1,195.4	-	-	-	-	-	-	-	-	-	-
1/10/2003	1,195.4	-	-	-	-	-	-	-	-	-	-
2/14/2003	1,195.4	-	-	-	-	-	-	-	-	-	-
3/11/2003	1,195.4	-	-	-	-	-	-	-	-	-	-
4/18/2003	1,195.4	1,192.6	1,186.0	-	-	-	-	-	-	-	-
5/16/2003	1,193.4	-	-	-	-	-	-	-	-	-	-
7/17/2003	1,193.4	-	1,183.0	-	-	-	-	-	-	-	-
9/6/2003	1,193.4	-	-	-	-	-	-	-	-	-	-
1/12/2004	1,193.4	-	1,183.0	-	-	-	-	-	-	-	-
2/9/2004	1,193.4	-	-	-	-	-	-	-	-	-	-
3/17/2004	1,193.4	-	1,179.5	-	-	-	-	-	-	-	-
4/23/2004	1,193.4	-	1,179.5	-	-	-	-	-	-	-	-
3/2/2005	1,186.3	1,178.7	1,178.4	-	-	-	-	-	-	-	-
3/9/2005	1,188.2	1,179.0	1,176.1	-	-	-	-	-	-	-	-
3/21/2005	1,189.1	1,181.8	1,180.7	-	-	-	-	-	-	-	-
4/8/2005	1,190.4	1,192.8	1,190.2	-	-	-	-	-	-	-	-
6/1/2005	1,189.4	1,179.8	1,177.7	-	-	-	-	-	-	-	-
6/14/2005	1,185.2	1,176.6	1,174.4	-	-	-	-	-	-	-	-
6/30/2005	1,184.2	1,176.6	1,175.5	-	-	-	-	-	-	-	-
7/7/2005	1,184.0	1,176.5	1,175.3	-	-	-	-	-	-	-	-
7/14/2005	1,182.9	1,176.5	1,175.3	-	-	-	-	-	-	-	-
7/21/2005	1,186.3	1,177.9	1,176.8	-	-	-	-	-	-	-	-
7/28/2005	1,185.8	1,178.6	1,177.3	-	-	-	-	-	-	-	-
8/5/2005	1,190.4	1,181.4	1,180.9	-	-	-	-	-	-	-	-
8/12/2005	1,187.2	1,181.4	1,180.8	-	-	-	-	-	-	-	-
8/19/2005	1,187.9	1,179.7	1,177.5	-	-	-	-	-	-	-	-

Table 3. Groundwater Elevation, Gradient, and Flow Direction

Cave Creek Landfill, Maricopa County

Sample Date	Groundwater Elevation by Well (ft amsl)									Gradient (feet/foot)	Flow Direction (degrees from North)
	PW	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08		
8/26/2005	1,190.6	1,184.0	1,182.0	-	-	-	-	-	-	-	-
9/2/2005	1,191.5	1,185.3	1,184.4	-	-	-	-	-	-	-	-
9/8/2005	1,194.0	1,187.0	1,184.6	-	-	-	-	-	-	-	-
9/15/2005	1,193.9	1,187.6	1,184.7	-	-	-	-	-	-	-	-
9/22/2005	1,195.1	1,188.6	1,185.6	-	-	-	-	-	-	-	-
9/29/2005	1,195.6	1,189.3	1,186.2	-	-	-	-	-	-	-	-
10/6/2005	1,195.6	1,189.5	1,186.1	-	-	-	-	-	-	-	-
10/13/2005	1,195.7	1,189.8	1,186.4	-	-	-	-	-	-	-	-
10/20/2005	1,183.3	1,176.0	1,174.7	-	-	-	-	-	-	0.0029	101
10/27/2005	1,183.3	1,176.0	1,174.7	-	-	-	-	-	-	0.0029	102
11/3/2005	1,183.3	1,176.0	1,174.8	-	-	-	-	-	-	0.0030	104
11/10/2005	1,183.2	1,175.8	1,174.6	-	-	-	-	-	-	0.0030	105
12/8/2005	1,183.5	1,176.7	1,175.2	-	-	-	-	-	-	0.0028	262
1/12/2006	1,183.4	1,177.6	1,174.2	-	-	-	-	-	-	0.0073	204
2/10/2006	1,182.5	1,175.4	1,174.0	-	-	-	-	-	-	0.0028	93
3/10/2006	1,182.6	1,175.5	1,174.2	-	-	-	-	-	-	0.0029	100
4/13/2006	1,182.4	1,175.2	1,173.8	-	-	-	-	-	-	0.0034	115
5/9/2006	1,182.1	1,175.0	1,173.7	-	-	-	-	-	-	0.0030	99
6/20/2006	1,182.3	1,175.4	1,173.5	-	-	-	-	-	-	0.0032	114
7/13/2006	1,182.2	1,175.3	1,173.5	-	-	-	-	-	-	0.0032	114
8/16/2006	1,181.3	1,174.6	1,172.8	-	-	-	-	-	-	0.0031	114
9/19/2006	1,182.3	1,175.2	1,173.9	-	-	-	-	-	-	0.0031	127
10/13/2006	1,181.4	1,174.5	1,172.4	-	-	-	-	-	-	0.0036	125
11/13/2006	1,179.6	1,171.4	1,166.6	-	-	-	-	-	-	0.0093	142
12/13/2006	1,180.7	1,173.9	1,171.9	-	-	-	-	-	-	0.0034	120
1/18/2007	1,180.2	1,173.6	1,172.2	-	-	-	-	-	-	0.0060	155
2/21/2007	1,179.8	1,173.1	1,171.3	-	-	-	-	-	-	0.0061	155
3/20/2007	1,179.5	1,172.9	1,171.2	-	-	-	-	-	-	0.0066	155
4/16/2007	1,179.3	1,172.7	1,170.9	-	-	-	-	-	-	0.0061	155
5/22/2007	1,179.1	1,172.4	1,170.7	-	-	-	-	-	-	0.0060	154
6/12/2007	1,178.7	1,172.1	1,170.3	-	-	-	-	-	-	0.0060	155
7/18/2007	1,178.6	1,172.0	1,170.1	-	-	-	-	-	-	0.0060	155
9/18/2007	1,177.7	-	1,169.6	-	-	-	-	-	-	-	-

Table 3. Groundwater Elevation, Gradient, and Flow Direction

Cave Creek Landfill, Maricopa County

Sample Date	Groundwater Elevation by Well (ft amsl)									Gradient (feet/foot)	Flow Direction (degrees from North)
	PW	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08		
10/24/2007	1,177.5	-	1,169.2	-	-	-	-	-	-	-	-
11/16/2007	1,177.2	-	1,168.9	-	-	-	-	-	-	-	-
12/19/2007	1,176.8	-	1,168.6	-	-	-	-	-	-	-	-
1/12/2008	1,175.9	-	1,168.2	-	-	-	-	-	-	-	-
2/20/2008	1,176.3	-	1,168.2	1,169.2	-	-	-	-	-	0.0027	92
3/12/2008	1,175.4	-	1,168.2	1,170.0	-	-	-	-	-	0.0023	242
4/16/2008	1,174.9	-	1,167.5	1,169.0	-	-	-	-	-	0.0024	253
5/20/2008	1,177.1	-	1,167.9	1,168.6	-	-	-	-	-	0.0030	100
6/16/2008	1,175.9	-	1,168.0	1,167.2	-	-	-	-	-	0.0031	130
7/18/2008	1,175.7	-	1,167.0	1,168.2	-	-	-	-	-	0.0029	266
8/13/2008	1,174.3	-	1,167.1	1,167.8	-	-	-	-	-	0.0023	93
9/15/2008	1,174.6	-	1,168.4	1,168.0	-	-	-	-	-	0.0023	123
10/16/2008	1,173.8	-	1,167.0	1,167.4	-	-	-	-	-	0.0022	113
11/14/2008	1,173.8	-	1,167.0	1,167.1	-	-	-	-	-	0.0022	158
12/12/2008	1,174.6	-	1,168.0	1,167.3	-	-	-	-	-	0.0026	141
1/13/2009	1,174.4	-	1,167.5	1,166.9	-	-	-	-	-	0.0027	142
2/12/2009	1,173.2	-	1,165.8	1,166.7	-	-	-	-	-	0.0024	181
3/12/2009	1,173.6	-	1,165.6	1,167.1	-	-	-	-	-	0.0026	197
7/15/2009	1,173.1	-	1,165.2	1,167.6	-	-	-	-	-	0.0026	216
8/14/2009	1,172.6	-	1,165.0	1,163.7	-	-	-	-	-	0.0032	135
9/17/2009	1,172.8	-	1,164.8	1,165.5	-	-	-	-	-	0.0026	172
10/15/2009	1,172.6	-	1,164.6	1,165.2	-	-	-	-	-	0.0026	170
11/12/2009	1,172.6	-	1,164.6	1,165.4	-	-	-	-	-	0.0026	176
12/11/2009	1,172.7	-	1,164.4	1,165.2	-	-	-	-	-	0.0027	176
1/13/2010	1,172.2	-	1,164.4	1,166.7	-	-	-	-	-	0.0027	215
2/17/2010	1,173.5	-	1,166.0	1,167.5	-	-	-	-	-	0.0024	198
3/10/2010	1,171.7	-	1,163.9	1,164.4	-	-	-	-	-	0.0026	167
4/16/2010	1,171.5	-	1,163.7	1,164.3	-	-	-	-	-	0.0027	172
5/20/2010	1,171.6	-	1,163.6	1,164.2	-	-	-	-	-	0.0028	172
6/16/2010	1,171.6	-	1,163.9	1,164.1	-	-	-	-	-	0.0027	165
7/20/2010	1,171.7	-	1,163.3	1,164.0	-	-	-	-	-	0.0029	174
8/13/2010	1,171.7	-	1,163.3	1,164.1	-	-	-	-	-	0.0029	176
9/13/2010	1,171.6	-	1,163.5	1,163.8	-	-	-	-	-	0.0029	165

Table 3. Groundwater Elevation, Gradient, and Flow Direction

Cave Creek Landfill, Maricopa County

Sample Date	Groundwater Elevation by Well (ft amsl)									Gradient (feet/foot)	Flow Direction (degrees from North)
	PW	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-08		
10/15/2010	1,171.9	-	1,163.3	1,164.0	-	-	-	-	-	0.0029	174
11/16/2010	1,171.8	-	1,163.2	1,164.1	1,162.6	-	-	-	-	0.0030	171
12/16/2010	1,171.8	-	1,163.3	1,164.6	1,162.6	-	-	-	-	0.0029	180
1/11/2011	1,171.8	-	1,163.1	1,164.0	1,162.4	1,162.0	-	-	-	0.0030	174
2/15/2011	1,171.8	-	1,163.2	1,165.0	1,163.0	1,162.6	-	-	-	0.0028	180
3/9/2011	1,171.7	-	1,163.2	1,164.1	1,162.6	1,162.0	-	-	-	0.0029	178
4/30/2011	1,171.8	-	1,163.3	1,164.3	1,162.7	1,162.2	-	-	-	0.0029	176
5/26/2011	1,171.7	-	1,163.4	1,164.2	1,162.7	1,162.2	1,164.8	-	-	0.0025	191
6/30/2011	1,171.3	-	1,163.2	1,164.1	1,162.5	1,165.7	1,161.3	-	-	0.0034	143
7/12/2011	1,171.3	-	1,163.2	1,164.1	1,162.5	1,165.7	1,161.0	-	-	0.0035	142
8/18/2011	1,171.2	-	1,163.1	1,163.9	1,162.4	1,163.0	1,160.8	-	-	0.0030	163
9/16/2011	1,171.1	-	1,163.1	1,163.9	1,162.4	1,161.9	1,160.8	-	-	0.0029	174
10/24/2011	1,171.0	-	1,163.1	1,165.1	1,162.3	1,162.3	1,160.6	-	-	0.0028	180
11/22/2011	1,171.3	-	1,162.6	1,163.4	1,161.9	1,158.0	1,160.5	-	-	0.0035	205
12/19/2011	1,171.3	-	1,162.8	1,163.2	1,162.0	1,157.9	1,160.5	-	-	0.0035	204
1/30/2012	1,171.0	-	1,163.2	1,173.7	1,162.7	1,162.0	1,161.2	-	-	0.0028	175
2/15/2012	1,169.8	-	1,162.9	1,164.2	1,162.5	1,162.0	1,160.8	-	-	0.0025	178
3/14/2012	1,170.8	-	1,163.0	1,163.7	1,162.2	1,161.8	1,160.8	1,162.2	1,170.0	0.0027	173
4/30/2012	1,171.1	-	1,163.4	1,163.4	1,162.6	1,160.9	1,160.6	1,162.3	1,169.8	0.0027	175
5/8/2012	1,170.4	-	1,162.7	1,163.2	1,162.2	1,161.6	1,160.5	1,162.3	1,169.7	0.0026	171
6/13/2012	1,170.3	-	1,162.7	1,164.9	1,162.0	1,161.6	1,160.1	1,162.0	1,169.6	0.0026	177
7/23/2012	1,169.9	-	1,162.3	1,164.4	1,161.8	1,161.3	1,160.1	1,161.6	1,169.1	0.0026	177
8/20/2012	-	-	-	-	-	1,161.3	1,160.2	-	1,169.0	0.0025	177
8/21/2012	-	-	-	1,163.8	-	-	-	1,162.0	-	0.0025	177
8/22/2012	1,169.6	-	1,162.5	-	1,161.6	-	-	-	-	0.0025	177
9/17/2012	1,169.3	-	1,162.0	1,162.7	1,161.4	1,160.9	1,160.7	1,162.0	1,168.4	0.0025	179
10/18/2012	1,169.0	-	1,161.9	1,162.3	1,161.1	1,160.7	1,159.5	1,160.8	1,168.1	0.0026	168

Notes: Flow direction measured in a clockwise rotation; North is 0 degrees, East is 90 degrees, South is 180 degrees, and West is 270 degrees
ft amsl - Feet above mean sea level
PW - Production Well
MW - Monitoring Well
- = data not applicable or available

Table 4. Groundwater TCE Data Summary — Cave Creek Landfill, Maricopa County

	Groundwater Sampling Results by Well - TCE (µg/L)								
Sample Date	**PW**	**MW-01**	**MW-02**	**MW-03**	**MW-04**	**MW-05**	**MW-06**	**MW-07**	**MW-08**
9/19/1985	**9.8**	-	-	-	-	-	-	-	-
9/27/1985	**9.8**	-	-	-	-	-	-	-	-
10/7/1985	**9.8**	-	-	-	-	-	-	-	-
11/18/1985	<1.9	-	-	-	-	-	-	-	-
11/27/1985	<1.9	-	-	-	-	-	-	-	-
12/6/1985	<1	-	-	-	-	-	-	-	-
7/16/1986	<1	-	-	-	-	-	-	-	-
8/4/1986	<1	-	-	-	-	-	-	-	-
6/8/1987	<1	-	-	-	-	-	-	-	-
6/10/1987	<1	-	-	-	-	-	-	-	-
10/23/1987	<0.5	-	-	-	-	-	-	-	-
5/25/1988	<1	-	-	-	-	-	-	-	-
3/19/1990	<0.5	-	-	-	-	-	-	-	-
3/21/1990	<1	-	-	-	-	-	-	-	-
8/14/1991	<1	-	-	-	-	-	-	-	-
11/20/1991	<1	-	-	-	-	-	-	-	-
7/22/1992	<1	-	-	-	-	-	-	-	-
7/31/1992	<1	-	-	-	-	-	-	-	-
6/14/1993	-	<2	<2	-	-	-	-	-	-
6/22/1993	-	<0.5	<0.5	-	-	-	-	-	-
12/17/1997	<1	**15.0**	2.5	-	-	-	-	-	-
5/28/1998	**8.9**	**11.0**	2.5	-	-	-	-	-	-
7/28/1998	**8.5**	-	-	-	-	-	-	-	-
11/17/1998	**12.0**	-	**7.0**	-	-	-	-	-	-
3/26/1999	**17.0**	<0.5	**6.3**	-	-	-	-	-	-
8/12/1999	**22.0**	2.0	**34.0**	-	-	-	-	-	-
8/30/1999	**17.0**	<0.5	**6.3**	-	-	-	-	-	-
1/19/2000	4.6	-	**28.0**	-	-	-	-	-	-
2/25/2000	4.3	-	<0.7	-	-	-	-	-	-
6/19/2000	**9.1**	-	-	-	-	-	-	-	-
8/18/2000	**9.6**	-	**11.0**	-	-	-	-	-	-
9/22/2000	**10.0**	-	**12.0**	-	-	-	-	-	-
11/22/2000	**10.0**	-	**12.0**	-	-	-	-	-	-
12/6/2000	**13.0**	-	<0.5	-	-	-	-	-	-
1/19/2001	**31.0**	-	<0.5	-	-	-	-	-	-
1/22/2001	**31.0**	-	<0.5	-	-	-	-	-	-
3/7/2001	**16.0**	-	2.3	-	-	-	-	-	-
3/27/2001	**16.0**	-	2.3	-	-	-	-	-	-
4/12/2001	**22.0**	-	2.5	-	-	-	-	-	-
5/23/2001	**6.7**	-	<0.6	-	-	-	-	-	-
6/1/2001	**13.0**	-	<0.6	-	-	-	-	-	-
7/20/2001	**7.9**	-	1.7	-	-	-	-	-	-
10/2/2001	4.4	-	<0.6	-	-	-	-	-	-
11/27/2001	3.8	-	<0.6	-	-	-	-	-	-
AWQS Limits:	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

Table 4. Groundwater TCE Data Summary — Cave Creek Landfill, Maricopa County

	Groundwater Sampling Results by Well - TCE (µg/L)								
Sample Date	**PW**	**MW-01**	**MW-02**	**MW-03**	**MW-04**	**MW-05**	**MW-06**	**MW-07**	**MW-08**
1/28/2002	4.8	-	-	-	-	-	-	-	-
2/1/2002	4.8	-	-	-	-	-	-	-	-
3/1/2002	**7.0**	-	-	-	-	-	-	-	-
3/22/2002	**7.0**	-	<0.2	-	-	-	-	-	-
4/1/2002	4.9	-	<0.2	-	-	-	-	-	-
4/30/2002	4.9	-	-	-	-	-	-	-	-
6/1/2002	4.4	-	-	-	-	-	-	-	-
6/3/2002	4.4	-	-	-	-	-	-	-	-
8/1/2002	**8.3**	-	-	-	-	-	-	-	-
8/7/2002	**8.3**	-	-	-	-	-	-	-	-
9/1/2002	**8.0**	-	-	-	-	-	-	-	-
10/1/2002	**8.6**	-	-	-	-	-	-	-	-
10/21/2002	**9.1**	-	-	-	-	-	-	-	-
12/1/2002	**16.0**	-	-	-	-	-	-	-	-
12/4/2002	**16.0**	-	-	-	-	-	-	-	-
1/1/2003	**15.0**	-	-	-	-	-	-	-	-
1/10/2003	**15.0**	-	-	-	-	-	-	-	-
3/1/2003	**18.0**	-	<0.2	-	-	-	-	-	-
3/11/2003	**18.0**	-	-	-	-	-	-	-	-
4/1/2003	**17.0**	-	-	-	-	-	-	-	-
4/18/2003	**17.0**	-	-	-	-	-	-	-	-
5/1/2003	**21.0**	-	-	-	-	-	-	-	-
5/16/2003	**21.0**	-	-	-	-	-	-	-	-
6/1/2003	**18.0**	-	-	-	-	-	-	-	-
6/13/2003	**18.0**	-	-	-	-	-	-	-	-
7/1/2003	**18.0**	-	-	-	-	-	-	-	-
7/17/2003	**18.0**	-	-	-	-	-	-	-	-
9/16/2003	**16.0**	-	-	-	-	-	-	-	-
10/1/2003	**20.0**	-	-	-	-	-	-	-	-
10/24/2003	**20.0**	-	-	-	-	-	-	-	-
11/1/2003	**21.0**	-	-	-	-	-	-	-	-
12/1/2003	**22.0**	-	-	-	-	-	-	-	-
1/1/2004	**22.0**	-	-	-	-	-	-	-	-
1/12/2004	**22.0**	-	-	-	-	-	-	-	-
2/1/2004	**23.0**	-	-	-	-	-	-	-	-
2/9/2004	**23.0**	-	-	-	-	-	-	-	-
3/1/2004	**25.0**	-	-	-	-	-	-	-	-
3/17/2004	**25.0**	-	-	-	-	-	-	-	-
4/1/2004	**27.0**	-	-	-	-	-	-	-	-
4/23/2004	**27.0**	-	-	-	-	-	-	-	-
5/1/2004	**25.0**	-	-	-	-	-	-	-	-
5/27/2004	-	-	<0.1	-	-	-	-	-	-
6/1/2004	**26.0**	-	-	-	-	-	-	-	-
6/30/2004	-	-	<0.1	-	-	-	-	-	-
AWQS Limits:	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

Table 4. Groundwater TCE Data Summary — Cave Creek Landfill, Maricopa County

	Groundwater Sampling Results by Well - TCE (µg/L)								
Sample Date	**PW**	**MW-01**	**MW-02**	**MW-03**	**MW-04**	**MW-05**	**MW-06**	**MW-07**	**MW-08**
7/1/2004	**26.0**	-	-	-	-	-	-	-	-
7/27/2004	**24.0**	-	<0.1	-	-	-	-	-	-
8/24/2004	**30.0**	-	<2	-	-	-	-	-	-
9/28/2004	**23.0**	-	<2	-	-	-	-	-	-
11/4/2004	**24.0**	-	<2	-	-	-	-	-	-
3/9/2005	3.4	**5.2**	<2	-	-	-	-	-	-
4/8/2005	1.4	**7.1**	<2	-	-	-	-	-	-
5/11/2005	3.0	**7.4**	<2	-	-	-	-	-	-
7/13/2005	2.6	**9.9**	<2	-	-	-	-	-	-
8/12/2005	**7.8**	**10.6**	<2	-	-	-	-	-	-
1/12/2006	**16.0**	**17.0**	<0.5	-	-	-	-	-	-
2/10/2006	**44.0**	**17.0**	<0.5	-	-	-	-	-	-
4/7/2006	**15.0**	**20.0**	0.5	-	-	-	-	-	-
5/9/2006	**10.0**	**24.0**	0.7	-	-	-	-	-	-
6/20/2006	**11.0**	**29.0**	1.0	-	-	-	-	-	-
8/16/2006	**12.0**	1.3	**29.0**	-	-	-	-	-	-
9/19/2006	3.0	**11.0**	1.4	-	-	-	-	-	-
11/17/2006	-	**40.0**	2.6	-	-	-	-	-	-
12/13/2006	3.0	**22.0**	2.9	-	-	-	-	-	-
2/21/2007	**12.0**	**63.0**	**5.9**	-	-	-	-	-	-
3/20/2007	**10.0**	**66.0**	**7.2**	-	-	-	-	-	-
4/16/2007	**13.0**	**75.0**	**9.9**	-	-	-	-	-	-
5/22/2007	**11.0**	**57.0**	**12.0**	-	-	-	-	-	-
6/12/2007	**9.4**	**57.0**	**15.0**	-	-	-	-	-	-
7/18/2007	**8.8**	-	**18.0**	-	-	-	-	-	-
9/18/2007	1.9	-	**32.0**	-	-	-	-	-	-
10/24/2007	**8.6**	-	**39.0**	-	-	-	-	-	-
11/16/2007	**13.0**	-	**44.0**	-	-	-	-	-	-
1/22/2008	2.5	-	**65.0**	<0.5	-	-	-	-	-
3/12/2008	1.5	-	**130.0**	<0.5	-	-	-	-	-
4/17/2008	**22.0**	-	**120.0**	<0.5	-	-	-	-	-
5/20/2008	**10.0**	-	**120.0**	<0.5	-	-	-	-	-
6/16/2008	1.3	-	**150.0**	<0.5	-	-	-	-	-
8/13/2008	**53.0**	-	**190.0**	<0.5	-	-	-	-	-
9/15/2008	**69.0**	-	**140.0**	<0.5	-	-	-	-	-
10/16/2008	**83.0**	-	**190.0**	<0.5	-	-	-	-	-
11/14/2008	**70.0**	-	**150.0**	<0.5	-	-	-	-	-
12/12/2008	**76.0**	-	**240.0**	<0.5	-	-	-	-	-
1/13/2009	**110.0**	-	**320.0**	<0.5	-	-	-	-	-
2/12/2009	**85.0**	-	**270.0**	<0.5	-	-	-	-	-
3/12/2009	**86.0**	-	**280.0**	<0.5	-	-	-	-	-
4/10/2009	**100.0**	-	**330.0**	<0.5	-	-	-	-	-
5/12/2009	**76.0**	-	**290.0**	<0.5	-	-	-	-	-
6/9/2009	-	-	**190.0**	-	-	-	-	-	-
AWQS Limits:	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

Table 4. Groundwater TCE Data Summary — Cave Creek Landfill, Maricopa County

	Groundwater Sampling Results by Well - TCE (µg/L)								
Sample Date	**PW**	**MW-01**	**MW-02**	**MW-03**	**MW-04**	**MW-05**	**MW-06**	**MW-07**	**MW-08**
6/9/2009	-	-	**150.0**	-	-	-	-	-	-
6/9/2009	-	-	**170.0**	-	-	-	-	-	-
6/9/2009	-	-	**99.0**	-	-	-	-	-	-
7/16/2009	2.1	-	**380.0**	<0.5	-	-	-	-	-
8/14/2009	**6.3**	-	**390.0**	<0.5	-	-	-	-	-
9/17/2009	3.8	-	**400.0**	0.9	-	-	-	-	-
10/15/2009	3.1	-	**430.0**	<0.5	-	-	-	-	-
11/12/2009	3.9	-	**340.0**	<0.5	-	-	-	-	-
12/11/2009	**8.0**	-	**410.0**	0.8	-	-	-	-	-
1/13/2010	**9.3**	-	**400.0**	<0.5	-	-	-	-	-
2/17/2010	**9.5**	-	**410.0**	<0.5	-	-	-	-	-
3/10/2010	**12.0**	-	**340.0**	0.5	-	-	-	-	-
4/16/2010	**42.0**	-	**450.0**	<0.5	-	-	-	-	-
6/16/2010	**5.2**	-	**420.0**	1.4	-	-	-	-	-
9/10/2010	**38.3**	-	**428.0**	0.7	-	-	-	-	-
11/19/2010	**21.2**	-	**412.0**	0.7	**5.2**	-	-	-	-
11/24/2010	**24.2**	-	**264.0**	1.6	**5.3**	-	-	-	-
3/8/2011	**30.5**	-	**215.0**	0.9	**5.9**	<0.5	-	-	-
3/30/2011	-	-	**303.0**	-	-	-	-	-	-
5/26/2011	**39.6**	-	**315.0**	1.0	4.7	<0.5	0.9	-	-
8/18/2011	-	-	-	-	-	<0.5	-	-	-
8/19/2011	**58.5**	-	-	2.4	**12.5**	-	1.3	-	-
8/23/2011	-	-	**228.0**	-	-	-	-	-	-
11/21/2011	-	-	-	-	-	<0.5	1.8	-	-
11/22/2011	**464.0**	-	**198.0**	2.6	**19.9**	-	-	-	-
12/12/2011	**54.5**	-	-	-	-	-	-	-	-
2/15/2012	-	-	-	-	-	<0.5	2.0	-	-
2/16/2012	-	-	-	1.5	**12.9**	-	-	-	-
2/17/2012	-	-	-	-	-	-	-	<0.5	-
2/21/2012	**31.3**	-	**127.0**	-	-	-	-	-	-
2/28/2012	-	-	-	-	-	-	-	-	<0.5
4/19/2012	-	-	-	-	-	-	-	<0.5	<0.5
5/8/2012	-	-	-	-	**18.1**	-	-	<0.5	<0.5
5/9/2012	-	-	-	-	-	<0.5	2.0	-	-
5/10/2012	**27.3**	-	**135.0**	1.9	-	-	-	-	-
8/20/2012	-	-	-	-	-	<5	<5	-	<5
8/21/2012	-	-	-	<5	-	-	-	<5	-
8/22/2012	**21.8**	-	**105.0**	-	**32.6**	-	-	-	-
AWQS Limits:	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

Notes: Grey text indicates a non-detected compound
Bold text indicates a detected compound above the AWQS (Aquifer Water Quality Standard)
µg/L - micrograms per liter
PW - Production Well
MW - Monitoring Well
- = data not applicable or available

Table 5. SVE Pilot Test Results - Summary of Operational Data

Cave Creek Landfill, Maricopa County

Parameter	Extraction from TSSV-1-S		Extraction from TSSV-1-M		Extraction from TSSV-1-D		Extraction from PW	
	One Day Test	Extended Pilot Test	One Day Test	Extended Pilot Test	One Day Test	Extended Pilot Scale Study	One Day Test	Extended Pilot Scale Study
Dates of Extraction	June 16, 2010	November 16, 2011 - December 15, 2011	June 16, 2010	January 16, 2012 - February 20, 2012	June 16, 2010	February 20, 2012 - February 29, 2012	June 16, 2010	November 16, 2011 - November 28, 2011
Duration [hrs]	5.5	527	5.5	818	5.5	214	3.0	282
Average Extraction Rate [scfm]	---	203	---	93.4	---	55.7	---	218
Extraction Rate [scfm[(1)]]	55 - 156	160 - 242	20 - 62	80.5 - 96.7	0 - 55	46.7 - 60.5	62 - 190	205 - 230
Volume Extracted [million cf]	---	6.42	---	4.58	---	0.715	---	3.69
Vacuum [inches-water]	10 - 42	79 - 100	10 - 56	100	10 - 56	95 - 100	8.6 - 26	65 - 85
PID Reading [ppmV]	---	88.7 - 245.0	---	108.8 - 183.4	---	160.1 - 176.4	54 - 94	37.0 - 176.8
Carbon Monoxide Concentration [%]	---	0 - 14	---	2 - 8	---	0 - 13	---	0.1 - 8.8
Methane Concentration [%[(2)]]	---	0 - 0.05	---	0 - 0.25	---	0.65 - 2.25	---	0.05 - 0.35
Oxygen Concentration [%]	---	7.6 - 10.5	---	4.1 - 13.1	---	2.5 - 17.7	---	5.9 - 9.6
TCE Concentration [ppmV]	6.7 - 43	85 - 170	20 - 31	83 - 140	6 - 57	250 - 490	19 - 24	140
TCE Concentration [mg/m^3]	36 - 230	460 - 910	110 - 170	446 - 753	32 - 310	1,300 - 2,600	100 - 130	753
1,1-DCE Concentration [ppmV]	0.073 - 0.43	1.2 - 2.1	ND - 0.16	<2.0	0.68 - 9.3	20 - 66	0.68 - 0.70	6.1
1,1-DCE Concentration [mg/m^3]	0.29 - 1.7	4.8 - 8.3	ND - 0.64	<7.9	2.7 - 37	79 - 262	2.7 - 2.8	24
PCE Concentration [ppmV]	0.18 - 1.2	1.7 - 4.0	0.57 - 0.93	2.7 - 5.4	0.47 - 4.4	9.9 - 35	0.93 - 1.1	5.5
PCE Concentration [mg/m^3]	1.2 - 7.9	12 - 27	3.9 - 6.3	18 - 37	3.2 - 30	67 - 240	6.3 - 7.5	37
Estimate of TCE Mass Extracted[(3)] [lbs]	---	291	---	172	---	87	---	173
TCE Mass Extracted per Day[(4)] [lbs/day]	---	13	---	5	---	10	---	15
Estimate of 1,1-DCE Mass Extracted[(3)] [lbs]	---	2.5	---	---	---	7.6	---	5.5
1,1-DCE Mass Extracted per Day[(4)] [lbs/day]	---	0.11	---	---	---	0.86	---	0.47
Estimate of PCE Mass Extracted[(3)] [lbs]	---	8.0	---	7.5	---	6.9	---	8.5
PCE Mass Extracted per Day[(4)] [lbs/day]	---	0.37	---	0.22	---	0.77	---	0.73

Notes:

[(1)] One-Day Test flow rates measured as actual cubic feet per minute.

[(2)] Methane concentrations measured as a percent of the lower explosive limit for methane (i.e., 5% by volume); value presented is converted to % by volume.

[(3)] Estimated Mass calculated from average flow rate and average VOC concentration over the duration of extraction.

[(4)] Estimated Mass extracted per day calculated using the duration of extraction.

'---' = Not evaluated or applicable

ppmV = parts per million by volume

scfm = standard cubic feet per minute

ND = not detected

Table 6. SVE Pilot Test Results - Wellhead Sample Data

Cave Creek Landfill, Maricopa County

Well Name	Date	Time	Flow [cfm]	Screened Interval [feet bgs]	Sample Concentration by Compound and Units																																	
					Acetone		Benzene		Chlorobenzene		Chloroform		1,2-DCB		1,4-DCB		Freon-12		1,1-DCA		1,1-DCE		cis-1,2-DCE		Methylene Chloride		MEK		PCE		THF		TCE		Freon-113		Vinyl chloride	
					[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]	[mg/m^3]	[ppmV]
TSSV-1-S	6/16/2010	10:57 AM	117	150 - 200	**11**	**4.7**	<0.27	<0.083	<0.27	<0.058	**0.48**	**0.099**	<0.27	<0.044	<0.27	<0.044	**0.35**	**0.07**	<0.27	<0.066	**0.29**	**0.07**	<0.27	<0.067	<0.27	<0.077	**17**	**5.6**	**1.2**	**0.18**	**44**	**15**	**36**	**6.7**	**19**	**2.4**	<0.27	<0.1
	6/16/2010	12:50 PM	55	150 - 200	<10	<4.3	<1.0	<0.32	<1.0	<0.22	<1.0	<0.21	<1.0	<0.17	<1.0	<0.17	**1.8**	**0.37**	<1.0	<0.25	**1.2**	**0.31**	<1.0	<0.25	<1.0	<0.29	<10	<3.4	**5.4**	**0.79**	**2.2**	**0.75**	**160**	**29**	**98**	**13**	<1.0	<0.4
	6/16/2010	2:23 PM	92	150 - 200	<7.4	<3.1	<0.74	<0.23	<0.74	<0.16	<0.74	<0.15	<0.74	<0.12	<0.74	<0.12	**1.6**	**0.32**	<0.74	<0.18	**1.1**	**0.27**	<0.74	<0.19	<0.74	<0.21	<7.4	<2.5	**4.9**	**0.72**	ND	ND	**140**	**27**	**86**	**11**	<0.74	<0.29
	6/16/2010	4:11 PM	120	150 - 200	<12	<4.8	<1.2	<0.36	<1.2	<0.25	<1.2	<0.24	<1.2	<0.19	<1.2	<0.19	**2.5**	**0.51**	<1.2	<0.28	**1.7**	**0.4**	<1.2	<0.29	<1.2	<0.33	<12	<3.9	**7.9**	**1.2**	<1.2	<0.39	**230**	**43**	**140**	**18**	<1.2	<0.45
	11/8/2011	2:20 PM	grab	150 - 200	<24	<10	<3.2	<1.0	<4.6	<1.0	<4.9	<1.0	<6.0	<1.0	<6.0	<1.0	<9.9	<2.0	<4.1	<1.0	**4.8**	**1.2**	<4.0	<1.0	<3.5	<1.0	<12	<4.0	**18**	**2.6**	<12	<4.0	**440**	**81**	**340**	**44**	<2.6	<1.0
	11/16/2011	6:05 PM	---	150 - 200	<24	<10	<3.2	<1.0	<4.6	<1.0	<4.9	<1.0	<6.0	<1.0	<6.0	<1.0	<9.9	<2.0	<4.1	<1.0	**4.8**	**1.2**	<4.0	<1.0	<3.5	<1.0	<12	<4.0	**12**	**1.7**	<12	<4.0	**460**	**85**	**390**	**51**	<2.6	<1.0
	11/23/2011	11:10 AM	---	150 - 200	<24	<10	<3.2	<1.0	<4.6	<1.0	<4.9	<1.0	<6.0	<1.0	<6.0	<1.0	<9.9	<2.0	<4.1	<1.0	**5.6**	**1.4**	<4.0	<1.0	<3.5	<1.0	<12	<4.0	**21**	**3.1**	<12	<4.0	**810**	**150**	**360**	**47**	<2.6	<1.0
	12/13/2011	1:40 PM	190	150 - 200	<48	<20	<6.4	<2.0	<9.2	<2.0	<9.8	<2.0	<12	<2.0	<12	<2.0	<20	<4.0	<8.1	<2.0	**8.3**	**2.1**	<8.0	<2.0	<6.9	<2.0	<24	<8.0	**27**	**4.0**	<24	<8.0	**910**	**170**	**420**	**55**	<5.1	<2.0
TSSV-1-M	6/16/2010	11:01 AM	55	350 - 400	**8.6**	**3.6**	<0.62	<0.19	**1.0**	**0.22**	**1.3**	**0.26**	<0.62	<0.10	<0.62	<0.10	**1.0**	**0.20**	<0.62	<0.15	<0.62	<0.16	**1.2**	**0.29**	<0.62	<0.18	**14**	**4.6**	**3.9**	**0.57**	**38**	**13**	**110**	**20**	**47**	**6.1**	<0.62	<0.24
	6/16/2010	12:55 PM	20	350 - 400	<5.8	<2.4	<0.58	<0.18	**1.6**	**0.36**	**1.4**	**0.28**	<0.58	<0.096	<0.58	<0.096	**1.2**	**0.23**	<0.58	<0.14	**0.64**	**0.16**	**1.9**	**0.47**	<0.58	<0.17	<5.8	<2	**4.4**	**0.65**	**4.8**	**1.6**	**120**	**22**	**54**	**7.1**	<0.58	<0.23
	6/16/2010	2:29 PM	23	350 - 400	<9.4	<3.9	<0.94	<0.29	**2.5**	**0.54**	**1.9**	**0.39**	<0.94	<0.16	<0.94	<0.16	**1.6**	**0.32**	<0.94	<0.23	<0.94	<0.24	**2.9**	**0.73**	<0.94	<0.27	<9.4	<3.2	**6.3**	**0.93**	**1.6**	**0.6**	**170**	**31**	**75**	**10**	<0.94	<0.13
	6/16/2010	4:07 PM	43	350 - 400	<9.3	<3.9	<0.93	<0.29	**1.5**	**0.33**	**1.4**	**0.29**	<0.93	<0.15	<0.93	<0.15	**1.3**	**0.26**	<0.93	<0.23	<0.93	<0.23	**1.9**	**0.49**	<0.93	<0.27	<9.3	<3.2	**4.2**	**0.62**	<0.93	<0.32	**120**	**23**	**58**	**7.6**	<0.93	<0.36
	11/8/2011	2:00 PM	grab	350 - 400	<24	<10	<3.2	<1.0	**5.1**	**1.1**	<4.9	<1.0	<6.0	<1.0	<6.0	<1.0	<9.9	<2.0	<4.1	<1.0	<4.0	<1.0	<4.0	<1.0	<3.5	<1.0	<12	<4.0	**11**	**1.6**	<12	<4.0	**279**	**52**	**123**	**16**	<2.6	<1.0
	1/16/2012	4:00 PM	83	350 - 400	<48	<20	<6.4	<2.0	**12**	**2.7**	<9.8	<2.0	<12	<2.0	<12	<2.0	<20	<4.0	<8.1	<2.0	<7.9	<2.0	<8.0	<2.0	<6.9	<2.0	<24	<8.0	**18**	**2.7**	<24	<8.0	**446**	**83**	**153**	**20**	<5.1	<2.0
	1/20/2012	2:21 PM	97	350 - 400	<48	<20	<6.4	<2.0	**26**	**5.6**	<9.8	<2.0	**12**	**2.0**	<12	<2.0	<20	<4.0	<8.1	<2.0	<7.9	<2.0	**15**	**3.9**	<6.9	<2.0	<24	<8.0	**22**	**3.2**	<24	<8.0	**510**	**95**	**168**	**22**	<5.1	<2.0
	1/31/2012	---	90	350 - 400	<48	<20	<6.4	<2.0	**55**	**12.0**	<9.8	<2.0	**42**	**7.0**	<12	<2.0	**20**	**4.7**	<8.1	<2.0	<7.9	<2.0	**44**	**11**	<6.9	<2.0	<24	<8.0	**37**	**5.4**	<24	<8.0	**698**	**130**	**199**	**26**	<5.1	<2.0
	2/20/2012	11:11 AM	100	350 - 400	<24	<10	<3.2	<1.0	**46**	**10.0**	<4.9	<1.0	**26**	**4.4**	<6.0	<1.0	<9.9	<2	<4.1	<1.0	**5.6**	**1.4**	**48**	**12**	<3.5	<1.0	<12	<4.0	**28**	**4.1**	<12	<4.0	**753**	**140**	**161**	**21**	**6.0**	**2.2**
TSSV-1-D	6/16/2010	11:00 AM	grab	549 - 599	**20**	**8.5**	**0.45**	**0.14**	**18**	**3.8**	**0.33**	**0.068**	**2.6**	**0.44**	**0.28**	**0.046**	<0.22	<0.045	**0.34**	**0.084**	**2.7**	**0.7**	**90**	**23**	**4.1**	**1.2**	**31**	**10**	**3.2**	**0.47**	**96**	**32**	**32**	**6.0**	**2.9**	**0.37**	**3.4**	**1.3**
	6/16/2010	12:53 PM	grab	549 - 599	<12	<4.9	<1.2	<0.37	**21**	**4.5**	<1.2	<0.24	**1.9**	**0.32**	<1.2	<0.19	<1.2	<0.24	**1.4**	**0.36**	**24**	**6.2**	**230**	**59**	**15**	**4.4**	<12	<4.0	**19**	**2.8**	**4.7**	**1.6**	**200**	**37**	**17**	**2.2**	**12**	**4.8**
	6/16/2010	2:26 PM	grab	549 - 599	<17	<7.3	<1.7	<0.54	**31**	**6.8**	<1.7	<0.36	**3.7**	**0.61**	<1.7	<0.35	<1.7	<0.35	**2.1**	**0.53**	**37**	**9.3**	**340**	**86**	**24**	**6.8**	<17	<5.9	**30**	**4.4**	**1.9**	**0.66**	**310**	**57**	**25**	**3.3**	**18**	**6.9**
	6/16/2010	4:09 PM	20	549 - 599	<15	<6.4	<1.5	<0.48	**25**	**5.3**	<1.5	<0.31	**2.4**	**0.40**	<1.5	<0.25	<1.5	<0.31	**1.9**	**0.48**	**34**	**8.5**	**310**	**77**	**22**	**6.3**	<15	<5.2	**26**	**3.9**	<1.5	<0.52	**270**	**51**	**23**	**3.0**	**16**	**6.2**
	11/8/2011	2:15 PM	grab	549 - 599	<12	<5.0	<1.6	<0.5	**42**	**9.2**	<2.4	<0.5	**6.0**	**1.0**	<3.0	<0.5	<5.0	<1.0	<2.0	<0.5	**2.9**	**0.74**	**110**	**28**	**6.7**	**1.9**	<5.9	<2.0	**5.4**	**0.79**	<5.9	<2.0	**47**	**8.8**	**5.4**	**0.70**	**7.2**	**2.8**
	2/20/2012	1:28 PM	48	549 - 599	<12	<5.0	<1.6	<0.5	**87**	**19**	**2.9**	**0.60**	**14**	**2.4**	<3.0	<0.5	<5.0	<1.0	**3.4**	**0.85**	**79**	**20**	**1,400**	**340**	**42**	**12**	<5.9	<2.0	**67**	**9.9**	<5.9	<2.0	**1,300**	**250**	**41**	**5.4**	**33**	**13**
	2/29/2012	1:38 PM	65	549 - 599	<120	<50	<16	<5.0	**120**	**26**	<2.4	<0.5	<3.0	<0.5	<30	<5.0	<50	<10	<20	<5.0	**262**	**66**	**1,200**	**310**	**110**	**32**	<59	<20	**240**	**35**	<0.59	<0.2	**2,600**	**490**	**250**	**32**	**59**	**23**
PW	6/16/2010	6:00 PM	62	680 - 823 [(1)]	<6.2	<2.6	<0.62	<0.19	**1.5**	**0.33**	<0.62	<0.13	<0.62	<0.10	<0.62	<0.10	**0.77**	**0.16**	<0.62	<0.15	**2.7**	**0.68**	**15**	**3.8**	<0.62	<0.18	<6.2	<2.1	**6.3**	**0.93**	<0.62	<0.21	**100**	**19**	**22**	**2.9**	<0.62	<0.24
	6/16/2010	6:58 PM	123	680 - 823 [(1)]	<8.5	<3.6	<0.85`	<0.27	**1.1**	**0.24**	<0.85	<0.17	<0.85	<0.14	<0.85	<0.14	**1.0**	**0.20**	<0.85	<0.21	**2.8**	**0.70**	**12**	**3.1**	<0.85	<0.24	<8.5	<2.9	**7.1**	**1.0**	<0.85	<0.29	**130**	**24**	**31**	**4.1**	<0.85	<0.33
	6/16/2010	8:00 PM	191	680 - 823 [(1)]	<6.3	<2.6	<0.63	<0.20	<0.63	<0.14	<0.63	<0.13	<0.63	<0.10	<0.63	<0.10	**0.93**	**0.19**	<0.63	<0.15	**2.7**	**0.69**	**11**	**2.8**	<0.63	<0.18	<6.3	<2.1	**7.5**	**1.1**	<0.63	<0.21	**120**	**23**	**29**	**3.8**	<0.63	<0.24
	11/8/2011	3:27 PM	grab	680 - 823 [(1)]	<11.9	<5	<1.6	<0.5	<2.3	<0.5	<2.4	<0.5	<3.0	<0.5	<3.0	<0.5	<5.0	<1.0	<2.0	<0.5	<2.0	<0.5	**7.1**	**1.8**	<1.5	<0.5	<5.9	<2.0	**7.5**	**1.1**	<5.9	<2.0	**140**	**26**	**72**	**9.4**	<1.3	<0.5
	11/23/2011	10:00 AM	230	680 - 823 [(1)]	<11.9	<5	<1.6	<0.5	<915	**1.8**	<2.4	<0.5	<3.0	<0.5	<3.0	<0.5	<5.0	<1.0	<2.0	<0.5	**24**	**6.1**	286	**72**	**3.0**	**1.0**	<5.9	<2.0	**37**	**5.5**	<5.9	<2.0	**752**	**140**	**11**	**1.4**	**13**	**5.2**

Notes: [(1)] Water level approximately 709-710 feet bgs. Vertical slots at top of new screen between 680 to 762 feet bgs.

bgs - below ground surface
cfm - cubic feet per minute
mg/l - micrograms per liter
ppmv - parts per million volume
ND - Compound was analyzed for, but not detected above the laboratory reporting limit.
DCB - dichlorobenzene
Freon-12 - dichlorodifuoromethane
DCA - dichloroethane
DCE - dichloroethene
MEK - methyl ethyl ketone
PCE - tetrachloroethene
THF - tetrahydrofuran
TCE - trichloroethene
Freon-113 - trichlorotrifluoroethane

Table 7. SVE Pilot Test Results - Treatment Performance Data

Cave Creek Landfill, Maricopa County

Analyte	Design[1] Influent Concentrations [mg/m3][2]	[ppmV]	VOC Concentrations by Location and Date: 12/13/11 Influent [ppmV]	01/16/12 Influent [ppmV]	01/31/12 Influent [ppmV]	02/29/12 Influent [ppmV]	12/13/11 Effluent [ppmV]	01/16/12 Post Lag [ppmV]	01/16/12 Effluent [ppmV]	01/31/12 Effluent [ppmV]	02/29/12 Effluent [ppmV]	Treatment System Efficiency by Date: 12/13/11 [%]	1/16/12 [%]	1/31/12 [%]	2/29/12 [%]
Chlorobenzene	1.31	0.285	<2.0	**2.7**	**12**	**26**	<0.010	<0.10	<0.010	<0.010	**0.015**	---	>99.6%	>99.9%	99.9%
Choroethane	---	---	<2.0	<2.0	<2.0	<5.0	<0.010	<0.10	<0.010	<0.010	**0.024**	---	---	---	---
Chloroform	0.48	0.098	<2.0	<2.0	<2.0	<5.0	<0.010	<0.10	<0.010	<0.010	<0.010	---	---	---	---
1,2-Dichlorobenzene	---	---	<2.0	<2.0	**7.0**	<5.0	<0.010	<0.10	<0.010	<0.010	<0.010	---	---	>99.9%	---
Dichlorodifluoromethane (F-12)	1.28	0.259	<4.0	<4.0	**4.7**	<10	**1.6**	**4.5**	**3.9**	**0.40**	**1.6**	---	---	91.5%	---
Dichlorotetrafluoroethane (F-114)	---	---	<2.0	<2.0	<2.0	<5.0	<0.010	**0.21**	**0.14**	<0.010	**0.028**	---	---	---	---
1,1-Dichloroethane	---	---	<2.0	<2.0	<2.0	<5.0	<0.010	<0.10	<0.010	<0.010	<0.010	---	---	---	---
1,1-Dichloroethene	1.78	0.449	<2.0	<2.0	<2.0	**66**	<0.010	<0.10	<0.010	<0.010	<0.010	---	---	---	>99.8%
cis-1,2-Dichloroethene	12.7	3.20	<2.0	<2.0	**11**	**310**	<0.010	<0.10	<0.010	<0.010	**0.019**	---	---	>99.9%	99.9%
Methyl ethyl ketone (2-butanone)	16.5	5.60	<8.0	<8.0	<8.0	<20	<0.040	<0.40	<0.040	<0.040	<0.040	---	---	---	---
Methylene chloride	---	---	<2.0	<2.0	<2.0	**32**	<0.010	<0.10	<0.010	<0.010	<0.010	---	---	---	>99.9%
Tetrachloroethene (PCE)	5.77	0.851	**2.4**	**2.7**	**5.4**	**35**	<0.010	<0.10	<0.010	<0.010	**0.011**	---	>99.6%	>99.8%	99.9%
Tetrahydrofuran	23.1	7.83	<8.0	<8.0	<8.0	<20	<0.040	<0.40	<0.040	<0.040	<0.040	---	---	---	---
Trichloroethene (TCE)	132	24.5	**100**	**83**	**130**	**490**	<0.010	<0.10	<0.010	<0.010	**0.076**	>99.9%	>99.9%	>99.9%	99.9%
Trichlorofluoromethane (F-11)	---	---	<2.0	<2.0	<2.0	<5.0	<0.010	<0.10	**0.030**	<0.010	<0.010	---	---	---	---
Trichlorotrifluoroethane (F-113)	60.5	7.90	**32**	**20**	**26**	**32**	<0.010	**1.9**	**1.5**	<0.010	**0.021**	>99.9%	92.5%	>99.9%	99.9%
Vinyl chloride	---	---	<2.0	<2.0	<2.0	**23**	**0.062**	**2.6**	<0.010	<0.010	**1.3**	---	---	---	94.3%
Total VOCs	255	51	134	108	196	1,014	1.7	9.2	5.6	0.40	3.1	98.8%	94.9%	99.8%	99.7%
PID[3] Field Screening [ppmV]	---	---	120.6	122.5	173.9	178.1	2.3	7.9	2.7	3.7	0.5	98.1%	97.8%	97.9%	99.7%
Influent Flow Rate [scfm]	---	---	290	82.5	90.2	64.5	---	---	---	---	---	---	---	---	---
Influent Dilution Setting [% open]	---	---	15%	0%	0%	0%	---	---	---	---	---	---	---	---	---

Notes:

'---' = Not applicable or available

mg/m^3 = milligrams per cubic meter

ppmV = parts per million by volume

scfm = standard cubic feet per minute

[1] Design concentrations used to estimate preliminary carbon usages were based on data collected during the One Day Preliminary SVE Test.

[2] Conversion of mg/m3 to ppmV assumes 25 deg C and 1 atm.

[3] The PID used is equipped with a 10.6 eV lamp.

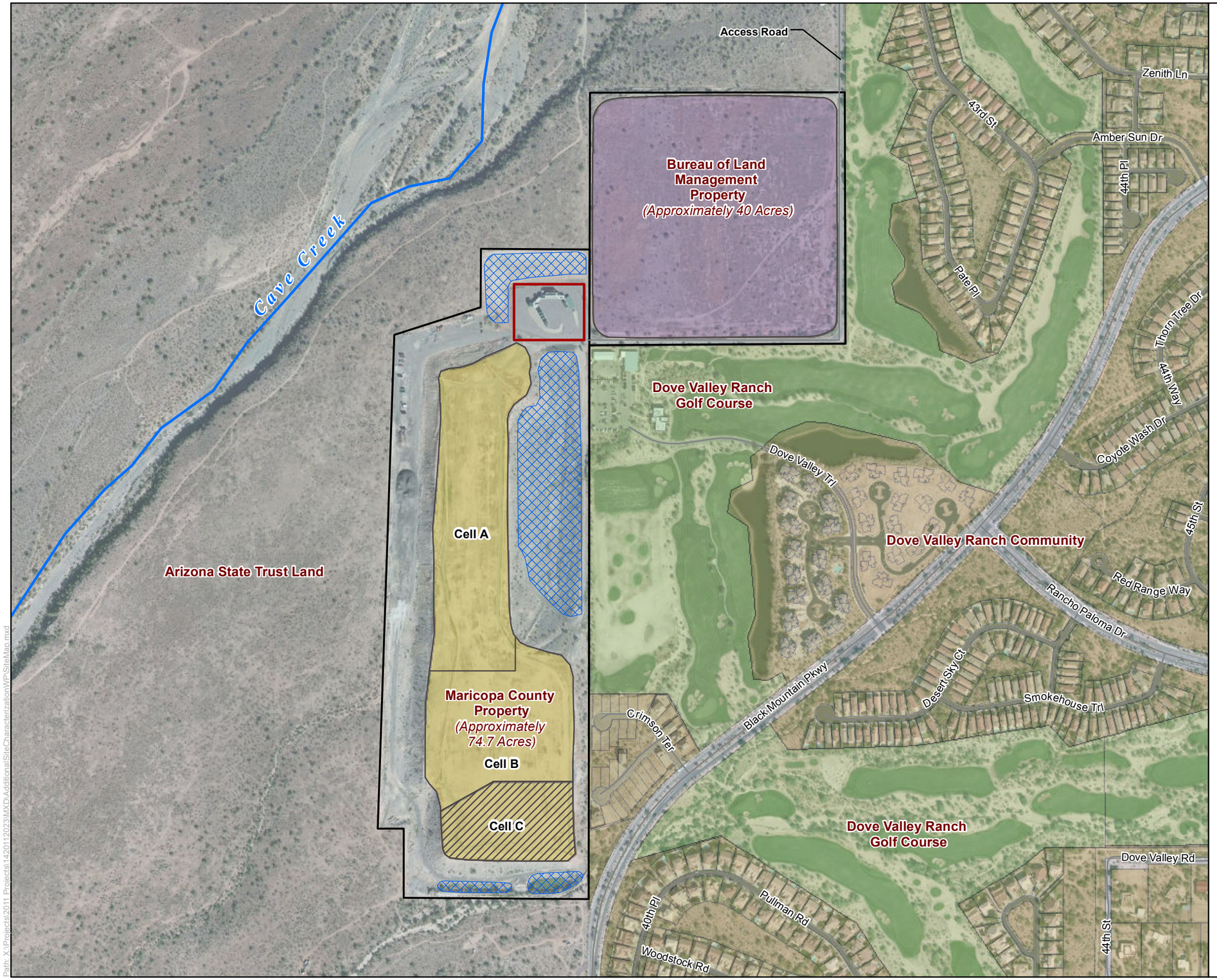
Table 8. Domestic/Public Water Supply Wells Registered with ADWR since March 2009 within 3 Miles of Cave Creek Landfill

Cave Creek Landfill, Maricopa County

ADWR Program	Registry No.	Owner Name	Well Type	Application Approval Date	Installation Date	Well Depth (feet bgs)	Static Water Level (feet bgs)	Casing Depth (feet bgs)	Casing Diameter (inches)	Casing Type	Location		
											Cadastral	UTM-X (Meters)	UTM-Y (Meters)
55	218928	City Of Phoenix	Non-Exempt/Service	6/1/2009	12/14/2009	1320	854	1320	16	Steel - Perforated Or Slotted Casing	A05004008DCC	410350.4	3738803.0
55	218978	Dan M Baxley	Exempt	5/28/2009	6/15/2009	805	690	800	5	Steel - Perforated Or Slotted Casing	A06003035DCD	405730.4	3742064.0
55	219460	Greg & Tricia Ohanessian	Exempt	11/18/2009	12/10/2009	720	363	720	6	Steel - Perforated Or Slotted Casing	A05004021BAB	411553.6	3736989.0
55	221177	Donald & Susan Turner	Exempt	11/28/2011	-	-	-	-	-	-	A05004005AAB	410782.8	3741817.0
55	911074	Betty Clayton	Exempt	9/4/2009	8/7/2010	510	356	510	4	Plastic Or PVC	A05004005BBB	409572.3	3741821.0
55	911731	Michael Dixon	Exempt	3/3/2010	-	700	280	700	5	Plastic Or PVC	A05004005BDA	410172.5	3741415.0
55	912638	Thomas Dempster	Exempt	10/20/2010	10/30/2010	1020	805	1020	5	Steel - Perforated Or Slotted Casing	A05004029ABA	410525.9	3735383.0
55	912707	Larry Lippon	Exempt	11/15/2010	-	320	85	320	6	Plastic Or PVC	A06004032CBA	409811.3	3742625.0
55	912799	Paula Scully	Exempt	12/27/2010	-	-	-	-	-	-	A06004032ACA	410617.3	3743021.0
55	912979	Charles Dixon	Exempt	2/25/2011	3/11/2011	700	340	680	4	Plastic Or PVC	A05004005ADA	410980.7	3741413.0
55	913783	Jack & Kim Farmer	Exempt	11/7/2011	-	-	-	-	-	-	A05004021BBD	411349.6	3736788.0
55	220996	Witts, LLC	Exempt	9/21/2011	-	-	-	-	-	-	A05004030CBC	407885.2	3734393.0
55	911959	George Pingitore	Exempt	-	-	-	-	-	-	-	A05004008CCA	409743.2	3739008.0

Notes:
-: No information available
bgs: below ground surface
City of Phoenix Well 55-218928 Replaces Well 55-524559
Exempt: A well is considered "exempt" if it has a maximum pump capacity of 35 gallons per minute; these wells are typically used to withdraw groundwater for domestic purposes, including watering less than two acres of grass or garden.
Non-Exempt: Non-exempt wells have a pump capacity greater than 35 gallons per minute.
PVC: Polyvinyl chloride

FIGURES



Site Location

Legend

- Estimated Boundary of Old Landfill Waste Area
- Estimated Boundary of New Landfill Waste Area
- Dove Valley Ranch Community
- Dove Valley Ranch Golf Course
- Landfill Property Boundaries
- Lined Cell
- Retention Basin
- Transfer Station

Notes: Cell boundaries are approximate.

0 125 250 500 Feet

N

Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Site Map | FIGURE **1**

Job No.	1420112023
PM:	NC
Date:	7/19/2012
Scale:	1" = 500'

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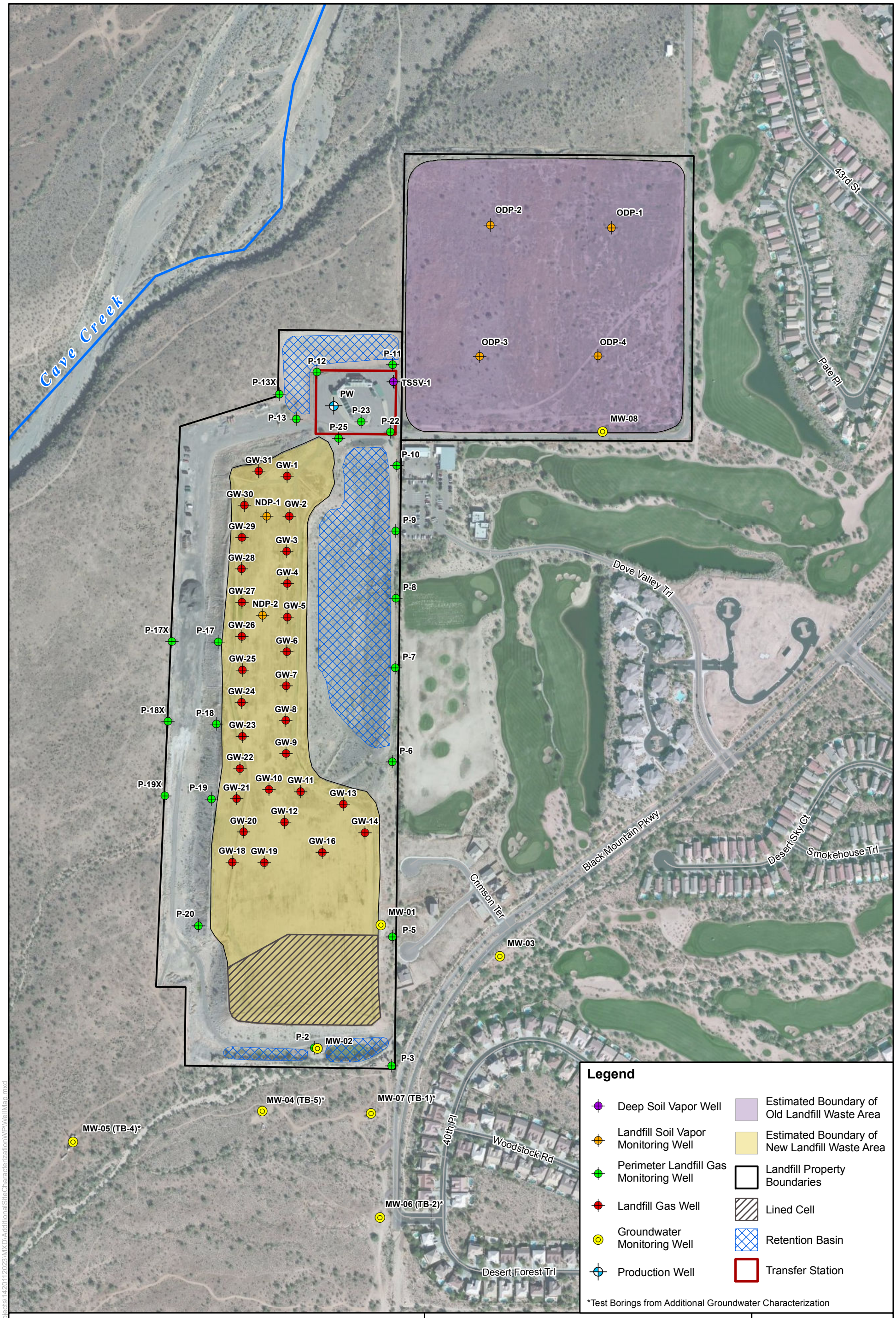
Path: X:\Projects\2011 Projects\1420112023\MXD\AdditionalSiteCharacterizationWP\SiteMap.mxd



Legend

- Deep Soil Vapor Well
- Landfill Soil Vapor Monitoring Well
- Perimeter Landfill Gas Monitoring Well
- Landfill Gas Well
- Groundwater Monitoring Well
- Production Well
- Estimated Boundary of Old Landfill Waste Area
- Estimated Boundary of New Landfill Waste Area
- Landfill Property Boundaries
- Lined Cell
- Retention Basin
- Transfer Station

*Test Borings from Additional Groundwater Characterization

0 200 400 800 Feet

N

Job No.	1420112023
PM:	NC
Date:	9/19/2012
Scale:	1" = 400'

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Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Well Map

FIGURE **2**

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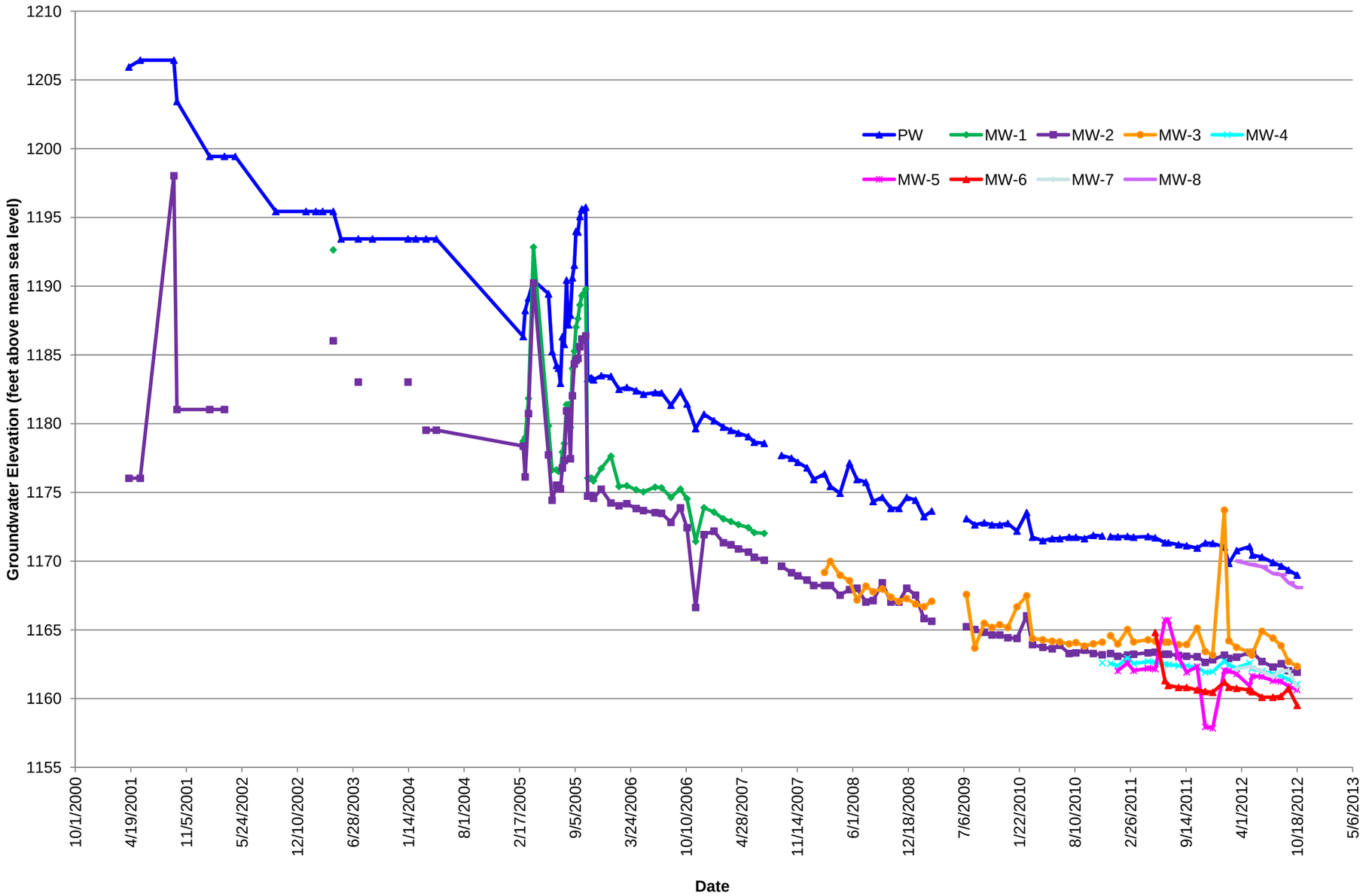
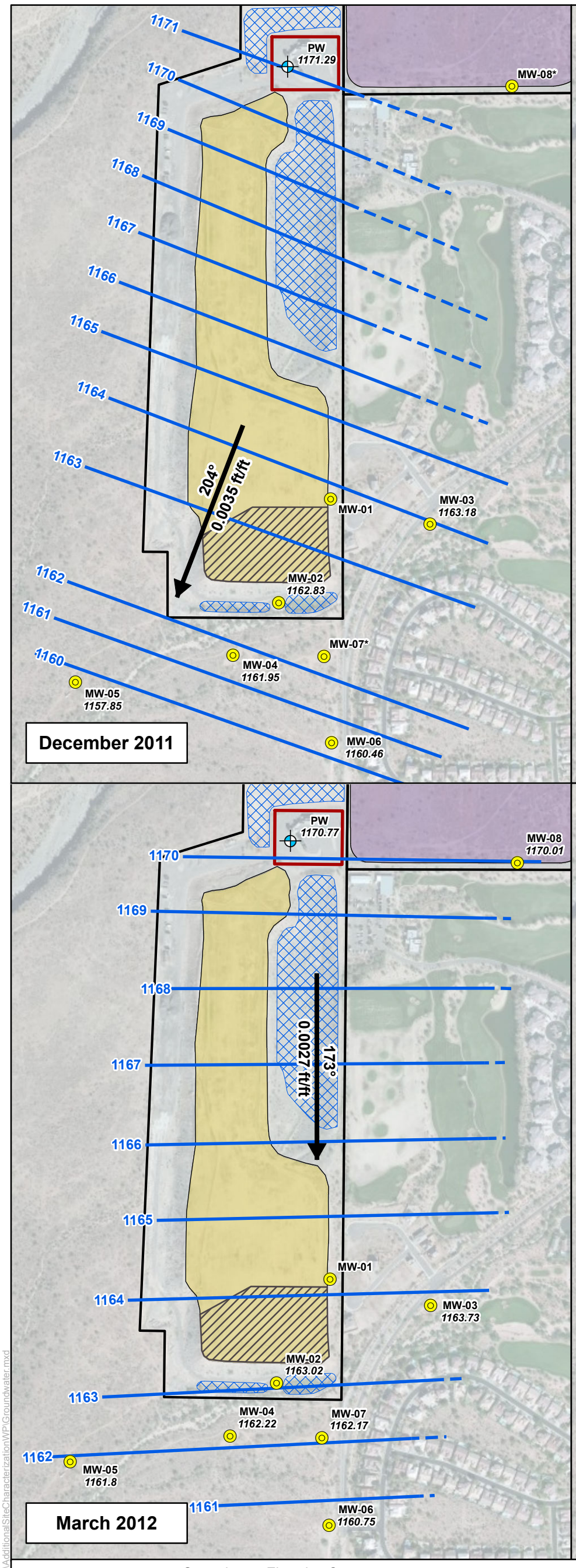
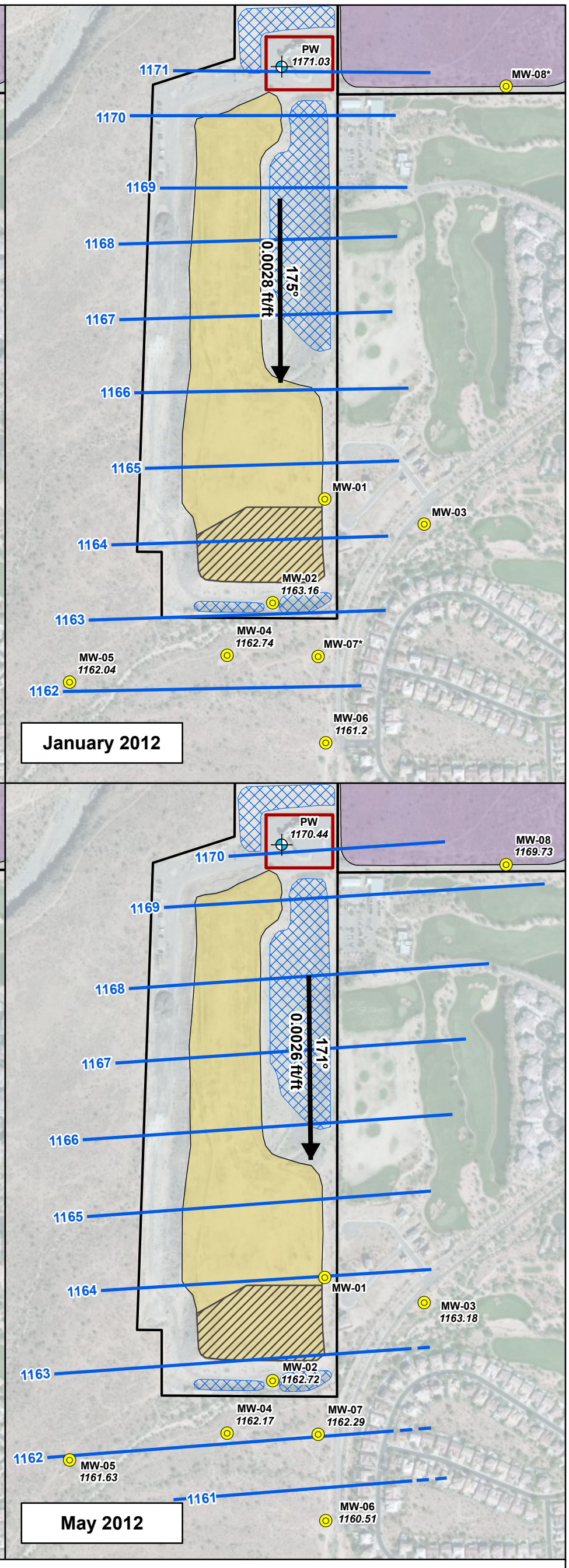
Path: X:\Projects\2011 Projects\1420112023\MXD\AdditionalSiteCharacterizationWP\WellMap.mxd



Job No.: 1420122015 Design: LM Drawn: JP Date: 11/2012	**Additional Site Characterization Work Plan** **Maricopa County Cave Creek Landfill** **Phoenix, Arizona**	amec
	Groundwater Elevation in Site Wells – 2001 through 2012	**FIGURE 3**





Legend

- Groundwater Elevation Contours (Dashed where inferred) *Contour Interval = 1 foot*
- Groundwater Flow Direction (degrees) Groundwater Flow Gradient (ft/ft)
- Groundwater Monitoring Well
- Production Well
- Estimated Boundary of Old Landfill Waste Area
- Estimated Boundary of New Landfill Waste Area
- Landfill Property Boundaries
- Lined Cell
- Retention Basin
- Transfer Station

Notes: * MW-07 installed on 02/08/2012
MW-08 installed on 01/09/2012

0 150 300 600 Feet

Job No.	1420112023
PM:	LM
Date:	7/10/2012
Scale:	1" = 600'

N

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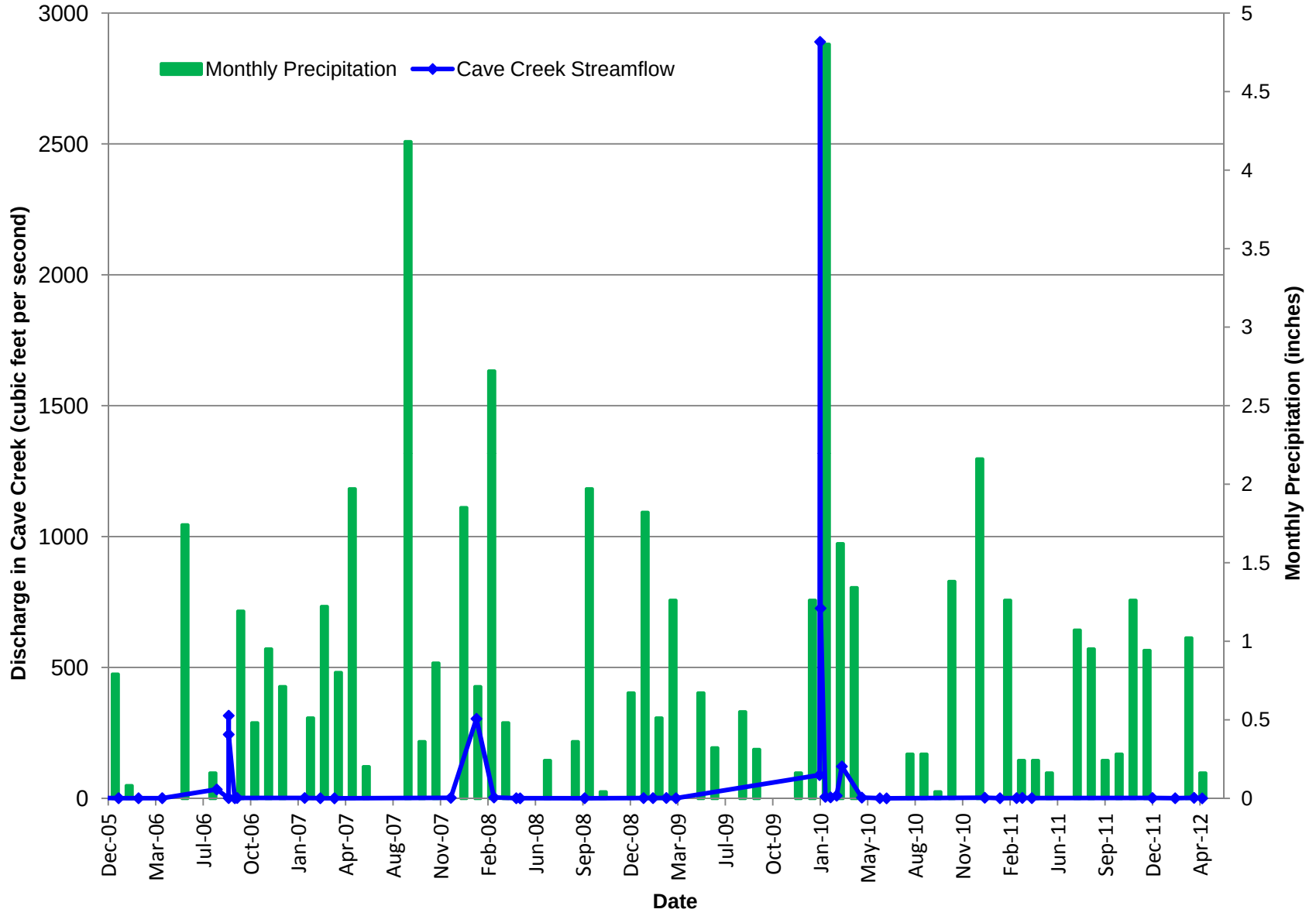
Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Potentiometric Surface Maps December 2011 through May 2012

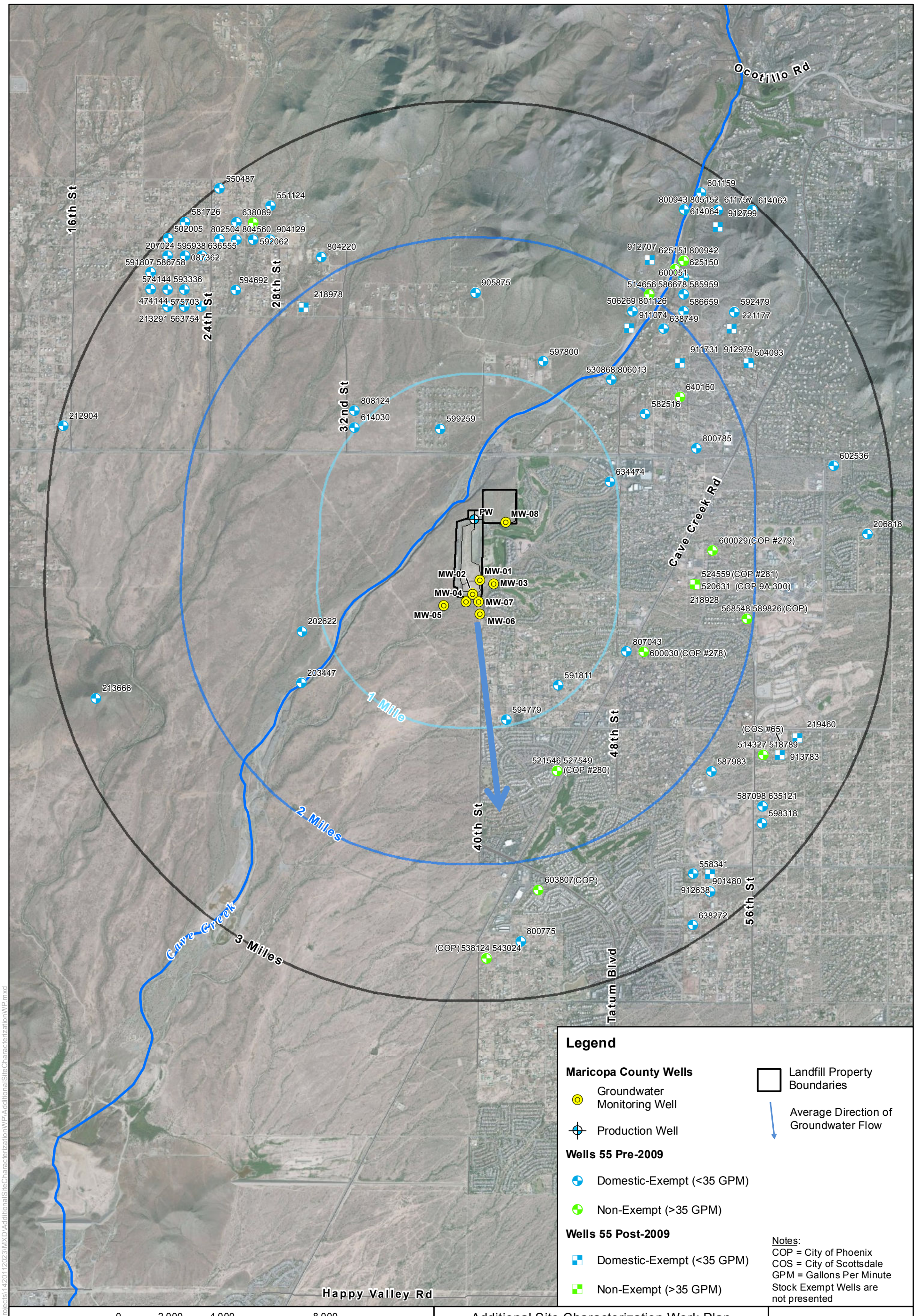
FIGURE **4**

amec

Path: X:\Projects\2011 Projects\1420112023\MXD\AdditionalSiteCharacterizationWP\Groundwater.mxd



Job No.: 1420112023 Design: LM Drawn: LM Date: 7/2012	**Additional Site Characterization Work Plan** **Maricopa County Cave Creek Landfill** **Phoenix, Arizona**	amec
	Streamflow in Cave Creek and Monthly Precipitation **2005 through 2012**	**FIGURE** **5**



Legend

Maricopa County Wells

- Groundwater Monitoring Well
- Production Well

Wells 55 Pre-2009

- Domestic-Exempt (<35 GPM)
- Non-Exempt (>35 GPM)

Wells 55 Post-2009

- Domestic-Exempt (<35 GPM)
- Non-Exempt (>35 GPM)

- Landfill Property Boundaries
- Average Direction of Groundwater Flow

Notes:
COP = City of Phoenix
COS = City of Scottsdale
GPM = Gallons Per Minute
Stock Exempt Wells are not presented

Job No.	1420112023
PM:	NC
Date:	7/17/2012
Scale:	1" = 4000'

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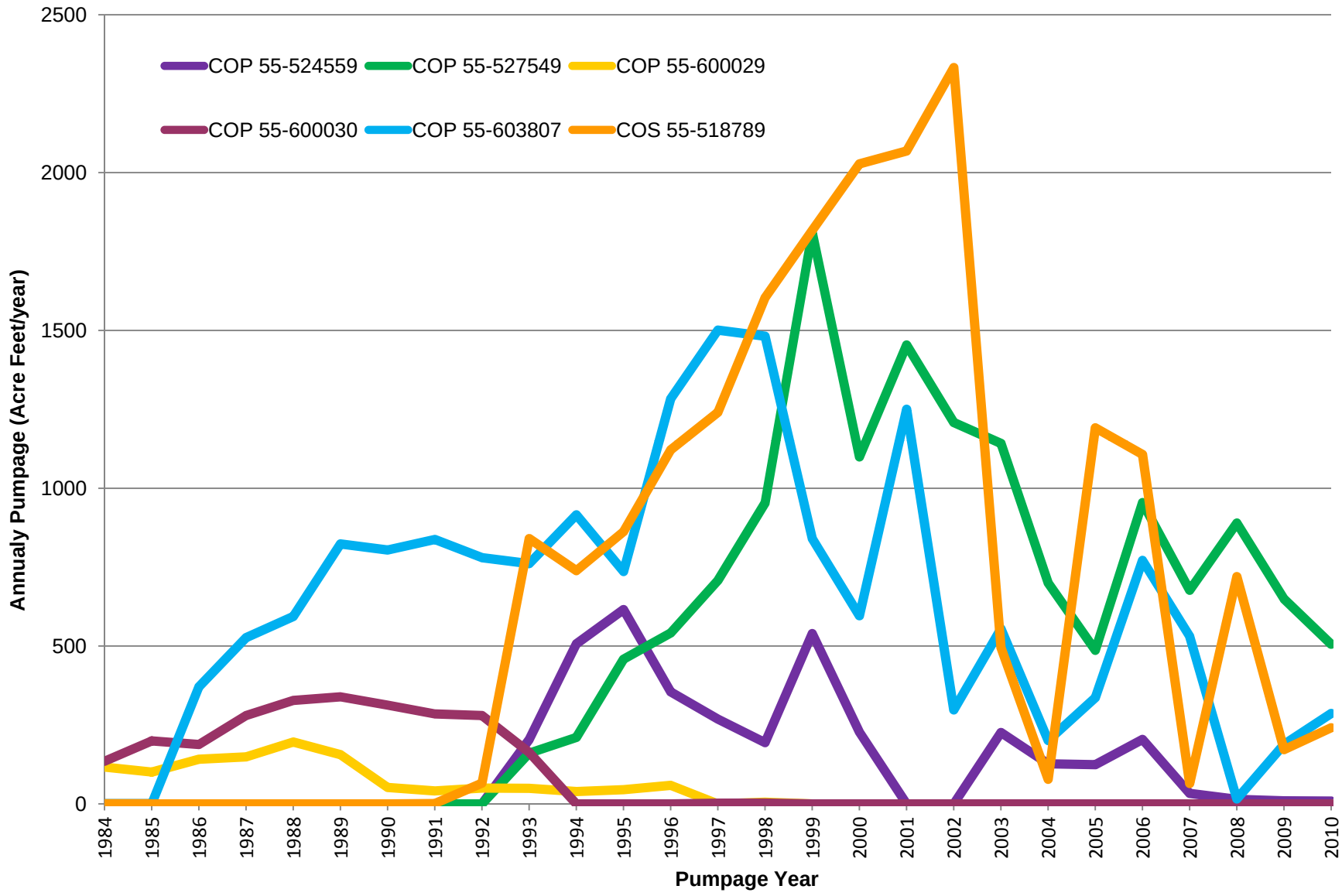
Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Select ADWR Registered Wells within a 3-Mile Radius of Cave Creek Landfill

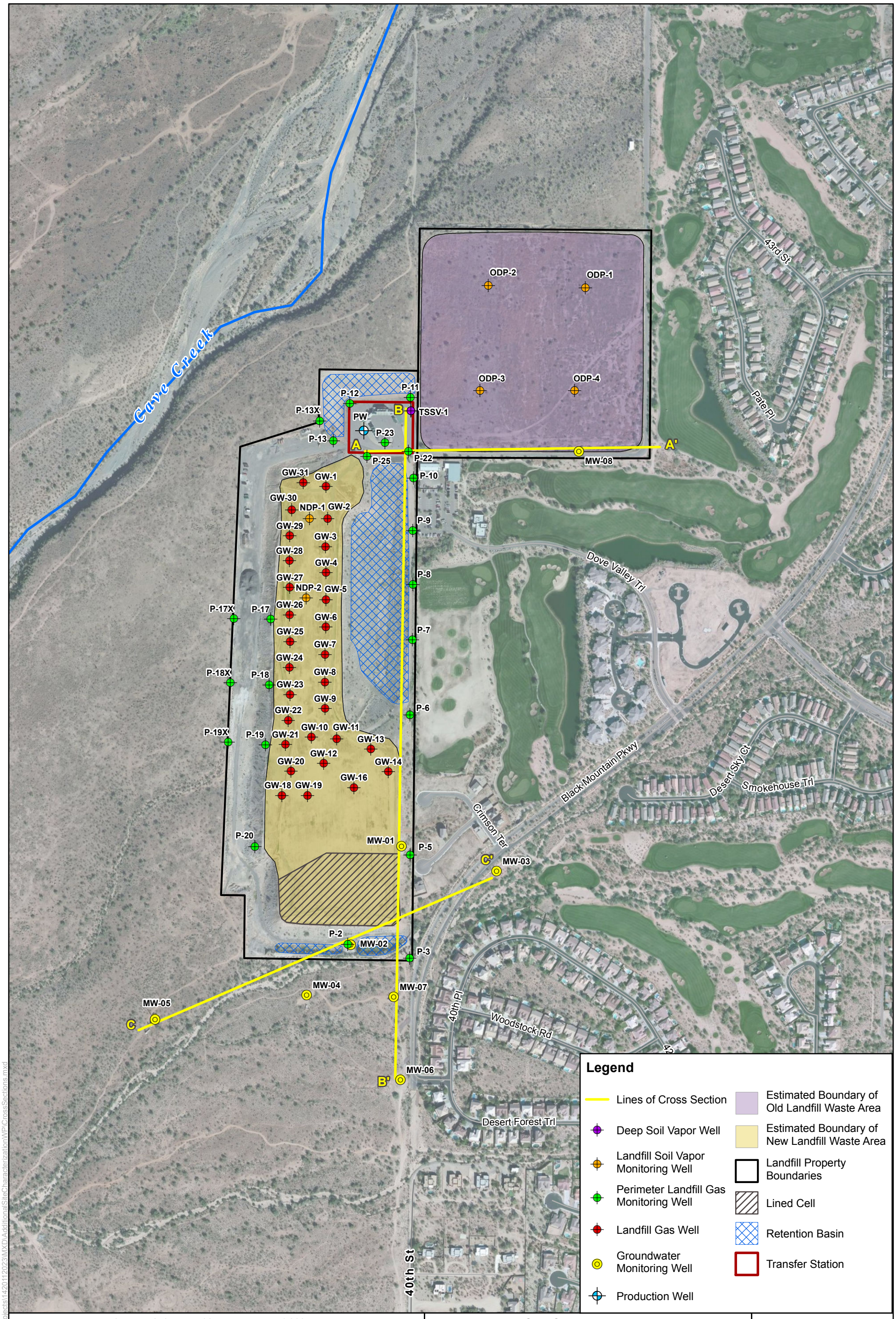
FIGURE **6**

amec

Path: X:\Projects\2011 Projects\1420112023\MXD\AdditionalSiteCharacterizationWP\AdditionalSiteCharacterizationWP.mxd



Job No.: 1420112023 Design: LM Drawn: LM Date: 7/2012	**Additional Site Characterization Work Plan** **Maricopa County Cave Creek Landfill** **Phoenix, Arizona**	amec
	Annual Groundwater Pumpage in COP and COS Wells near CCL	**FIGURE 7**



Job No.	1420112023
PM:	NC
Date:	7/19/2012
Scale:	1" = 500'

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Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Lines of Cross Section

FIGURE
8

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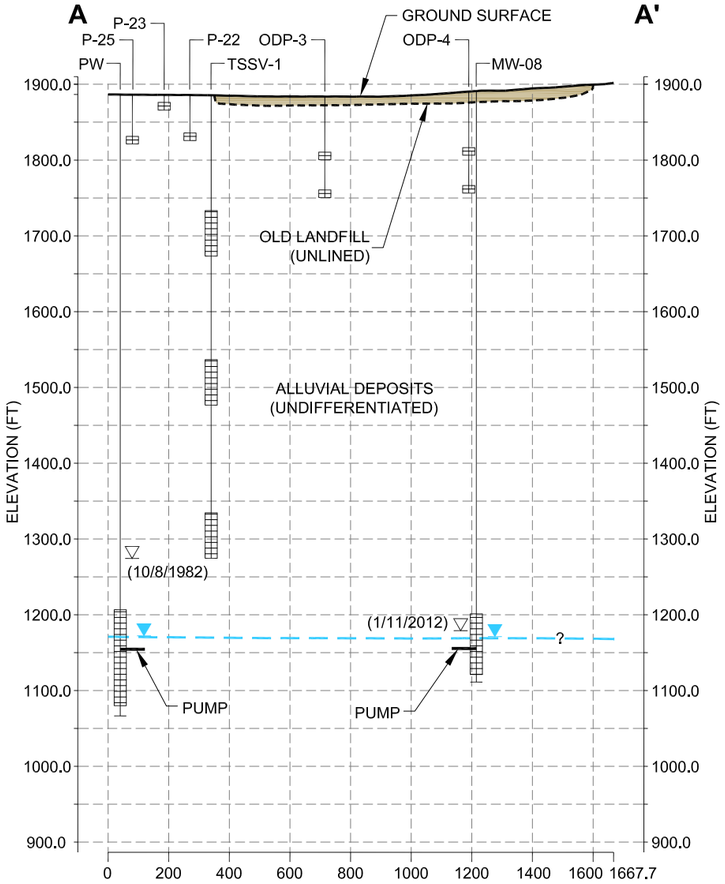
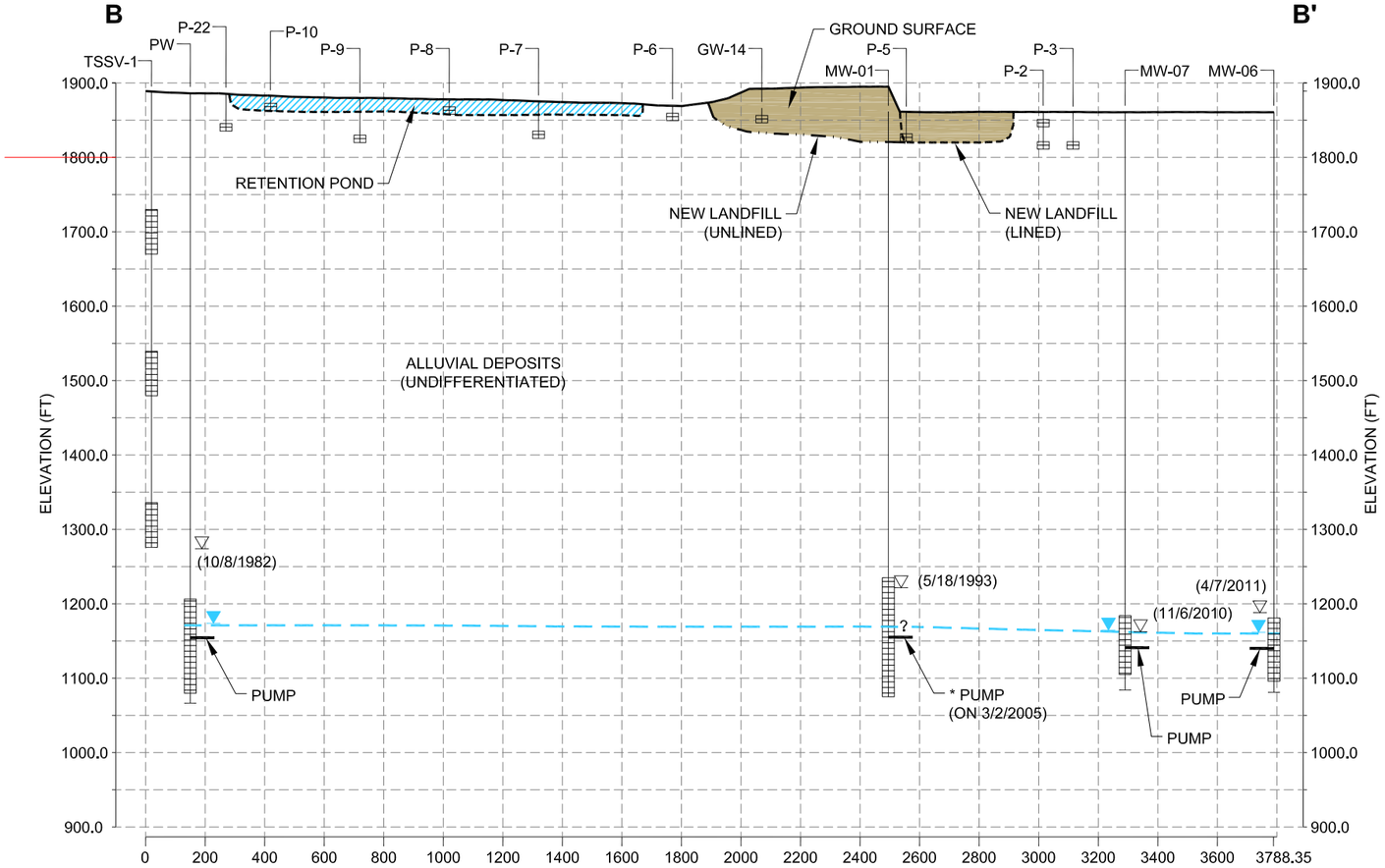
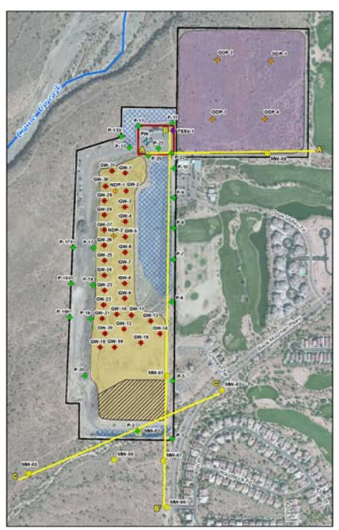
Path: X:\Projects\2011 Projects\1420112023\MXD\AdditionalSiteCharacterizationWP\CrossSections.mxd







CROSS-SECTION - VICINITY MAP

KEY

PUMP — LOCATION OF PUMP INLET AS OF JUNE 2012

SCREENED INTERVAL

WASTE

DEPTH TO WATER DURING DRILLING
(FEET BELOW GROUND SURFACE)

GROUNDWATER ELEVATION FROM TOP OF CASING
(FEET ABOVE MEAN SEA LEVEL) ON 4/30/2012

* NOTES:

1. PUMP IN MW-01 STUCK AND UNUSABLE SINCE AUGUST 2007.
2. GROUND SURFACE ELEVATION WAS OBTAINED FROM A DIGITAL ELEVATION MODEL OF THE AREA WITH A RESOLUTION OF 30 METER.

JOB NO.	14-2011-2023
DESIGN:	LM
DRAWN:	GWH
DATE:	6/2012
SCALE:	AS SHOWN

GENERALIZED HYDROSTRATIGRAPHIC
CROSS-SECTIONS A-A' & B-B'

CAVE CREEK LANDFILL

FIGURE
9

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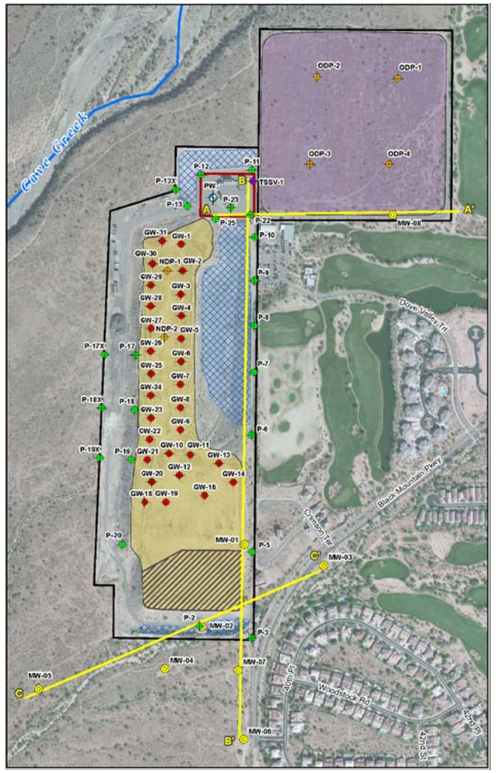
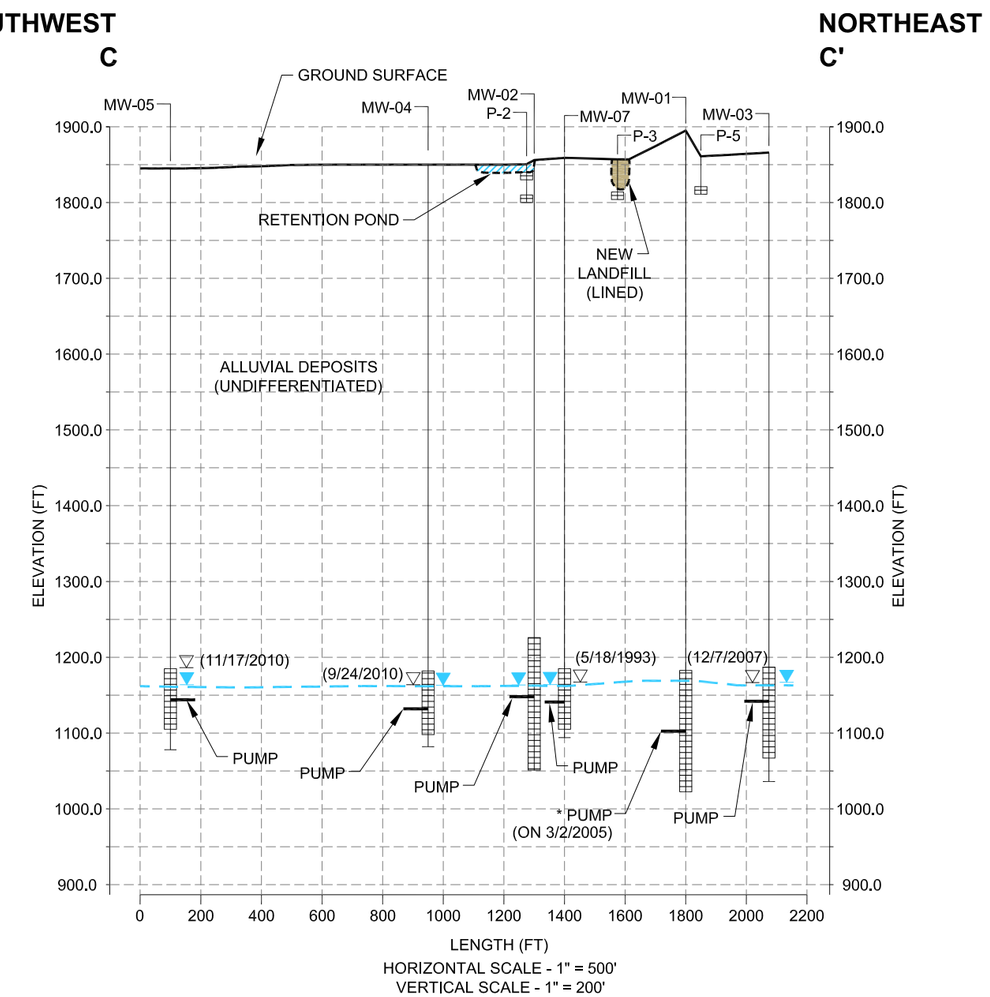
Phoenix, Arizona

G:\Environmental-Development\2011 Projects\14-2011-2023 Cave Creek Landfill FY2012\I GIS_Drafting\Cross-Sections.dwg



CROSS-SECTION - VICINITY MAP



KEY

PUMP — LOCATION OF PUMP INLET AS OF JUNE 2012

SCREENED INTERVAL

WASTE

DEPTH TO WATER DURING DRILLING
(FEET BELOW GROUND SURFACE)

GROUNDWATER ELEVATION FROM TOP OF CASING
(FEET ABOVE MEAN SEA LEVEL) ON 4/20/2012

* NOTES:

1. PUMP IN MW-01 STUCK AND UNUSABLE SINCE AUGUST 2007.

2. GROUND SURFACE ELEVATION WAS OBTAINED FROM A DIGITAL ELEVATION MODEL OF THE AREA WITH A RESOLUTION OF 30 METER.

JOB NO.	14-2011-2023
DESIGN:	LM
DRAWN:	GWH
DATE:	6/2012
SCALE:	AS SHOWN

GENERALIZED HYDROSTRATIGRAPHIC
CROSS-SECTION C-C'

CAVE CREEK LANDFILL

FIGURE
10

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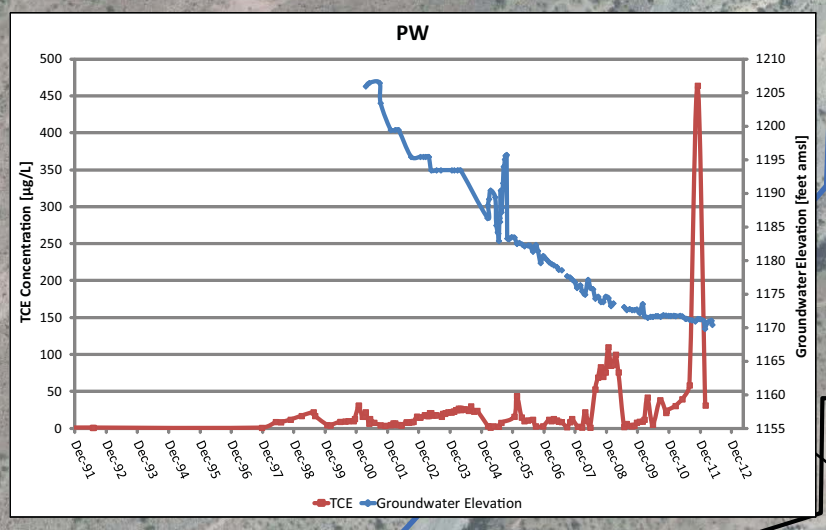
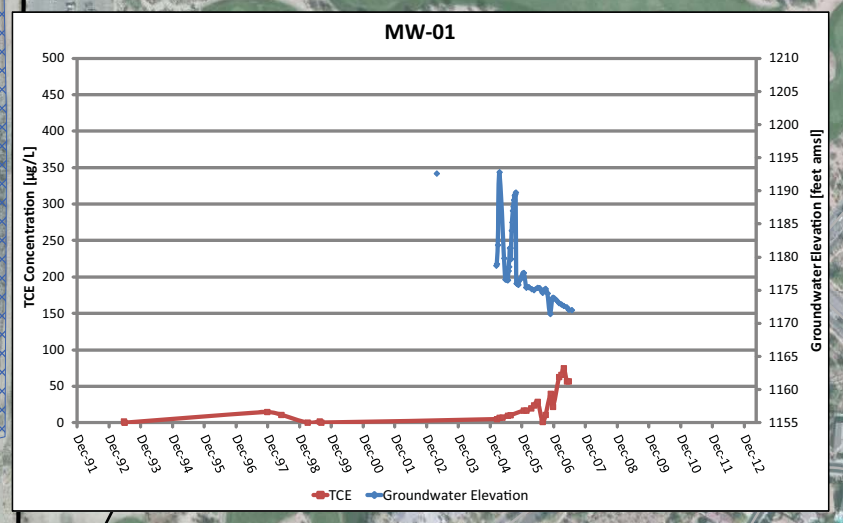
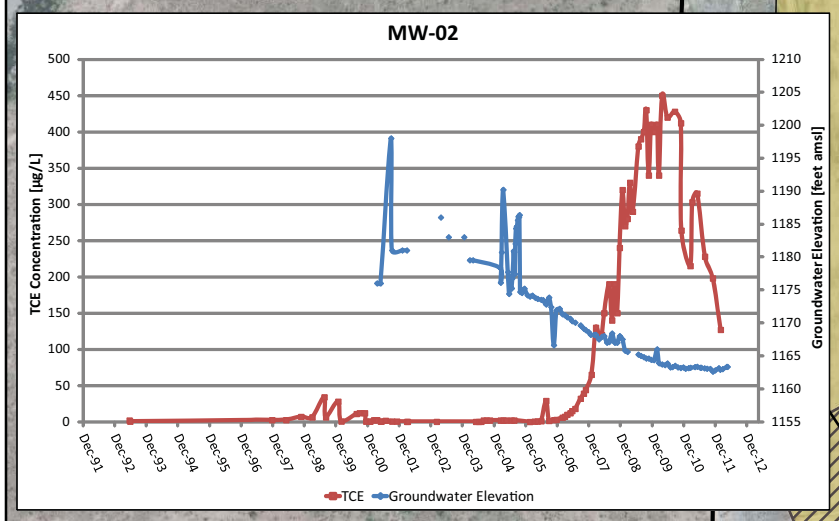
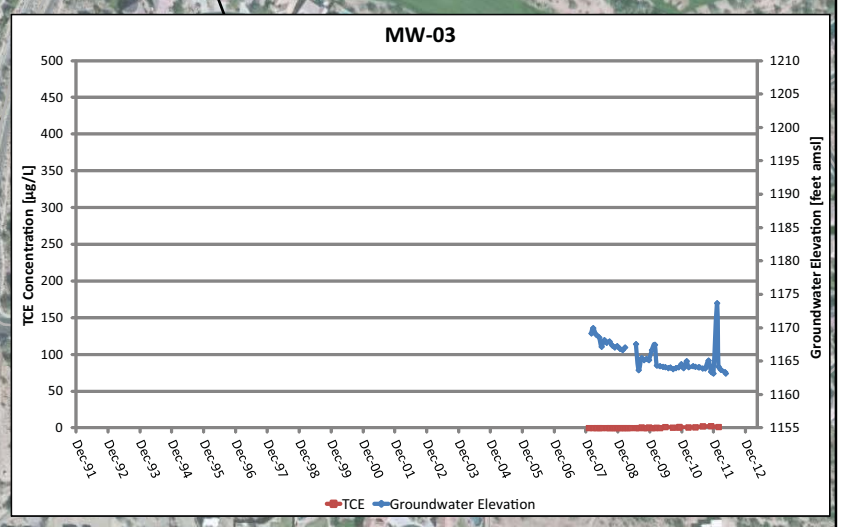
Phoenix, Arizona

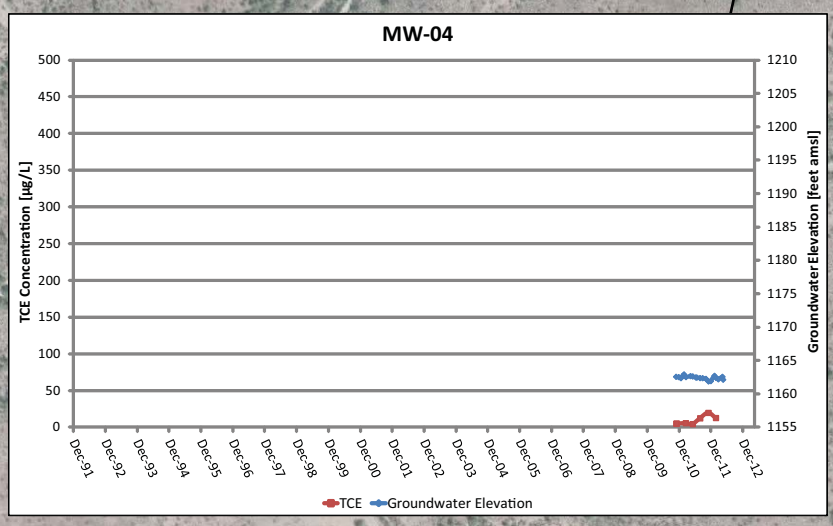
G:\Environmental-Development\2011 Projects\14-2011-2023 Cave Creek Landfill FY2012\I_GIS_Drafting\Cross-Sections.dwg











Cave Creek
PW
MW-08
Pate Pl
MW-01
MW-02
MW-03
MW-04
MW-05
MW-06
MW-07
Crimson Ter
Black Mountain Pkwy
Desert Sky Ct
Smokehouse Tr
Lonesome Trl
Sierra Sunset Trl
43rd St
40th St
Private

Legend

- Groundwater Monitoring Well
- Production Well
- Estimated Boundary of Old Landfill Waste Area
- Estimated Boundary of New Landfill Waste Area
- Landfill Property Boundaries
- Lined Cell
- Retention Basin
- Transfer Station

0 250 500 1,000 Feet

N

Job No.	1420112023
PM:	NC
Date:	7/10/2012
Scale:	1" = 500'

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Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

TCE Concentration Trends in Groundwater

FIGURE **11**

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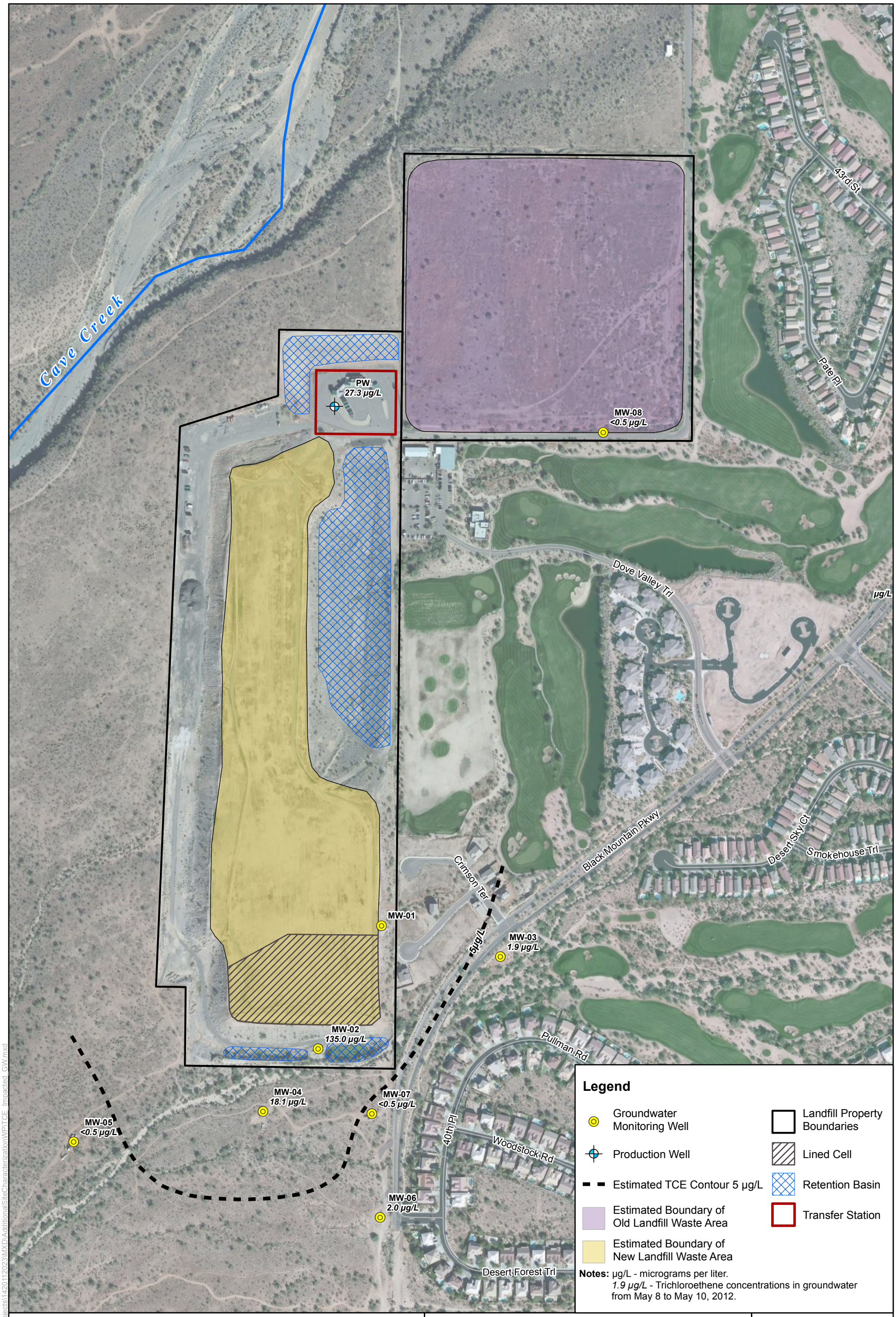
Path: X:\Projects\2011 Projects\1420112023\MXD\AdditionalSiteCharacterizationWP\Trends.mxd



Job No.	1420112023
PM:	NC
Date:	7/10/2012
Scale:	1" = 400'

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Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Estimated Extent of TCE - Impacted Groundwater

FIGURE **12**

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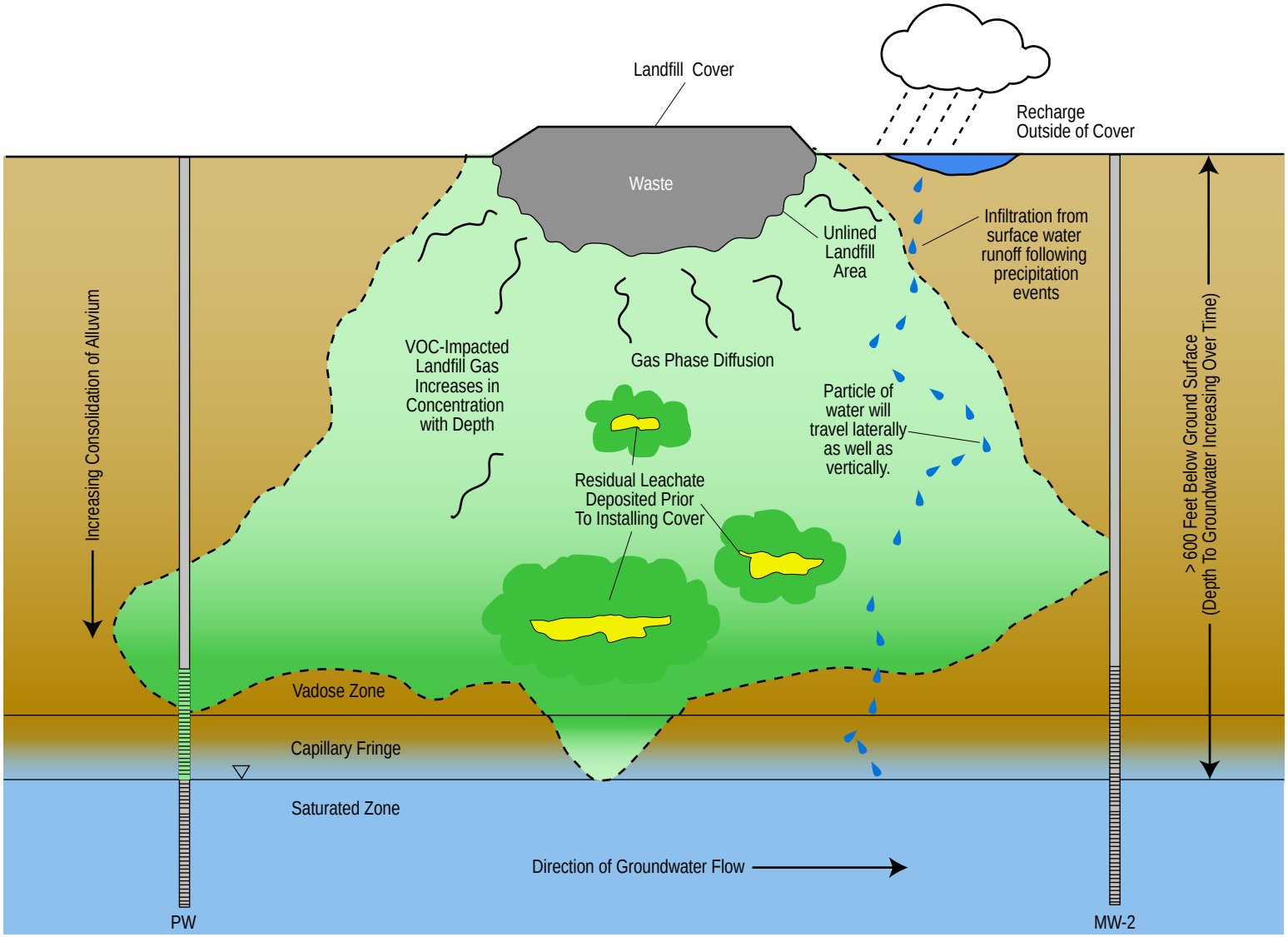
Path: X:\Projects\2011 Projects\1420112023\MXD\AdditionalSiteCharacterizationWP\TCE_Impacted_GW.mxd



GENERALIZED DEPICTION - NOT TO SCALE

Job No.	1420112023
PM:	NC
Date:	6/28/2012
Scale:	NTS

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Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Conceptual Site Model

FIGURE
13

amec

Cave Creek

TSSV-1

TSSV-2

TSSV-5

TSSV-4

TSSV-3

43rd St

Pate Pl

Dove Valley Trl

Black Mountain Pkwy

Desert Sky Ct

Smokehouse Trl

Crimson Ter

Pullman Rd

40th Pl

Woodstock Rd

Desert Forest Trl

Legend

- Future Deep Soil Vapor Well Location
- Deep Soil Vapor Well
- Landfill Soil Vapor Monitoring Well
- Perimeter Landfill Gas Monitoring Well
- Landfill Gas Well
- Groundwater Monitoring Well
- Production Well
- Estimated Boundary of Old Landfill Waste Area
- Estimated Boundary of New Landfill Waste Area
- Lined Cell
- Retention Basin

0 200 400 800 Feet

Job No.	1420122015
PM:	NC
Date:	11/19/2012
Scale:	1" = 400'

N

The map shown here has been created with all due and reasonable care and is strictly for use with AMEC Project Number 1420112023. This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind. AMEC assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.

Additional Site Characterization Work Plan
Maricopa County Cave Creek Landfill
Phoenix, Arizona

Planned Locations of Future Soil Vapor Monitoring Wells

FIGURE 14

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Path: X:\Projects\2012 Projects\1420122015 Cave Creek Landfill FY2013\MXD\WorkPlan_Future_DSV_Wells_Figure14.mxd

APPENDIX A

BORING LOGS

TEST DRILLING EQUIPMENT AND PROCEDURES

Description of Subsurface Exploration Methods

Auger Boring Drilling through overburden soils is performed with 6 5/8-inch O.D., 3 1/4-inch I.D. hollow stem auger or 4 1/2-inch solid stem continuous flight auger. Carbide insert teeth are normally used on bits so they can penetrate soft rock or very strongly cemented soils. A CME-75 truck-mounted drill rig is used to advance the auger. The drill rigs are powered with six-cylinder Cummins diesel engines capable of delivering about 11.4 kN-m torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 90 kN (20,000 pounds) downward force.

Generally, refusal to penetration of the auger is adopted as top of the SGC or "river-run" material or harder bedrock, which require other techniques for penetration. Grab samples or auger cuttings may be taken as necessary. Standard penetration tests or 2.42-inch diameter ring samples are taken in conjunction with the auger borings as needed, with the sampling interval and type being indicated on the boring logs.

Hammer Drill Drilling with the Hammer drill is accomplished with a Drill Systems AP-1000 drill rig advancing a double-walled drive casing with a link-belt 180 diesel pile driving hammer, having a rated energy of 8,100 foot-pounds per blow. Where noted on the boring log, the hammer is equipped with a supercharger which can boost the energy to approximately 12,000 foot-pounds per blow. The supercharger is used only in portions of the boring where blow counts are relatively high. Cuttings are removed with compressed air by a reverse circulation process, and are collected in a cyclone from which grab samples are obtained. The drive casing is either 9-inch O.D. by 6-inch I.D. or 6 5/8-inch O.D. by 4-inch I.D. and employs an expendable bit of slightly larger diameter than the O.D. of the casing. Hammer blows required to advance the drive casing are recorded in 1-foot increments, as noted on the boring logs. Standard penetration tests or 2.42-inch diameter ring samples taken are noted on the boring logs.

Core Boring Rock core samples are retrieved using a CME-75 drill rig, SAITECH GH 3 rig or Burley 2500, 4500 or 4000. The GH 3 is a portable hydraulic core drill. The GH 3 is powered by a Kohler two-cylinder 25-horsepower engine. The hydraulics motor which feeds a two-speed transmission and powers the BW spindle. This unit has a 3-foot stroke and is hand-fed with a 2,000 pound push-pull capability. The GH 3 has the capability of drilling with either B- or N-size core steel using standard or wireline systems. N-size core is the preferred size and it has a nominal O.D. of about 2 inches. The Burley 2500 and 4500 series are portable hydraulic core drills. The 4500 series is capable of a track-mounted or skid-type chassis. The Burley 2500 and 4500 series are powered by 44 and 75 HP power units, respectively, provide up to 2,000 foot-pounds (ft.-lbs.) of torque and in excess of 1,000 revolutions per minute (RPM) of spindle speed. Both rigs are capable of retrieving either N- or H-sized core using wireline systems. The N-size core has a nominal O.D. of about 2 inches and the H-size of about 2.4 inches. The Burley 4000 is a track-mounted core drill.

The CME-75 utilizes a wireline core drilling system that takes N-size cores. Using the NQ wireline system, core is recovered quickly by retrieving the core-laden inner tube through the drill string.

TEST DRILLING EQUIPMENT AND PROCEDURES (Cont.)

Sampling Procedures Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In many cases, 2-inch O.D., 1 3/8-inch I.D. samples are used to obtain the standard penetration resistance. “Undisturbed” samples of firmer soils are often obtained with 3-inch O.D. samples lined with 2.42-inch I.D. brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samples in 6-inch increments. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. These values are expressed in blows per 6 inches on the boring logs. "Undisturbed" sampling of softer soils is sometimes performed with thin walled Shelby tubes (ASTM D1587), pitcher samplers, Denison samplers or continuous CME samplers. Where samples of rock are required, they are obtained by NQ diamond core drilling (ASTM D2113). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Also, representative samples are obtained from the cuttings from the hammer and Schramm drill rig.

Boring Records Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares the boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the boring logs.

TERMINOLOGY USED TO DESCRIBE THE RELATIVE DENSITY, CONSISTENCY OR FIRMNESS OF SOILS

The terminology used on the boring logs to describe the relative density, consistency or firmness of soils relative to the standard penetration resistance is presented below. The standard penetration resistance (N) in blows per foot is obtained by the ASTM D1586 procedure using 2" O.D., 1 3/8" I.D. samplers.

1. **Relative Density.** Terms for description of relative density of cohesionless, uncemented sands and sand-gravel mixtures.

N	Relative Density
0-4	Very loose
5-10	Loose
11-30	Medium dense
31-50	Dense
50+	Very dense

2. **Relative Consistency.** Terms for description of clays which are saturated or near saturation.

N	Relative Consistency	Remarks
0-2	Very soft	Easily penetrated several inches with fist.
3-4	Soft	Easily penetrated several inches with thumb.
5-8	Medium stiff	Can be penetrated several inches with thumb with moderate effort.
9-15	Stiff	Readily indented with thumb, but penetrated only with great effort.
16-30	Very stiff	Readily indented with thumbnail.
30+	Hard	Indented only with difficulty by thumbnail.

3. **Relative Firmness.** Terms for description of partially saturated and/or cemented soils which commonly occur in the Southwest including clays, cemented granular materials, silts and silty and clayey granular soils.

N	Relative Firmness
0-4	Very soft
5-8	Soft
9-15	Moderately firm
16-30	Firm
31-50	Very firm
50+	Hard

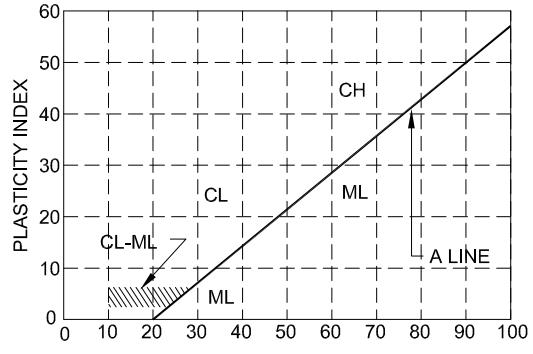
UNIFIED CLASSIFICATION SYSTEM FOR SOILS

Soils are visually classified by the United Soil Classification System on the boring logs presented in this report. Grain-size analysis and Atterberg Limits Tests are often performed on selected samples to aid in classification. The classification system is briefly outlined on this chart. For a more detailed description of the system, see " The Unified Soil Classification System " ASTM Designation: D2487

MAJOR DIVISION				GRAPH SYMBOL	GROUP SYMBOL	TYPICAL DESCRIPTION
COARSE-GRAINED SOILS (Less than 50% passes No. 200 sieve)	GRAVELS (50% or less of coarse fraction passes No. 4 sieve)	CLEAN GRAVELS (Less than 5% passes No. 200 sieve)			GW	Well graded gravels, gravel-sized mixtures or sand-gravel-cobble mixture.
					GP	Poorly graded gravels, gravel-sized mixtures or sand-gravel-cobble mixture.
		GRAVELS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart		GM	Silty gravels, gravel-sand-silt mixture.
			Limits plot below "A" line & hatched zone on plasticity chart		GC	Clayey gravels, gravel-sand-clay mixture.
	SANDS (More than 50% of coarse fraction passes No. 4 sieve)	CLEAN SANDS (Less than 5% passes No. 200 sieve)			SW	Well graded sands, gravelly sands.
					SP	Poorly graded sands, gravelly sands.
		SANDS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart		SM	Silty sands, sand-silt mixtures.
			Limits plot below "A" line & hatched zone on plasticity chart		SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS LIMITS PLOT BELOW "A" LINE & HATCH ZONE ON PLASTICITY CHART	SILTS OF LOW PLASTICITY (Liquid limit less than 50)			ML	Inorganic silts, clayey silts with slight plasticity.
		SILTS OF HIGH PLASTICITY (Liquid limit more than 50)			MH	Inorganic silts of high plasticity, silty soils, elastic silts.
	CLAYS LIMITS PLOT BELOW "A" LINE & HATCH ZONE ON PLASTICITY CHART	CLAYS OF LOW PLASTICITY (Liquid limit less than 50)			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		CLAYS OF HIGH PLASTICITY (Liquid limit more than 50)			CH	Inorganic clays of high plasticity, fat clays, silty and sandy clays of high plasticity.

NOTE: Coarse-grained soils with between 5% to 12% passing the No. 200 sieve and fine-grained soils with limits plotting in the hatched zone on the plasticity chart to have dual symbol.

PLASTICITY CHART



DEFINITIONS OF SOIL FRACTIONS

SOIL COMPONENT	PARTICLE SIZE RANGE
Boulders	Above 300mm (12in.)
Cobbles	300mm to 75mm (12in. to 3in.)
Gravel	75mm (3in.) to No. 4 sieve
Coarse gravel	75mm to 19mm (3in to 3/4in.)
Fine gravel	19mm (3/4in.) to No. 4 sieve
Sand	No. 4 to No. 200
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines (silt or clay)	Below No. 200 sieve

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
0	1.4			A				SP-SM	note: adding water for dust control from 0 to 20'	**POORLY GRADED SAND WITH SILT & GRAVEL,** few fines, some fine to coarse grained, angular to subangular gravel, mostly medium to coarse grained, subangular sand, nonplastic, dark gray to black
5	0.6									
10	1.8			A						note: slight increase in coarse grained gravel below 10'
15										
20	2.4			A				SP	note: adding hydrogel to water to stabilize borehole from 20' to 640'	**POORLY GRADED SAND WITH GRAVEL,** some to mostly fine to coarse grained, angular to subangular gravel, mostly medium to coarse grained, subangular sand, nonplastic, dark red to black
25										
30				A						
35										
40	1.7			A						
45										
50										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)
RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
50				A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued
55										
60				A						
65										
70				A						
75										
80	0.4			A						note: dark red, green, & black below approximately 80'
85	0.8									
90	0.8			A				SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** few fines, some fine to coarse grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, black
95	1.0									note: decrease in gravel & increase in fines below approximately 95'
100										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
100	0.8			A				SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** continued note: dark gray to black from 100' to 109'
105	1.0									
110	0.6			A						note: dark green to black below 109'
115	0.8									
120				A						
125	0.6									
130	0.6			A						
135	0.6									
								SP		**POORLY GRADED SAND WITH GRAVEL,** some to mostly fine to coarse grained, subangular to angular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark green to black
140	0.4			A						
145	0.8									
150										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.00	0930	11-6-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
150	0.8			A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued note: slight decrease in coarse grained gravel below approximately 155'
155	0.6									
160	0.6			A						
165	0.8									
170	0.8			A						note: gray to dark gray below approximately 170'
175	1.0									
180	1.0			A				SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** few fines, some fine grained, angular to subangular gravel, mostly medium to coarse grained, subangular to angular sand, nonplastic, dark green to black
185	0.4									
190	0.6			A						
195	0.6							SM		**SILTY SAND WITH GRAVEL,** little fines, little to some fine grained, angular to subangular gravel, mostly fine to coarse grained, angular to subangular sand, nonplastic, dark green to black
200										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.00	0930	11-6-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
200				A				SM		**SILTY SAND WITH GRAVEL,** continued
205	0.8							SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** few fines, little to some fine grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark green to dark gray
210	1.0			A						
215	0.8							SP		**POORLY GRADED SAND WITH GRAVEL,** trace fines, some fine to coarse grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark green to dark gray
220	0.6			A						
225	1.0									note: decrease in gravel & dark green to black below 224'
230	0.8			A						
235	0.8									
240	0.4			A						
245	1.0									
250										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.00	0930	11-6-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
250	0.8			A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued note: dark gray to black from 260' to 279'
255	0.6									
260	1.0			A						
265	0.8									
270	0.8			A						
275										
280	1.0			A						note: dark gray & green from 279' to 324'
285	0.8									
290	1.2			A						
295	1.4									
300										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.00	0930	11-6-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
300	1.2			A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued
305	1.0									
310	1.2			A						
315	0.8									
320	1.0			A						
325	0.8							SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** few fines, some fine grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark gray
330	1.0			A						
335	1.2									
340	1.0			A						
345	0.8									
350										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)
RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
350	1.0			A				SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** continued
355	1.4									
360	0.8			A						
365	1.4									
370	1.0			A						
375	1.4									
380	1.4			A						
385	0.8									note: some to mostly fine to coarse grained gravel below 385'
390	1.2			A						
395	1.6									
400										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.00	0930	11-6-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
400	1.2			A				SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** few fines, little fine grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark gray
405	1.2									
410	1.0			A						
415	1.6									
420				A				SP		**POORLY GRADED SAND WITH GRAVEL,** trace fines, some to mostly fine to coarse grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark gray
425	0.6									
430	0.8			A						
435	0.6									
440	1.0			A						
445	0.8									
450										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.00	0930	11-6-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
450	0.8			A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued
455	1.0									
460	1.2			A						note: reddish-brown to dark gray from 460' to 470'
465	1.0									
470	0.9			A						
475										
480	1.4			A						note: decrease in gravel from 480' to 490'
485	0.8									
490	0.9			A						
495									note: changing to 5 1/2" tricone bit at 500'	
500										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)
RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification	Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
500	1.2			A		SP		**POORLY GRADED SAND WITH GRAVEL,** continued
505	0.9							note: dark gray to black from 504' to 520'
510				A				
515	1.4							
520				A		SP		**POORLY GRADED SAND WITH GRAVEL,** some to mostly fine to coarse grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark gray to black
525	2.4							
530	1.4			A		GP		**POORLY GRADED GRAVEL WITH SAND,** some to mostly medium to coarse grained, angular to subangular sand, mostly fine to coarse grained, angular to subangular gravel, nonplastic, dark gray to black
535	1.7							note: rig chatter from 538' to 540'; possible cobbles & boulders present
	2.0							
540	1.4			A				
545	2.2							
550								

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.00	0930	11-6-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification	Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
550	1.0			A		GP		**POORLY GRADED GRAVEL WITH SAND,** continued
555								
	2.0						note: had to trip out of borehole; drill pipes were tightening up at 558'	
560	1.6			A				
565	1.4							note: rig chatter, possible cobbles & boulders present from 564' to 570'
570	1.8			A				note: increase in medium to coarse grained, angular to subangular sand below 570'; possible poorly graded sand with gravel
575	3.3							
	1.5							
580	1.2			A			note: tripping out borehole to loosen drill pipe at 585'	
585						SM		**SILTY SAND WITH GRAVEL,** little fines, little to some fine to coarse grained, angular to subangular gravel, mostly medium to coarse grained, angular to subangular sand, nonplastic, dark gray
590				A				
595						GP		**POORLY GRADED GRAVEL WITH SAND**
	0.5							
600								

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
600	1.2			A				GP		**POORLY GRADED GRAVEL WITH SAND,** some medium to coarse grained, angular to subangular sand, mostly fine to coarse grained, angular to subangular gravel, nonplastic, dark gray
605	0.8									
610	1.1			A						
615										
620	1.4			A					note: tripping out of borehole to loosen drill pipe at 618'	
625	1.0									
630	0.8			A						
635	2.3									note: rig chatter, possible cobbles & boulders present from 635' to 638'
	1.3									
640									note: stopped drilling with mud from 640' to 718' for clean water sample	
645										note: rig chatter, possible cobbles & boulders present from 645' to 650'
650										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)
RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
650	0.8			A				GP		**POORLY GRADED GRAVEL WITH SAND,** continued
655										
				A						
660										
665								GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND,** few silt, some medium to coarse grained, subangular to angular sand, mostly fine to coarse grained, angular to subangular gravel, nonplastic, gray
				A						
670										note: increase in fines from 665' to 680'
675										
				A						note: decrease in fines below 680'
680								GP		**POORLY GRADED GRAVEL WITH SAND,** trace silt, little to some fine to coarse grained, subangular to angular sand, mostly fine grained, subangular to angular gravel, nonplastic, grayish-brown
685										
				A						
690										
▽695										note: collected ground water sample: TB1-718-110610 at 12:30 on 11-6-10
				A						
700										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-2-10 to 11-6-10

LOCATION SE of Landfill (moved 45' WSW)

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
700								GP		**POORLY GRADED GRAVEL WITH SAND,** continued note: increase silt below 705'
705								GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND,** trace cobbles, few silt, little fine to coarse grained, subangular to angular sand, mostly fine grained, subangular to angular gravel, nonplastic, grayish-brown note: rig chatter, possible boulders present below 708'
				A						
710										
715										
720										Total Depth = 718' Stopped 5 1/2" percussion hammer at 500' Drilled 5 1/2" tricone from 500' to 718' Stopped 5 1/2" tricone at 718'
725										
730										
735										
740										
745										
750										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.00	0930	11-6-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-1

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
0				A				SP	note: adding water from 0' to 665' in pilot hole; using mud during over reaming	**POORLY GRADED SAND WITH GRAVEL,** few fine grained sand, some fine to coarse grained gravel, mostly medium to coarse grained sand, nonplastic, tan to light brown
5										
10				A						
15										
20				A					note: 14" conductor casing installed using 20" drill bit from 0 to 20'	note: increase in coarse gravel at 20', possible GP
25										
30				A						note: black, red & green at 30'
35										
40				A						note: increase in gravel, possible GP from 40' to 50'
45										
50										note: increase in medium grained sand at 50'

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.80	11:22	4-7-11
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
50				A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued
55										
60				A						note: increase in coarse grained gravel at 60'
65										
70				A						note: increase in medium to coarse grained sand at 70'
75										
80				A						
85										
90				A						
95										
100										note: increase in coarse grained gravel at 100'

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
100				A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued
105										
110				A				SP		**POORLY GRADED SAND,** mostly medium to coarse grained sand, angular to subangular, nonplastic, black, green & tan
115										
120				A				GP		**POORLY GRADED GRAVEL WITH SAND,** little coarse grained sand, mostly coarse grained gravel, angular to subangular, black, green and red
125										
130				A				SP		**POORLY GRADED SAND,** trace fine grained sand, trace fine grained gravel, angular to subangular, mostly medium to coarse grained sand, black, green, red & tan
135										
140				A						
145										
150										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
150				A				SP		**POORLY GRADED SAND,** continued
										note: few gravel & dark brown, black, red, green & tan
155										
160				A						
165										
170				A						note: increase in fine grained gravel, medium brown at 170', possible poorly graded sand with gravel
175										
180				A						
185										
190				A						note: increase in fine grained gravel at 190'; possible poorly graded sand with gravel
195										
200										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.80	11:22	4-7-11
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
200				A				SP-SM		**POORLY GRADED SAND WITH SILT AND GRAVEL,** few silt, few to little subangular to angular gravel, mostly fine to medium grained sand, nonplastic, brown
205										
210				A						
215										
220				A						note: increase in fine grained sand at 220'
225										
230				A						note: increase in coarse to medium grained sand at 230'
235										
240				A						
245										
250										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.80	11:22	4-7-11
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
250				A				SP		**POORLY GRADED SAND,** trace fines, mostly medium to coarse grained sand, angular to subangular, nonplastic, tan, green & orange
255										
260				A				SP-SM		**POORLY GRADED SAND WITH SILT,** few silt, mostly medium to coarse grained sand, angular to subangular, nonplastic, brown, black, tan, orange & green
265										
270				A						
275										
280				A						
285										
290				A						note: trace gravel at 290'
295										
300										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
300				A				SP-SM		**POORLY GRADED SAND WITH SILT,** few silt, mostly medium to coarse grained sand, angular to subangular, nonplastic, brown, black & orange
305										
310				A						note: few fine grained gravel at 310'
315										
320				A						note: increase in fines at 320'
325										
330				A						note: decrease in fines at 330'
335								SP		**POORLY GRADED SAND,** trace fines, mostly medium to coarse grianed sand, angular to subangular, nonplastic, brown, black & orange
340				A						
345										
350										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
350				A				SP-SM		**POORLY GRADED SAND WITH SILT,** few silt, mostly medium to coarse grained sand, subangular to angular, nonplastic, brown
355										
360				A				SP		**POORLY GRADED SAND,** trace fines, mostly medium to coarse grained sand, angular to subangular, nonplastic, brown
365										
370				A				SP-SM		**POORLY GRADED SAND WITH SILT,** few silt, mostly medium to coarse grained sand, angular to subangular, nonplastic, brown
375										
380				A						note: increase in coarse grained sand at 380'
385										
390				A				SP		**POORLY GRADED SAND,** trace fines, mostly medium to coarse grained sand, angular to subangular, nonplastic, black, brown, green & orange
395										
400										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
400				A				SP		**POORLY GRADED SAND,** continued
405										
410				A						
415										
420				A						
425										
430				A						note: increased in fines at 430'
435										
440				A				SP		**POORLY GRADED SAND WITH GRAVEL,** few fine grained gravel, angular to subangular, mostly medium to coarse grained sand, nonplastic, black, brown, green & orange
445										
450										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
450				A				SP		**POORLY GRADED SAND WITH GRAVEL,** continued note: trace fines below 450'
455										
460				A						
465										
470				A				SP		**POORLY GRADED SAND,** trace fine grained gravel & fine sand, mostly medium to coarse grained sand, angular to subangular, nonplastic, black, brown, green & orange
475										
480				A						
485										
490				A						
495										
500										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
500				A				SP		**POORLY GRADED SAND,** continued
505										
510				A						
515										
520				A						
525										
530				A						
535										
540				A						note: decrease in fine grained sand at 540'
545										
550										note: increase in fine grained sand at 550'

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.80	11:22	4-7-11
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
550				A				SP		**POORLY GRADED SAND,** continued
555										
560				A						
565										
570				A						
575										
580				A				SM		**SILTY SAND WITH GRAVEL,** little fine to coarse gravel, subangular to angular, mostly medium grained to coarse grained sand, subangular to angular, uncemented to weakly cemented, minimal reaction with HCL, nonplastic, light brown to brown
585										
590				A						
595										
600										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
600				A				SM		**SILTY SAND WITH GRAVEL,** continued
605										
610				A						
615										
620				A						
625										note: caving below 625'
630				A						note: increase in coarse grained gravel & trace cobbles from 630' to 640'
635										
640				A						note: added back side mud between 620' to 660'
645										
650										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
650				A				SM		**SILTY SAND WITH GRAVEL,** continued
655										
660				A						note: hole caving without use of water, very dusty in cyclone; observed silty sand with gravels, light brown to brown note: increasing gravels below ~660' to ~675'
665									note: at 665' tried to drill dry per work plan, but had to add water for dust control measures; used mud during over reaming through entire borehole	
670				A						
675										
680				A						
685										
690				A						
▽ 695										
700										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	695.80	11:22	4-7-11
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
700				A				SM		**SILTY SAND WITH GRAVEL,** continued
705										
710				A						
715										
720				A						
725								SP-SM		**POORLY GRADED SAND WITH SILT,** few silt, mostly fine grained sand, subangular to angular, nonplastic, grayish brown to light brown
730				A						
735										
740				A						note: increasing grain sizes below ~745'
745								SM		**SILTY SAND WITH GRAVEL,** little to some fine gravel, subangular to angular, some to mostly fine to coarse grained sand, subangular to angular, nonplastic, grayish-brown
750										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 4-1-11 to 4-30-11

LOCATION

RIG TYPE VERSA Drill SN-1097
BORING TYPE 5 1/2" O.D. Pilot; 11 5/8" O.D. Tricone Bit

DATUM

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
750				A				SM		**SILTY SAND WITH GRAVEL,** continued
755										
760				A						
765								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** few silt, little to some fine grained gravel, subangular to angular, some to mostly fine to coarse grained sand, subangular to angular, nonplastic, grayish brown
770										
775										
780										Total depth = 776'11" Stopped 5 1/2" O.D. pilot hole at 720' Stopped 11 5/8" tricone at 777' note: downhole geophysics conducted by Southwest Exploration on 5-1-11
785										
790										
795										
800										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
695.80	11:22	4-7-11

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-2

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
0	1.0			A				GM	note: adding water for dust control from 0 to 80' in pilot hole; using mud during over reaming	**SILTY GRAVEL WITH SAND,** little to some silt, little to some fine to coarse grained, subangular to angular sand, some to mostly fine to coarse grained, subangular to angular gravel, nonplastic, light brown note: cobbles present note: weakly cemented zones
10				A				GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND,** few silt, little to some fine to coarse grained, subangular to angular sand, some to mostly fine to coarse grained, subangular to angular gravel, nonplastic, brown note: decrease fines below 9'
20	1.0			A				GP		**POORLY GRADED GRAVEL WITH SAND,** little to some coarse grained, subangular sand, some to mostly coarse grained, subangular to subrounded gravel, nonplastic, dark gray note: boulders up to 16" in diameter & cobbles present
30				A						
40	1.2			A					note: switch to stratex to drive down temporary casing to 44'; switch back to downhole hammer at 40'	note: heavy rig chatter during 12 1/4" tricone over reaming from 40' to 42'
50										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
50				A				GP		**POORLY GRADED GRAVEL WITH SAND,** continued
55										note: heavy rig chatter during 12 1/4" tricone over reaming from 55' to 58'
60				A						
	1.0									
65										
70				A						note: increase in fines below 75'
75								GW	moist	**WELL GRADED GRAVEL WITH SAND,** trace silt, little to some fine to coarse grained, subangular to angular sand, some to mostly fine to coarse grained, subangular to angular gravel, nonplastic, brown to grayish-brown
80				A					note: adding hydrogel to water to stabilize borehole from 80' to 640'; in pilot hole; using mud during over reaming	note: cobbles present
	0.8									
85										
90				A						note: decrease in coarse grains below 95'
95								SP-SM		note: actual deviation measured = 0.5° at 95' **POORLY GRADED SAND WITH SILT & GRAVEL,** few silt, little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, brown
100										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
100	0.7			A				SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** continued
105										
110				A						note: decrease in silts & increase in coarse grains below ~115'
115								GP		**POORLY GRADED GRAVEL WITH SAND,** trace silt & cobbles, little to some fine to coarse grained, angular to subangular sand, some to mostly fine grained, subangular to angular gravel, uncemented, nonplastic, grayish-brown
120				A						note: slight rig chatter during 12 1/4" tricone over reaming at 123'
125										
130				A						
135										note: decrease in gravel below ~138'
140				A				SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** few silt, little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, grayish-brown
145										
150										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
681.40	0850	11-17-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
150				A				SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
155										
160				A						
165										
170				A						
175										
180				A						note: decrease in fines & increase in coarse grains below ~185'
185								GP		**POORLY GRADED GRAVEL WITH SAND,** little to some fine to coarse grained, subangular to angular sand, some to mostly fine to coarse grained, subangular to angular gravel, nonplastic, grayish-brown
190				A						note: cobbles present
195										note: actual deviation measured = 1.1° at 195'
200										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
200	0.7			A				GP		**POORLY GRADED GRAVEL WITH SAND,** continued
205										
210				A						
215										
220	0.6			A						
225										
230				A						note: increase in fines below ~230'
235								SM		**SILTY SAND WITH GRAVEL,** little to some fine grained, subangular to angular gravel, little to some silt, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, brown
240	0.6			A						
245										note: slight rig chatter during 12 1/4" tricone over reaming at 248'
250										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
681.40	0850	11-17-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
250				A				SM		**SILTY SAND WITH GRAVEL,** continued note: decrease in fines & increase in coarse grains below 255'
255								GP		**POORLY GRADED GRAVEL WITH SAND,** little to mostly fine to coarse grained, subangular to angular sand, some to mostly fine grained, subangular to angular gravel, nonplastic, brown to grayish-brown note: cobbles present
260	0.6			A				SM		**SILTY SAND WITH GRAVEL,** little to some silt, little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, light brown
265										
270				A						note: decrease in fines below 270'
275								GP	note: lost water/mud circulation at 275' during 12 1/4" over reaming	**POORLY GRADED GRAVEL WITH SAND,** little to some fine to coarse grained, subangular to angular sand, some to mostly fine grained, subangular to angular gravel, nonplastic, gray note: cobbles present
280	0.5			A				SM		**SILTY SAND WITH GRAVEL,** little to some silt, little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, light brown to brown
285										
290				A						
295										note: heavy rig chatter during 12 1/4" tricone over reaming at 300' note: actual deviation measured = 0.2° at 300'
300										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
300	0.6			A				SM		**SILTY SAND WITH GRAVEL,** continued
305										note: heavy rig chatter during 12 1/4" tricone over reaming at 305' note: decrease in fines & increase gravels below 309'
310				A				GP		**POORLY GRADED GRAVEL WITH SAND,** trace silt, little to some fine to coarse grained, subangular to angular sand, some to mostly fine to coarse grained, subangular to angular gravel, nonplastic, light brown to grayish-brown note: cobbles present
315										
320	0.7			A						
325										
330				A						note: reddish-brown fines at 330'
335										
340	0.6			A						
345										note: slight rig chatter during 12 1/4" tricone over reaming at 348'
350										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
681.40	0850	11-17-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
350				A				GP		**POORLY GRADED GRAVEL WITH SAND,** continued note: silty sand lense at 355'
355										
360	0.5			A						note: slight to moderate rig chatter during 12 1/4" tricone over reaming at 360'
365										note: decrease in fines from 365' to 370' note: moderate to heavy rig chatter during 12 1/4" tricone over reaming at 368'
370				A				SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown
375										
380	0.4			A						note: decrease in fines, color change to grayish-brown, increase in gravel below 385'
385								SW		**WELL GRADED SAND WITH GRAVEL,** little to mostly fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, grayish-brown to gray to dark gray
390				A						note: heavy rig chatter during 12 1/4" tricone over reaming at 392'
395										note: slight rig chatter during 12 1/4" tricone over reaming at 398'
400										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
400	0.5			A				SW		**WELL GRADED SAND WITH GRAVEL,** continued note: moderate to heavy rig chatter during 12 1/4" tricone over reaming at 400'
405										
410				A					note: lost water/mud circulation during 12 1/4" over reaming, an estimated 300 gals, at 410'	
415										
420	0.5			A						note: silts below 425', color change back to brownish-gray
425								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** few silt, little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, grayish-brown to light brown
430				A						
435										
440	0.6			A						
445										
450										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
450				A				SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
455										
								SM		**SILTY SAND WITH GRAVEL,** little to some silt, little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, brown
460				A						note: decrease in fines below 465'
465										
								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** few silt, little to some fine grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, grayish-brown
470				A						note: moderate to heavy rig chatter during 12 1/4" tricone over reaming at 473'
475										
480				A						
485										
490				A						note: moderate rig chatter during 12 1/4" tricone over reaming at 490'
495										
500										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10

LOCATION 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo

BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
500				A				SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
505										note: moderate to heavy rig chatter during 12 1/4" tricone over reaming at 508'
510				A						
515										
520				A						
525									note: lost water/mud circulation during 12 1/4" over reaming at 525'	
530				A						
535										
540				A						
545										
550										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
681.40	0850	11-17-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10

LOCATION 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo

BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
550				A				SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
555										
560				A						
565										note: slight rig chatter during 12 1/4" tricone over reaming at 565'
								GP		**POORLY GRADED GRAVEL WITH SAND,** trace silt, little to some fine to coarse grained, subangular to angular sand, some to mostly fine to coarse grained, subangular to angular gravel, nonplastic, grayish-brown
570				A						
575										
580				A						
585										
590				A						
595										note: increase in fines below 595'
								SM		**SILTY SAND WITH GRAVEL,** little to some silt, little to some fine to coarse grained, subangular to angular gravel, some to mostly fine to coarse grained, subangular to angular sand, nonplastic, brown
600										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
681.40	0850	11-17-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
600				A				SM		**SILTY SAND WITH GRAVEL,** continued
605									note: lost water/mud circulation during 12 1/4" over reaming, an estimated 600 to 700 gals, at 600'	
610				A						
615										
620	0.5			A						note: decrease in fines below 625'
625								GP		**POORLY GRADED GRAVEL WITH SAND,** trace silt, little to some fine to coarse grained, subangular to angular sand, some to mostly fine to coarse grained, subangular to angular gravel, nonplastic, gray to dark gray
630				A						note: cobbles present
635										
640	0.7			A					note: not adding hydrogel for clean water sample from 640' to 700' in pilot hole; using mud during over reaming	
645										
650										note: slight to moderate rig chatter during 12 1/4" tricone over reaming at 648'

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10

LOCATION 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo

BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
650				A				GP		**POORLY GRADED GRAVEL WITH SAND,** continued
655										
660	0.7			A						
665										
670				A						
675										
680 ▽	0.5			A						note: collected groundwater sample: TB-04-700-111710 at 10:20 on 11-17-10
685										
690				A						
695										
700										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10 **LOCATION** 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo
BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
700				A				GP	note: using mud during over reaming from 700' to 767'	**POORLY GRADED GRAVEL WITH SAND,** continued
705								SM		**SILTY SAND,** little silt, little fine grained sand, mostly medium to coarse grained, angular to subangular sand, brown to black note: possibly few clay with low to medium plasticity
710				A						
715	12.8									note: increase in coarse grained sand below 715'
720	6.6			A						
725	7.8									note: increase in medium grained sand & increase in silt below 725'
730	7.8			A						
735	5.0									
740	6.8			A						
745	5.0 5.8									
750										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
681.40	0850	11-17-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 11-10-10 to 12-10-10

LOCATION 50' from stake, SWC of landfill

RIG TYPE T-3 Atlas CopCo

BORING TYPE 5 1/2" O.D. Pilot; 12 1/4" O.D. Tricone Bit

DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
750	4.3			A				SM		**SILTY SAND,** continued
755								SM		**SILTY SAND,** little silt, little to some medium to coarse grained sand, some to mostly fine grained sand, brown to black note: possible few clay with low to medium plasticity
760	5.8									
765	6.5									Total Depth = 767' Stopped 5 1/2" percussion hammer at 700' Stopped 12 1/4" tricone at 767' note: downhole geophysics conducted by Southwest Exploration on 12-10-10
770										
775										
780										
785										
790										
795										
800										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	681.40	0850	11-17-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-4

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
0								SM	note: adding water for dust control from 0 to 180' in pilot hole; using mud during over reaming	**SILTY SAND,** few subangular to subrounded cobbles & boulders up to 36" in diameter, few fine to coarse grained gravel, some silt, mostly medium to coarse grained sand, uncemented to weakly cemented, nonplastic, light brown to brown
5										
10										
15										
20									note: difficulty drilling during conductor casing installation using 17 1/4" drill bit from 0 to 20'	
25										
30										
35										
								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** few silt, little to some fine to coarse grained, subangular to subrounded gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown to dark brown
40										
45										note: becoming poorly graded below 45'
50										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
▼			
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SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
50								SP-SM	note: lost circulation during over reaming with 9 7/8" tricone bit at 55'	**POORLY GRADED SAND WITH SILT & GRAVEL,** continued
55										
60										
65								GW-GM		**WELL GRADED GRAVEL WITH SILT & SAND,** trace cobbles & boulders, few silt, few to little medium to coarse grained, subangular to subrounded sand, mostly fine to coarse grained, subangular to subrounded gravel, nonplastic, brown note: actual deviation measured = 0.5° at 70'
70										
75										
80										
85										
90										
95										
100										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
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SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
100								GW-GM		**WELL GRADED GRAVEL WITH SILT & SAND,** continued
105										note: actual deviation measured = 0.4° at 108'
110										
115										
120										
125								ML		**SANDY SILT WITH GRAVEL,** little fine to coarse grained, subangular to subrounded gravel, some fine to coarse grained, subangular to subrounded sand, weakly cemented, nonplastic, brown to light brown
130								GW-GM		**WELL GRADED GRAVEL WITH SILT & SAND,** trace cobbles, few silt, few to little medium to coarse grained, subangular to subrounded sand, mostly fine to coarse grained, subangular to subrounded gravel, nonplastic, brown to grayish-brown
135										
140										
145										
150										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
686.15	10:38	9-24-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
150								GW-GM		**WELL GRADED GRAVEL WITH SILT & SAND,** continued
155										
160										
165										
										note: actual deviation measured = 0.5° at 168'
170										
175										
180										note: increase in fines below 180'
185								SM		**SILTY SAND WITH GRAVEL,** trace cobbles, llittle fine to coarse grained, subangular to subrounded gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown
190									note: adding hydrogel to water to stabilize borehole from 180' to 320' in pilot hole; using mud during over reaming	
195										
200										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
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SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
200								SM		**SILTY SAND WITH GRAVEL,** continued
205										
210										
215										
										note: hard drilling from 218' to 225'
220										note: possible cobbles & boulders present, heavy rig chatter during over reaming with 9 7/8" tricone bit at 218'
225										note: possible cobbles & boulders present, heavy rig chatter during over reaming with 9 7/8" tricone bit at 225'
230										note: actual deviation measured = 0.6° at 230'
235										note: increase in coarse grained material below 235'
								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** trace cobbles, few silt, little to some fine grained, subangular to subrounded gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown
240										note: actual deviation measured = 0.7° at 240'
245										
										note: actual deviation measured = 0.5° at 248'
250										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
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SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
250								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
255										
260										note: possible cobbles & boulders present, heavy rig chatter during over reaming with 9 7/8" tricone bit at 259'
265										
270										
275										
280										
285										
290										note: increase in silts below 290'
								SM		**SILTY SAND WITH GRAVEL,** little to some fine grained, subangular to subrounded gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown
295										note: possible cobbles & boulders present, heavy rig chatter during over reaming with 9 7/8" tricone bit from 299' to 300'
300										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
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SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
300								SM		**SILTY SAND WITH GRAVEL,** continued
305										note: actual deviation measured = 0.6° at 308'
310										
315										
320										
325								GM	note: stopped adding water & hydrogel from 320' to 360' in pilot hole; using mud during over reaming	**SILTY GRAVEL WITH SAND,** trace cobbles, little silt, little to some fine to coarse grained, subangular to subrounded sand, some fine to coarse grained, subangular to subrounded gravel, nonplastic, brown to grayish-brown note: increase in gravel from 325' to 335'
330										
335										
340								SM		**SILTY SAND WITH GRAVEL,** little to some fine grained, subangular to subrounded gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, light brown to grayish-brown note: increase in silt at 340'
345										
350										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
686.15	10:38	9-24-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
350								SM		**SILTY SAND WITH GRAVEL,** continued
355										
360									note: adding hydrogel to water to stabilize borehole from 360' to 640' in piolt hole; using mud during over reaming	
365										
370										note: actual deviation measured = 0.7° at 368'
375										note: possible cobbles & boulders present, heavy rig chatter during over reaming with 9 7/8" tricone bit at 375'
380										
385										
390										
395										
400										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
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SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
400								SM		**SILTY SAND WITH GRAVEL,** continued
405										
410										
415										
420										
425								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** trace cobbles, few silt, some fine to coarse grained, angular to subangular gravel, mostly fine to coarse grained, angular to subangular sand, nonplastic, brown to grayish-brown note: black to grayish-brown, gravel and/or cobbles below 425' note: actual deviation measured = 1.1° at 428' note: actual deviation measured = 0.9° at 430'
430										
435										
440										
445										
450										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
686.15	10:38	9-24-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
450								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
455										
460									note: switched to 5 1/2" tricone bit during original pilot hole drilling at 460'	
465										
470										note: actual deviation measured = 0.9° at 468' note: increase in silt below 470'
475								SM		**SILTY SAND WITH GRAVEL,** trace cobbles, little to some fine grained, subangular to angular gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown
480										
485										
490										
495								GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND**
500										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
686.15	10:38	9-24-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
500								GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND,** trace cobble, few silt, little to some fine to coarse, subangular to subrounded sand, mostly fine grained, subangular to angular gravel, nonplastic, grayish-brown
505										note: possible boulders
510										
515										note: yellowish-brown to rusty brown & increase in silt below 515'
520								SM		**SILTY SAND WITH GRAVEL,** trace cobbles, little fine grained, subangular to angular gravel, little coarse grained, subangular to subrounded sand, mostly fine to medium grained sand, nonplastic, yellowish-brown
525										
530										note: brown below 530' note: actual deviation measured = 1.3° at 530'
535										note: decrease in silt below 535'
540								GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND,** few silt, little to some fine to coarse grained, subangular to subrounded sand, mostly fine grained, subangular to angular gravel, nonplastic, brown
545										
550										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
686.15	10:38	9-24-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
550								GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND,** continued note: increase in silt below 555'
555										
560								SM		**SILTY SAND WITH GRAVEL,** trace cobbles, little to some fine grained, subangular to angular gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown
565										
570										
575										
580										
585										note: decrease in coarse grained sand below 585'
590										note: lense of mostly fine grained sand with silt at approximately at 590'
595										
600										

GROUNDWATER

DEPTH(ft)	HOUR	DATE
686.15	10:38	9-24-10

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
600								SM		**SILTY SAND WITH GRAVEL,** continued
605										
610										
615										
620										
625								GP-GM		**POORLY GRADED GRAVEL WITH SILT & SAND,** trace cobbles, few silt, little to some fine to coarse grained, subangular to subrounded sand, mostly fine grained, subangular to angular gravel, nonplastic, brown to grayish-brown note: actual deviation measured = 2.7° at 630'
630										
635										
640									note: adding hydrogel in pilot hole from 640' to 700' for clean water sample; using mud during over reaming	
645	1.75									note: increase in silt below 645'
								SM		**SILTY SAND WITH GRAVEL**
650										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
650								SM		**SILTY SAND WITH GRAVEL,** trace cobbles, little to some fine to coarse grained, subangular to angular gravel, mostly fine to coarse grained, subangular to subrounded sand, nonplastic, brown
	1.75									
655										
660									note: drilling dry from 660' to 675' in pilot hole; using mud during over reaming	
665	1.5									
670										note: yellowish-brown color from 660' to 670'
									note: drill started rattling; adding water from 675' to 700' in pilot hole; using mud during over reaming	note: actual deviation measured = 2.8° at 670'
675	1.5									note: increase in silt from 675' to 685'
680										
685 ▽	1.8									note: collected groundwater sample TB5-700-092410 at 12:40 on 9-24-10
690										
695										note: possible cobbles & boulders present below 695', color change to grayish-brown, decrease in fines
	1.8									
700										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
▼			
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▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
700	12.8			A				SP	note: using mud during over reaming from 700' to 768'	**POORLY GRADED SAND WITH GRAVEL,** some to mostly coarse grained, subangular to angular gravel, mostly medium to coarse grained, subangular sand, nonplastic, dark gray to gray
705	7.7									
	1.1									
710	8.4			A						
715	9.4									note: zones of cobbles, small boulders up to 1' to 2' thick
720	9.2			A						note: few fine grained sand at 720'
										note: cobbles at 723'
725	9.0									
	13.0									
730				A						
735	7.2									
740	7.0			A						note: slight increase in fine grained sand from 740' to 750'
745	6.7									
750										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2010-2022 **DATE** 9-21-10 to 10-22-10

LOCATION South of Landfill

RIG TYPE T-3 Atlas CopCo Reverse Air Rotary
BORING TYPE 5 1/2" O.D. Pilot; 9 7/8" O.D. Tricone Bit; 12 1/4" O.D. Tricone Bit
DATUM Ground Surface

Depth in Feet	Drill Rate Min/ft.	Graphical Log	Sample	Sample Type	Sample Identification			Unified Soil Classification or Rock Unit	REMARKS	VISUAL CLASSIFICATION
750				A				SP		**POORLY GRADED SAND WITH GRAVEL,** few fine grained sand, some medium to coarse grained, subangular sand & mostly coarse grained, subangular to angular gravel, nonplastic, dark gray to gray
755	7.4									
760	5.8			A						note: few to little fine grained sand from 760' to 768'
765	6.0									
770										Total depth = 768' Stopped 5 1/2" percussion hammer at 460' Drilled 5 1/2" tricone from 460' to 700' Stopped 9 7/8" tricone at 480' Stopped 12 1/4" tricone at 768' note: downhole geophysics conducted by Southwest Exploration on 10-23-10
775										
780										
785										
790										
795										
800										

GROUNDWATER

	DEPTH(ft)	HOUR	DATE
▽	686.15	10:38	9-24-10
▼			
▼			
▼			

SAMPLE TYPE
Continuous Soil Core Examined
Samples Consist of 2 - 8oz Glass Jars
1 - 40ml Amber VOA - Methonal Extraction

LOG OF TEST BORING NO. TB-5

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill

RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
0								SM	note: using mud starting at surface	Disturbed at surface; **SILTY SAND WITH GRAVEL,** predominantly fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular to subrounded gravel, occasional cobbles, uncemented, nonplastic, light brown to brown
						0.1	CH4=0%		note: chattering below 2'	
							CO2=0%			
							O2=20.8%			
5							Bal=79.2%			
									note: air monitoring equipment PID & Landtec	
				A	100%	0.0	CH4=0%			
10							CO2=0%			note: cobbles below 5'; >6" in diameter, possible boulders ~2' in diameter below 10'
							O2=20.8%			
							Bal=79.2%			
					100%	0.0	CH4=0%		note: mud rotary switched out with hammer bit at 15' very hard to drill	
15							CO2=0%			
							O2=20.8%			
							Bal=79.2%			
				A		0.0	CH4=0%		note: conductor casing set to 19'	
							CO2=0%			
20	8.4						O2=20.7%			
							Bal=79.3%			
25								GM		**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular to subrounded gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles & boulders, uncemented, nonplastic, grayish-brown
				A	100%	0.0	CH4=0%			
30	16.2						CO2=0%			
							O2=20.8%			
							Bal=79.2%			
35									note: chattering at 35'	
				A	100%	0.0	CH4=0%			
40	9.5						CO2=0%			
							O2=20.2%			
							Bal=79.8%			
45										
				A	100%	0.0	CH4=0%			
50										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
50	7.0						CO2=0% O2=21% Bal=79%	GM		**SILTY GRAVEL WITH SAND,** continued
55								SM	note: deviation measurement 0.25° at 60' note: added third collar for added weight at 60'	**SILTY SAND WITH GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular to subrounded gravel, uncemented, nonplastic, grayish-brown
60	6.2			A	100%	0.0	CH4=0% CO2=0% O2=20.5% Bal=79.5%			
65										
70				A	100%			GM		**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular to subrounded gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles & rare boulders, uncemented, nonplastic, grayish-brown to brown
75										
80	5.0			A	100%			SM	note: lots of chatter at 80'	**SILTY SAND WITH GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular to subrounded gravel, rare cobbles, uncemented, nonplastic, grayish-brown
85										
90				A	100%					
95								GM		**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular to subrounded gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles, rare boulders, uncemented, nonplastic, grayish-brown
100				A	100%					

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
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SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
100	4.0							GM		**SILTY GRAVEL WITH SAND,** continued
105										
110				A	100%					
115									note: deviation measurement 0.5° at 120'	
120	3.6			A	100%	0.1	CH4=0.1% CO2=0% O2=21% Bal=78.9%			
								SM		**SILTY SAND WITH GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular to subrounded gravel, uncemented, nonplastic, grayish-brown
125										
130				A	100%	0.0	CH4=0.2% CO2=0% O2=20.8% Bal=79%			
135										
140	3.7			A	100%	0.0	CH4=0% CO2=0% O2=21.2% Bal=78.8%			
								GM	note: chattering at 143'	**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular to subrounded gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles to rare boulders, uncemented, nonplastic, grayish-brown
145										
150				A	100%	0.0	CH4=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
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SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
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C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
150	3.7						CO2=0%	GM		**SILTY GRAVEL WITH SAND,** continued
							O2=21.1%			
							Bal=78.9%			
155										
				A	100%	0.0	CH4=0.1%			
160	2.3						CO2=0%			
							O2=21.1%			
							Bal=78.8%			
								SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** predominantly fine grained, subangular to subrounded sand, fine to coarse grained, subangular to subrounded gravel, rare cobbles, uncemented, nonplastic, grayish-brown
165										
				A	100%					
170										
175										
				A	100%	0.0	CH4=0%			
180	2.4						CO2=0%			
							O2=20.2%			
							Bal=79.8%			
185										
				A	100%					
190										
195									note: chattering at 195'	
				A	100%					
200										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
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SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
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C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
200	3.0							SP-SM	note: deviation measurement 0° at 200'	**POORLY GRADED SAND WITH SILT & GRAVEL,** continued
205										
210				A	100%					
215						0.0	CH4=0% CO2=0% O2=20.4%			
							Bal=79.6%	SW-SM	note: chattering at 218'	**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular to subrounded gravel, occasional cobbles, uncemented, nonplastic, grayish-brown
220	4.9			A	100%					
225									note: chattering at 225'	
230				A	100%	0.1	CH4=0% CO2=0% O2=20.8% Bal=79.2%			
235								SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** predominantly fine to coarse grained, subangular to subrounded sand, fine grained, subangular to subrounded gravel, rare cobbles, uncemented, nonplastic, grayish-brown
240	2.9			A	100%	0.0	CH4=0% CO2=0% O2=21.4% Bal=78.6%			
245								SP-SM		**POORLY GRADED SAND WITH SILT,** predominantly fine grained, subangular to subrounded sand, uncemented, nonplastic, grayish-brown
250				A	100%	0.0	CH4=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
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SAMPLE TYPE
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C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
250	2.9						CO2=0% O2=21.3% Bal=78.7%	SP-SM		**POORLY GRADED SAND WITH SILT,** continued
255								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular gravel, occasional cobbles, uncemented, nonplastic, grayish-brown
				A	100%	0.0	CH4=0% CO2=0% O2=21.2% Bal=78.8%			
260	3.7									
265										
				A	100%	0.0	CH4=0% CO2=0% O2=20.9% Bal=79.1%			
270										
275									note: chattering at 275'	
								SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** predominantly fine grained, subangular to subrounded sand, fine to coarse grained, subangular gravel, occasional to rare cobbles, uncemented, nonplastic, grayish-brown
				A	100%	0.0	CH4=0.3% CO2=0% O2=20.7% Bal=79.0%			
280	3.4									
285								SW-SM	note: chattering at 285'	**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular gravel, occasional cobbles, uncemented, nonplastic, grayish-brown
				A	100%	0.0	CH4=0% CO2=0% O2=20.8% Bal=79.2%		note: mud viscosity = 40 sec	
290										
295										
				A	100%	0.0	CH4=0%			
300										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
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SAMPLE TYPE
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D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill

RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
300	2.7						CO2=0%	SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
							O2=20.9%			
							Bal=79.1%			
305									note: chattering at 305'	
310	7.7			A		0.0	CH4=0%			
							CO2=0%			
							O2=20.5%			
							Bal=79.5%			
315										
320	5.2			A	100%	0.0	CH4=0%		note: mud density = 9.5 lbs/gal mud viscosity = 35 sec	
							CO2=0%			
							O2=20.4%			
							Bal=79.6%		change out mud on 12-8-11	
325								GM		**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles, uncemented, nonplastic, grayish-brown
330				A	100%	0.0	CH4=0%		note: mud density = 9.1 lbs/gal mud viscosity = 35 sec	
							CO2=0%			
							O2=21.1%			
							Bal=78.9%			
335										
340	6.8			A	100%	0.0	CH4=0%			
							CO2=0%			
							O2=21.4%			
							Bal=78.6%			
345										note: increasing gravel below 345'
350				A	100%	0.1	CH4=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
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SAMPLE TYPE
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LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
350	6.8						CO2=0%	GM		**SILTY GRAVEL WITH SAND,** continued
							O2=21%		note: chatter at 352', slower drilling below 350', possible cobbles	
							Bal=79%			
355										
								SP-SM		**POORLY GRADED SAND WITH SILT & GRAVEL,** predominantly fine grained, subangular to subrounded sand, fine grained, subangular gravel, rare cobbles, uncemented, nonplastic, grayish-brown
360	4.5			A	95%	0.0	CH4=0.1%		note: deviation measurements = 1° to 1.25° note: chatter at 362'	
							CO2=0.1%			
							O2=20.2%			
365							Bal=79.6%			
								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine grained, subangular gravel, occasional cobbles, uncemented, nonplastic, grayish-brown
370				A	95%					
375										
				A	95%					
380	3.4								note: chattering at 380'	
385								GM		**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles, uncemented, nonplastic, grayish-brown
				A	95%					
390										
395										
400				A	95%	0.0	CO=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
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SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
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LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
400	4.3						LEL=0%	GM	note: using PID & 4-gas meter at 400', devation = 1°	**SILTY GRAVEL WITH SAND,** continued
							O2=20.9%			
405									note: chatter at 405'	
410				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
415									note: chatter at 417'	
								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine grained, subangular gravel, rare cobbles, uncemented, nonplastic, grayish-brown
420	3.7			A	95%	0.0	CO=0%		note: chattering at 420'	
							LEL=0%			
							O2=20.9%			
425										
430				A	95%					
435								GM		**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles, uncemented, nonplastic, grayish-brown
440	4.5			A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
445										
								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL**
450				A	95%	0.0	CO=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
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SAMPLE TYPE
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LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
450	4.5						LEL=0% O2=20.9%	SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular gravel, uncemented, nonplastic, grayish-brown
455									note: chatter at 455'	
								SP-SM		**POORLY GRADED SAND WITH SILT,** predominantly fine grained, subangular to subrounded sand, rare gravel, uncemented, nonplastic, brown to grayish-brown
460	15.8			A	95%	0.0	CO=0% LEL=0% O2=20.9%		note: deviation at 1.25°, mud density = 9.2 lbs/gal mud viscosity = 32 sec	
465										
								GM	note: chatter at 465'	**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles, uncemented, nonplastic, grayish-brown
470				A	95%	0.0	CO=0% LEL=0% O2=20.6%			
475									note: chatter at 475'	
480	6.7			A	95%	0.0	CO=0% LEL=0% O2=20.9%		note: mud viscosity = 36 sec, mud density = 9.3 lbs/gal note: thinning mud on 12-14-11	
485								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine grained, subangular gravel, uncemented, nonplastic, grayish-brown
490				A	95%	0.0	CO=0% LEL=0% O2=20.9%			
								GM	note: mud viscosity = 38 sec note: changed mud on 12-15-11, mud density = 9.1 lbs/gal mud viscosity = 35 sec	**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular gravel, fine to coarse grained, subangular to subrounded sand, occasional cobbles, uncemented, nonplastic, grayish-brown
495	20.8									
500				A	95%	0.0	CO=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
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LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
500	12.1						LEL=0% O2=20.9%	GM	note: deviation at 0.5° to 0.75°, chatter at 500', viscosity = 38 sec density = 9.15 lbs/gal	**SILTY GRAVEL WITH SAND,** continued
505										
510				A	95%	0.1	CO=0% LEL=0% O2=20.6%	SW-SM		**WELL GRADED SAND WITH SILT,** fine to coarse grained, subangular to subrounded sand, rare to trace fine grained, subangular gravel, uncemented, nonplastic, grayish-brown
515									note: mud viscosity = 38 sec	
520	12.0			A	95%	0.1	CO=0% LEL=0% O2=20.9%		note: chatter at 520'	
525								SM		**SILTY SAND WITH GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine grained, subangular gravel, rare cobbles, uncemented, nonplastic, grayish-brown to brown
530	3.0			A	95%	0.0	CO=0% LEL=0% O2=20.9%		note: changing out mud on 12-17-11	
535										
540	7.7			A	95%	0.0	CO=0% LEL=0% O2=20.9%		note: mud viscosity = 43 sec mud density = 9.1 lbs/gal note: chatter at 543'	
545								SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** fine to coarse grained, subangular to subrounded sand, fine to coarse grained, subangular gravel, rare cobbles, uncemented, nonplastic, grayish-brown
550				A	95%	0.0	CO=0%			

GROUNDWATER

DEPTH (ft)	HOUR	DATE
715.8	1450	1-11-12

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C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
550							LEL=0%	SW-SM		**WELL GRADED SAND WITH SILT & GRAVEL,** continued
							O2=20.9%			
555										
									note: mud viscosity = 46 sec mud density = 9.2 lbs/gal	
560				A	95%	0.0	CO=0%			
	6.6						LEL=0%			
							O2=20.9%			
565										
570				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
575										
	9.0									
580				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
585								GM		**SILTY GRAVEL WITH SAND,** fine to coarse grained, subangular gravel, fine to coarse grained, subangular to subrounded sand, rare to trace cobbles, uncemented, nonplastic, grayish-brown
590				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
595									note: driller indicated drilling very hard below 595'	note: possible boulders of strongly cemented zone below 595'
									deviation = 0.5°	
600				A	95%	0.0	CO=0%			

GROUNDWATER

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▽	715.8	1450	1-11-12
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LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
600	16.0						LEL=0%	GM	note: mud viscosity = 33 sec mud density = 9.15 lbs/gal	**SILTY GRAVEL WITH SAND,** continued
							O2=20.9%			
605									note: swivel not rotating continuously turns & stops very slow penetration below 595'	
610				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
615										
620				A	95%	0.0	CO=0%			
	21.5						LEL=0%		note: mud viscosity = 30 sec mud density = 9.3 lbs/gal	
							O2=20.9%			
625										
630				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
635	13.4								note: changed out drill bit, same size 14-3/4" tricone	
640				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
645										
650				A	95%	0.0	CO=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
650	11.4						LEL=0%	GM		**SILTY GRAVEL WITH SAND,** continued
							O2=20.9%			
655									note: chatter below 655'	
660	4.1			A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
665									note: drill rod bouncing from 665' to 668'	
670				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
675	15.0									
680	15.2			A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%		note: chatter & bouncing below 680'	
685								SM		**SILTY SAND WITH GRAVEL,** fine to medium grained, subangular to subrounded sand, fine grained, subangular gravel, rare cobbles, uncemented, nonplastic, grayish-brown
690				A	95%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
695										
700				A	95%	0.0	CO=0%			

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
700	7.6						LEL=0%	SM		**SILTY SAND WITH GRAVEL,** continued
							O2=20.9%			
705										
710	10.6			A	90%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
715 ▽									note: tagged water level at 715.84' & 718.34' BTOC with sounder on 1/11/12	
720	10.0			A	90%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
725										
730	25.8			A	90%	0.0	CO=0%			
							LEL=0%		note: mud viscosity = 36 sec density = 9.4 lbs/gal	
							O2=20.9%			
735									note: chatter below 735', slow penetration rate, mud viscosity = 34 sec, mud density = 9.4 lbs/gal	
740				A	90%	0.0	CO=0%			
							LEL=0%			
							O2=20.9%			
745										
750				A	90%					

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill
Groundwater Investigation

JOB NO. 14-2011-2023 **DATE** 12-1-11 thru 1-5-12

LOCATION South of Old Landfill
RIG TYPE Versa Drill
BORING TYPE Mud Rotary - 15" Dia. Tricone
SURFACE ELEV.
DATUM Ground Surface

Depth in Feet	Drill Rate Min/Ft.	Graphical Log	Sample	Sample Type	Drilling Fluid Recovery	PID Meter Reading (ppm)	Landfill Gases	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
750	7.0				90%			SM		**SILTY SAND WITH GRAVEL,** continued
755										
760	12.0			A	90%	0.0	CO=0% LEL=0% O2=20.9%			
765				A	90%					
770										Yellow Jacket Drilling completed drilling to 766' on 1-5-2012 Geophysical logging performed on 1-6-2012 by Southwest Exploration; added sonic logging to determine water level ~715' note: TB-8 was converted to groundwater well MW-8 on 1-9-2012
775										
780										
785										
790										
795										
800										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽	715.8	1450	1-11-12
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TB-8

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
0	5.0							GW	Washed cuttings Water added to borehole to control dust	**COARSE GRAVEL,** considerable fine grained, angular gravel, trace sand, little to no fines, predominantly well graded, angular gravel, gray to brown to beige, moist
10	7.5				0.0	0.0	0.0/0.0	GW		**COARSE GRAVEL,** considerable fine grained, angular gravel, some sand, trace fines, predominantly well graded, angular gravel, gray to brown to beige, moist
20	5.0				0.0	0.0	0.0/0.0	GM		**FINE GRAVEL,** some coarse grained, angular gravel, some sand, trace fines, poorly graded, fine grained, angular gravel, gray to brown to beige, wet
25	5.0									
30	6.0				0.3	0.0	0.0/0.0	GW	Fines likely washed away, sample collected in sieve & rinsed before putting on plastic	**FINE GRAVEL,** some coarse grained, angular gravel, some coarse grained sand, trace fines, predominantly well graded, fine grained, angular gravel, gray to brown to green to reddish-orange, moist
40	5.0				0.5	0.0	0.0/0.0	GW/GP		**COARSE TO FINE GRAVEL,** considerale fine grained, angular gravel, some sand (coarse), trace fines, 50/50 rough split of angular, coarse & fine grained gravel, occasional coarse grained gravel up to 1'6" in diameter, gray to brown to blue
45										
50										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
50					0.0	0.0	0.0/0.0	GP	Fines likely washed away	**FINE GRAVEL,** considerable coarse grained, angular gravel, some coarse grained sand, gray to brown to muli-colored, moist
70					0.0	0.1	0.0/0.0	GP		**FINE GRAVEL,** considerable coarse grained, angular gravel, trace coarse grained sand, gray to brown to beige
80					0.0	0.1	0.0/0.0	GW	Fines washed away	**FINE GRAVEL,** considerable coarse grained gravel, trace sand, gray to brown to blue, moist
90					0.0	0.1	0.0/0.0	GW		**COARSE GRAVEL,** considerable fine grained, angular gravel, trace sand, subrounded, trace fines, occasional gravel up to 1'6" in diameter, angular, gray to brown to blue, moist
100										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
100					0.0	0.0	0.0/0.0	GW		**FINE GRAVEL,** some coarse grained, angular gravel, some coarse grained, angular to subrounded sand, trace fines, poorly graded, fine grained gravel, predominantly up to 6" to 1mm in diameter, gray to brown to blue, moist
110					0.0	0.0	0.0/0.0	GW		**WELL GRADED SAND WITH GRAVEL,** occasional coarse grained gravel, some fine grained gravel, trace fines, predominantly coarse grained sand, angular to subangular, pink to gray to brown to white, moist
120					0.0	0.0	0.0/0.0	SW		**WELL GRADED SAND WITH GRAVEL,** occasional coarse grained gravel, some fine grained gravel, trace fines, predominantly coarse grained, angular to subangular sand, pink to gray to brown to white, moist
130								SW	Sample washed by driller, no readings collected	**GRAVELLY SAND,** dark brown to dark gray, 30% gravel, subangular to subrounded, up to 2cm, granitic sand, well graded, coarse to fine, subangular to subrounded, granitic, fines washed out by driller, wet from driller washing sample
140					0.5	0.0	0.0/20.4	SW		AA at 140' driller stopped washing sample, 5% silt to clay size in sample
150										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
150					0.0	0.0	0.0/20.4	SW		AA at 150'
155										
160					0.0	0.0	0.0/20.3	SW		AA at 160' with 5% fine silt (unwashed sample)
165										
170					0.0	0.0	0.0/20.3	SW		AA at 170' decreasing large (to 2cm) gravel (5%), gravel (30%), 0.5cm granitic
175										
180					0.0	0.0	0.0/20.4	SW		**GRAVELLY SAND,** grayish-black, gravel 30% to 0.5cm with occasional (>5%) to 1cm, granitic, subangular to subrounded, well graded sand, very coarse to fine, subangular to subrounded, granitic, no stain, no odor, 5% silt to clay
185	1.0									
190					4.0	0.0	0.1/20.8			AA at 190' **GRAVELLY SAND,** continued
195					6.0			SP/GP		**SAND WITH GRAVEL,** occasional small cobbles, predominantly coarse grained gravel & medium to coarse grained, subangular to subrounded sand, nonplastic, grayish-brown, slight odor
200										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
200					6.0	0.0	0.1/20.9	SP/GP		**SAND WITH GRAVEL,** continued
205										
210								GP		**GRAVEL & COBBLES WITH SAND,** predominantly coarse grained, subrounded gravel & coarse grained, subangular to subrounded sand, nonplastic, gray to dark gray
215										
220	1.4				0.0	0.0	0.1/20.8	SP/GP		**SAND & GRAVEL**, occasional cobble, predominantly medium to coarse grained, subangular sand & coarse grained, subrounded gravel with calcium carbonate coatings on some gravel, nonplastic, grayish-brown
225										
230	1.3				9.6	0.0	0.1/20.4	SP	Adding some water while drilling away, sample	**SAND WITH GRAVEL,** rare small cobble, predominantly medium to coarse grained, subangular sand & coarse grained, subrounded gravel, some calcium carbonate coating on gravel, nonplastic, grayish-brown
235										
240	2.0				6.3	0.0	0.1/20.6	GP		**SAND WITH GRAVEL,** continued, some cobbles, slight odor
245										
250										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
250					4.7	0.0	0.1/21.1	SP		**SAND WITH GRAVEL,** continued, some cobbles, slight odor
255										
260					0.9	0.0	0.1/20.4			
265										
270					3.6	0.0	0.1/20.5	GP		**SAND, GRAVEL & COBBLES,** increasing in cobbles below 270', predominantly coarse grained, subrounded gravel & medium to coarse grained, subangular to subrounded sand, cemented in zones, nonplastic, gray
275										
280					3.9	0.0	0.1/20.4			
285										
290					2.9	0.0	0.1/20.3			
295										
300										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
300					4.4	0.0	0.1/20.7	GP		**SAND, GRAVEL & COBBLES,** continued, rare small boulder, cemented in zones
305										
310					2.5	0.0	0.1/20.6			note: considerable cobbles below 310'
315										
320					3.5	0.0	0.1/20.6			
325										
330										note: moderately to strongly lime cemented, some to considerable cobbles below 330'
335										
340					3.7	0.0	0.1/20.6			note: 8" stradex refusal at 345', pulled casing back to 340', advancing 7" air hammer in open hole
345										
350										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
350					0.0	0.1	0.1/20.8	GP		**SAND, GRAVEL & COBBLES,** continued, predominantly coarse grained, subrounded gravel & coarse grained, subangular to subrounded sand, nonplastic, gray to black note: considerable lime cementation in zones, some cobbles, predominantly coarse grained sand & gravel
355										
360					0.5	0.1	0.1/20.8	SP		**SAND WITH GRAVE,** predominantly medium to coarse grained, subangular to subrounded sand & fine grained, subrounded gravel, lime cemented in zones, nonplastic, gray to black note: increase in sand at 360'
365										
370					0.8	0.0	0.1/20.7			
375										
380					0.7	0.0	0.1/20.7	SP/GP		**SAND & GRAVEL,** predominantly coarse grained, subrounded gravel & medium to coarse grained, subangular sand, nonplastic, dark gray to black note: lime cemented in zones
385										
390					0.7	0.0	0.1/20.7			
395										
400										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
400					1.0	0.1	0.2/20.7	SP		**SAND WITH GRAVEL,** predominantly coarse grained, subangular sand with well graded gravel, nonplastic, dark gray with some pinkish-brown
405										
410					1.1	0.0	0.1/20.7			
415										
420					2.2	0.0	0.1/20.8	SP to SP/GP		
425										
430					1.6	0.0	0.1/20.7	SP/GP		**SAND & GRAVEL,** well graded, subrounded gravel & predominantly medium to coarse grained, subangular sand, nonplastic, dark gray to pinkish-brown
435										
440					2.5	0.0	0.1/20.7			
445										
450										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
450					1.6	0.0	0.1/20.9	SP/GP		**SAND & GRAVEL,** continued note: increase in coarse grained gravel from 450' to 460'
455										
460					3.1	0.0	0.1/21.0			note: slight odor at 460' & 470'
465										
470					3.5	0.0	0.1/20.8			
475										
480					2.4	0.0	0.1/20.8	SP/GP		**SAND & GRAVEL,** well graded, subrounded to subangular gravel with some calcium carbonate coated particles, predominantly medium to coarse grained, subangular to angular sand, nonplastic, dark gray with some pinkish-brown
485										
490					1.4	0.0	0.1/20.8			
495										
500										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
500					2.3	0.0	0.1/21.0	GW		**GRAVEL WITH SAND,** well graded, subangular to subrounded gravel & predominantly medium to coarse grained, subangular to angular sand, nonplastic, gray to some pinkish-brown
505										
510					3.9	0.0	0.1/21.0	GW to SP/GW		note: increase in sand content, grading to sand & gravel below 510'
515										
520					3.6	0.0	0.1/20.9			
525										
530					7.5	0.0	0.1/20.8	SP/GP		**SAND & GRAVEL,** rare small cobble, predominantly coarse grained, subangular to subrounded sand & gravel, nonplastic, dark gray with some pinkish-brown
535										
540					12.0	0.0	0.1/20.9	GP		**GRAVEL WITH SAND,** predominantly coarse grained, subrounded gravel, some with calcium carbonate coating, predominantly medium to coarse grained, subangular to angular sand note: some to considerable reddish-brown to orangish-brown iron-oxide stained gravel below 540'
545										
550										

GROUNDWATER

DEPTH (ft)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
550					12.7	0.0	0.1/21.0	GP		**GRAVEL WITH SAND,** continued
555										
560					8.3	0.0	0.1/21.0			note: rare small cobble below 560'
565										
570					10.0	0.0	0.1/21.2			note: decrease in gravel content below 570', grading to sand & gravel
575										
580					14.5	0.0	0.1/21.2	SP/GP		**SAND & GRAVEL,** predominantly coarse grained, subangular sand & coarse grained, subrounded gravel, nonplastic, gray with some brown
585										
590					7.5	0.0	0.1/21.1			note: increase in fine grained gravel below 590'
595										
600										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▽			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

PROJECT Cave Creek Landfill - Soil Vapor Monitor Well
3955 East Carefree Highway
Phoenix, Arizona

JOB NO. 09-114-03029 **DATE** 12-17-09 thru 1-16-10

LOCATION Northeast corner of Transfer Station

RIG TYPE Ingersoll Rand T3W Top Drive
SAMPLE TYPE 8" & 11" Stradex & 7" Hammer
SURFACE ELEV.
DATUM

Depth in Feet	Drill Rate Min./Ft.	Graphical Log	Sample	Sample Type	PID Meter Reading (ppm)	Methane (%)	Carbon Monoxide/ Oxygen (%)	Unified Soil Classification	Remarks	VISUAL CLASSIFICATION
600					23.0	0.0	0.1/21.3	SP/GP		**SAND & GRAVEL,** continued note: some lime cemented zones
605										
610					18.3	0.0	0.1/21.4			Stopped Auger at 610' at 1100 on 1-16-10 Trip out of hole with 7" bit, ready to install, 1st string of 2" schedule 80 PVC
615										
620										
625										
630										
635										
640										
645										
650										

GROUNDWATER

	DEPTH (ft)	HOUR	DATE
▽		none	
▼			
▼			
▼			

SAMPLE TYPE
A - Auger cuttings; NR - No Recovery
S - 2" O.D. 1.38" I.D. tube sample
U - 3" O.D. 2.42" I.D. tube sample
T - 1" O.D. thin-walled tube sample
D - 2.5" O.D. 1.9" I.D. tube sample
C - California sample

LOG OF TEST BORING NO. TSSV-1

APPENDIX B

GEOPHYSICAL LOGS

Memo

To	**Natalie Chrisman Lazarr, PE**	File no	**14-2012-1015**
From	**Michael L. Rucker, PE**	cc:	**File**

Tel **602-733-6000**
Fax **602-733-6100**
Date **October 25, 2012**

Subject **Review of Downhole Geophysical Logs**
Monitor Wells at Maricopa County Cave Creek Landfill

Geophysical borehole logs performed by Southwest Exploration Services, LLC for the following monitor wells were reviewed by Michael L. Rucker PE with AMEC.

MW-04 / TB-5	electrical / gamma / caliper
MW-5 / TB-4	electrical / gamma / caliper
MW-6 / TB-2	electrical / gamma / caliper
MW-7	electrical / gamma / caliper
MW-8	dual guard electrical / gamma / caliper / sonic

The typical borehole diameters ranged from about 11 inches (MW-6) to about 12 to 16 inches (MW-4, MW-5, MW-7) to 18 inches (MW-8), with larger diameter in the upper 20 feet to accommodate (apparently steel) surface casing. Borehole fluids were reported to be fresh mud with reported typical fluid resistivity ranging from about 5 ohm-m (MW-7) and 7 to 8 ohm-m (MW-6), where a fluid resistivity log was included. Measured resistivities above the groundwater table (assumed to be below depths of about 600 to 700 feet based on convergence of electrical resistivity values from the different measurement spacings) were typically greater than 50 ohm-m at the 16-inch normal spacing, and typically greater than 100 ohm-m at the 64-inch normal spacing. Such high resistivities are consistent with alluvium having little to essentially no clay content. Clays have a very low resistivity (high conductivity), and clay conductivity will dominate the electrical resistivity measurements if sufficient clays are present. A lack of 'character' or little change in the spontaneous potential and natural gamma curves are also consistent with an absence of clays in the alluvium materials. Conversely, an absence of clays is consistent with relatively high or higher permeabilites.

The shallower alluvium, extending perhaps to depths of about 180 – 200 feet at MW-4, -5, -6 and -7, and perhaps about 100 – 110 feet at MW-8, is consistent with lower density coarse grained alluvium. The natural gamma ray logs have slightly lower counts (lower API units) in that upper portion of the borehole, which is consistent with a lower density of natural radioactive material (derived primarily from slightly radioactive granitic source materials?). Caliper logs at MW-6 and -7 indicate significant overbreakage or instability in the upper borehole; loose sands and gravels and / or cobbles removed from the borehole wall are common reasons for borehole overbreakage. Resistivities, especially for the deeper 64-inch normal, are high to highest in this

AMEC Environment & Infrastructure, Inc.
4600 East Washington Street, Suite 600
Phoenix, Arizona 85034-1917
Tel: (602) 733-6000
Fax: (602) 733-6100 www.amec.com

region. This is consistent with low moisture content and / or minimum particle surface area in the geo-material mass that can become moistened or wetted and thus contribute to electrical conductivity (inverse of resistivity). Based on the borehole geophysical results, this upper portion of the alluvium is anticipated to have high to very high permeabilities.

A (or several) relatively thin, reduced resistivity zone is logged at the bottom of the shallower alluvium, commonly at a depth of roughly 200 feet (+/-) except at MW-8, where it located at a depth of about 110 feet. A slightly higher average natural gamma count indicates an increase in alluvium material density. Where the 16-inch normal resistivity is less than about 25 ohm-m (it approaches that value in MW-5 and MW-8, a significant increase in alluvium fines may be indicated; vertical flow may be inhibited at these locations. However, such a horizon with sufficiently low resistivity is not shown in the logs to be present across the region having the monitoring wells.

Use of the 16-inch normal resistivity as a primary indicator of presence of fines is a function of the alluvium geometry and moisture conditions. Above the groundwater table, alluvium formation saturation or moisture content may be profoundly impacted by invasion of drilling fluid from the borehole. As drilling mud penetrates into the formation, a mud cake forms that stabilizes the borehole. Very short (8-inch normal) resistivity measurements may be profoundly influenced by the borehole fluid. Long (64-inch resistivity measurements may include a significant portion of formation (if above the water table) that is not saturated by drilling fluid as the mud cake inhibits drilling fluid flow into the formation. The 16-inch short normal resistivity is a compromise between borehole influence and (above the water table) formation saturation.

The presence of the water table is probably indicated when the 64-inch normal and 16-inch normal resistivity values are similar. However, even below the water table, formation resistivities for the 16-inch and 64-inch resistivities (and guard log resistivities) are greater than about 25 ohm-m. Such high resistivity indicates an absence of fines, and especially clays, in the alluvium. An absence of fines, especially clays in the alluvium is consistent with high permeabilities in the alluvium.

MW-04/TB-5

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	AMEC CONSULTANTS
WELL ID	TB-5
FIELD	CAVE CREEK
COUNTY	MARICOPA
STATE	ARIZONA

TYPE OF LOGS: E-LOGS-GAMMA RAY
MORE:

OTHER SERVICES
CALIPER

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	10-23-10	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	E-LOGS-GAMMA-CALIPER	DENSITY	
DEPTH-DRILLER	768 FT	LEVEL	FULL
DEPTH-LOGGER	764 FT	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	764 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	LAYNE	LOGGING TRUCK	TRUCK #400
RECORDED BY / Logging Eng.	D. JACOVITCH/D.ECKMAN	TOOL STRING/SN	MSI-2PEA-F
WITNESSED BY	AMEC-MARK, KAREN	LOG TIME:ON SITE/OFF SITE	1315 1745

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	12 1/4"	20 FT	TOTAL DEPTH	14"		SURFACE	20 FT
2							

COMMENTS:

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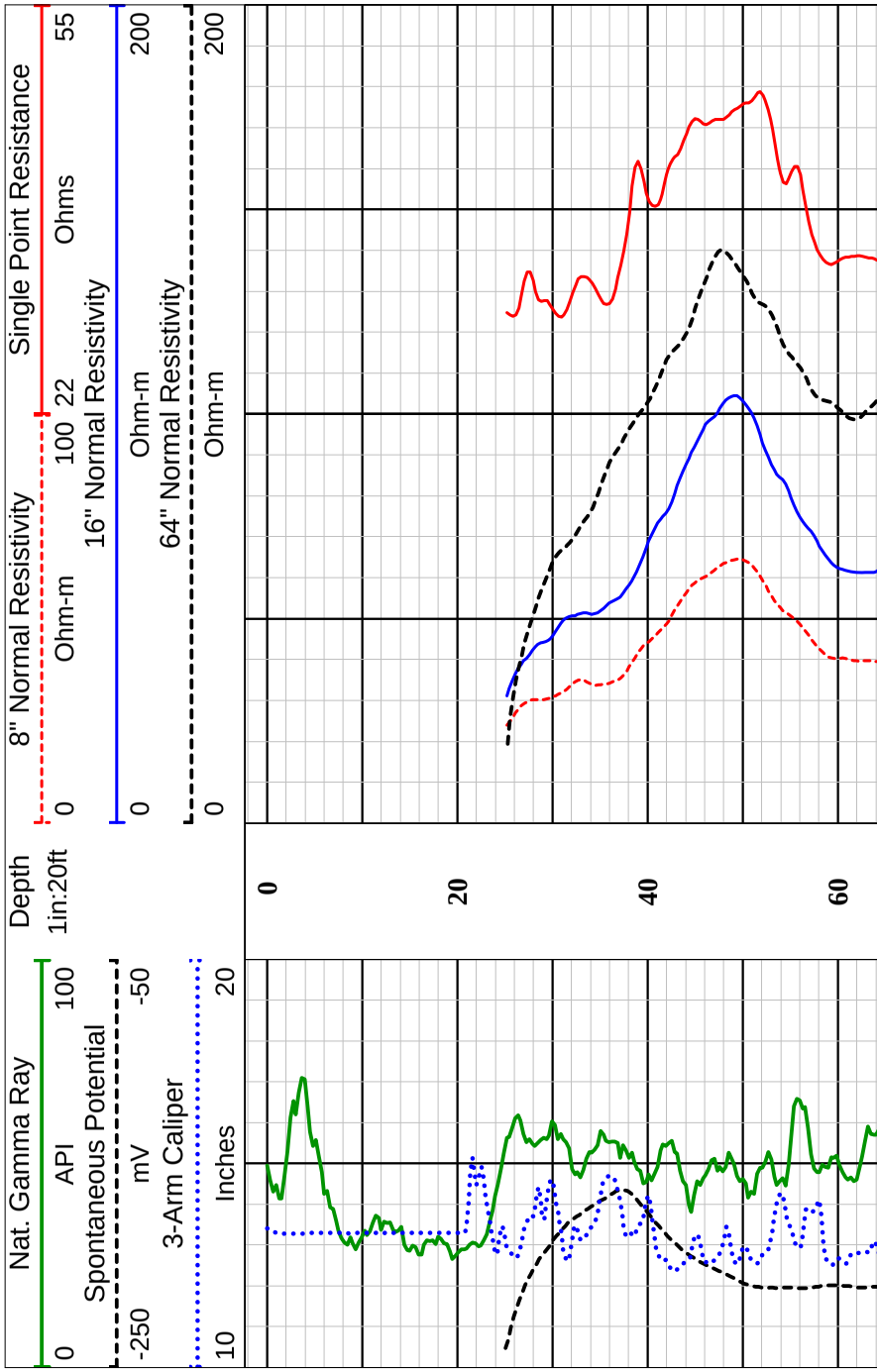

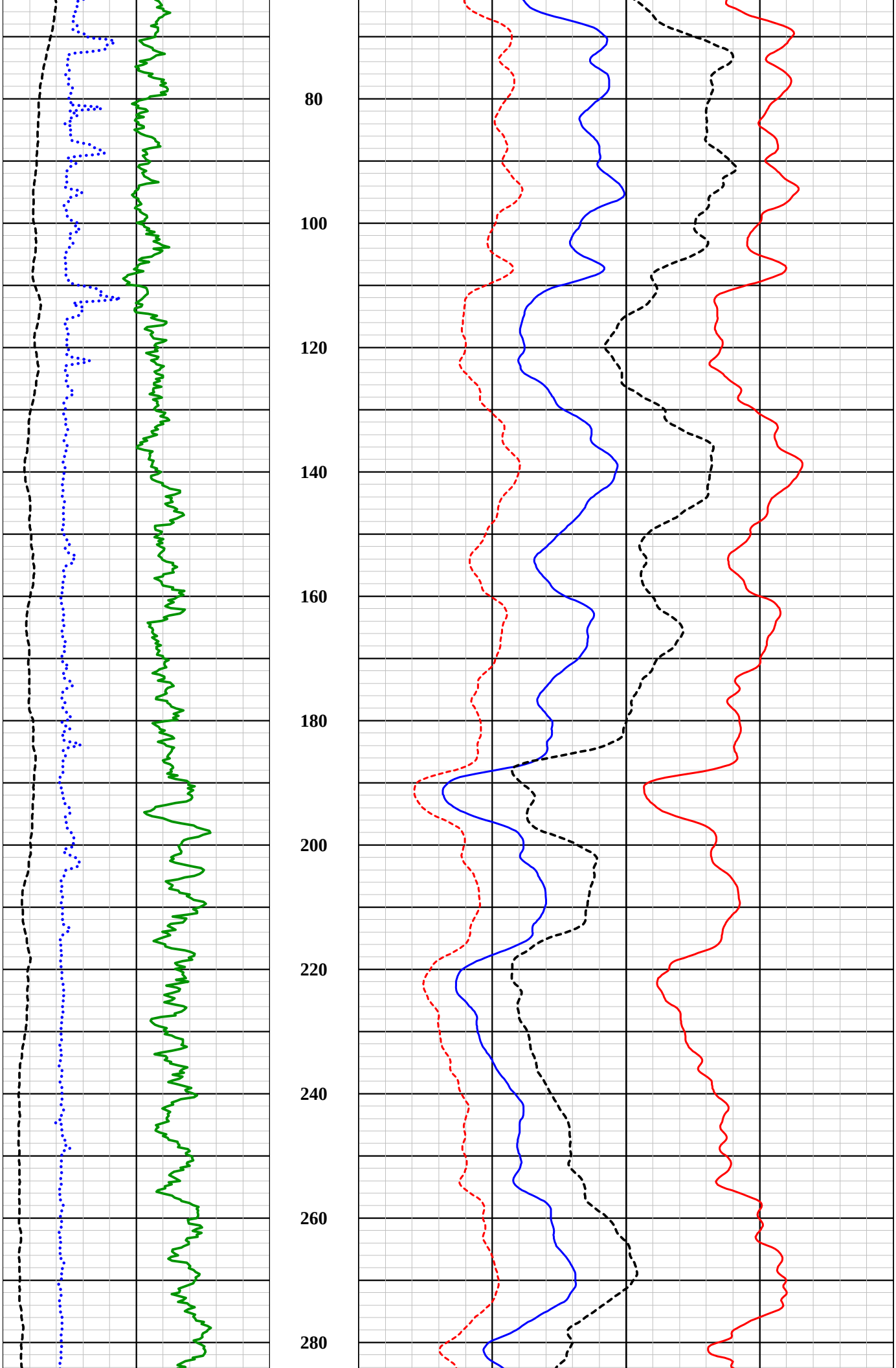
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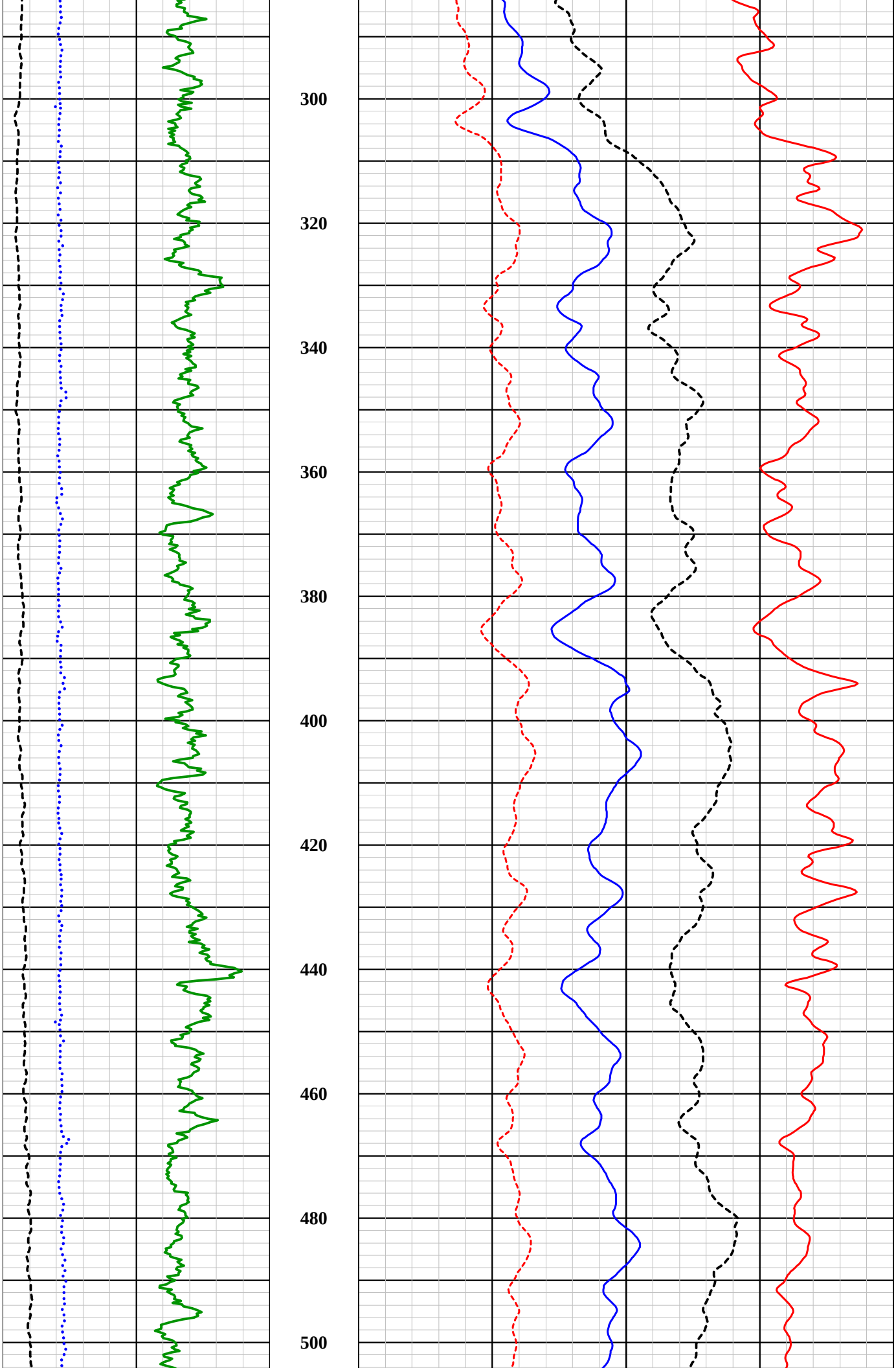
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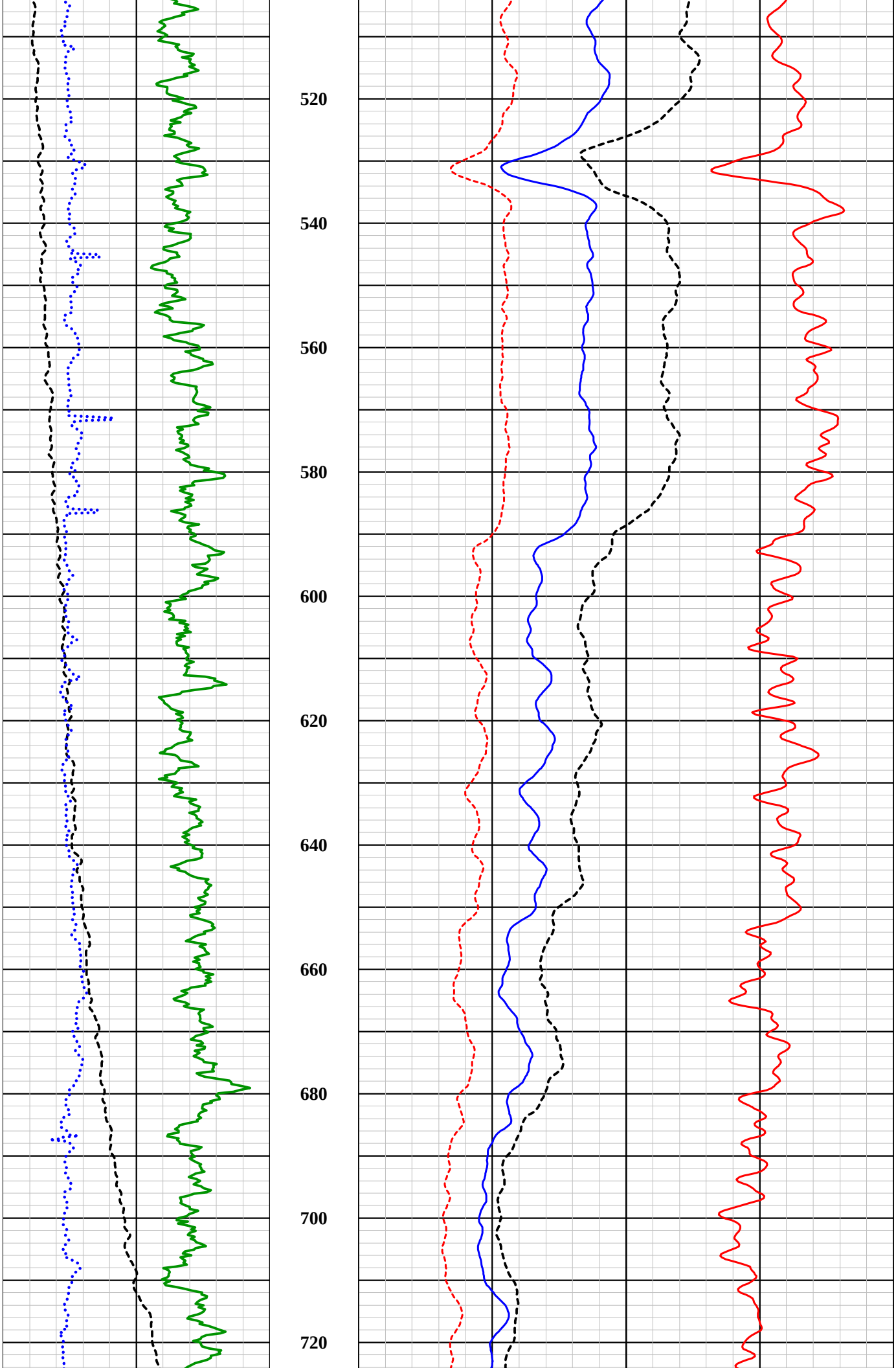
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620
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660
680
700
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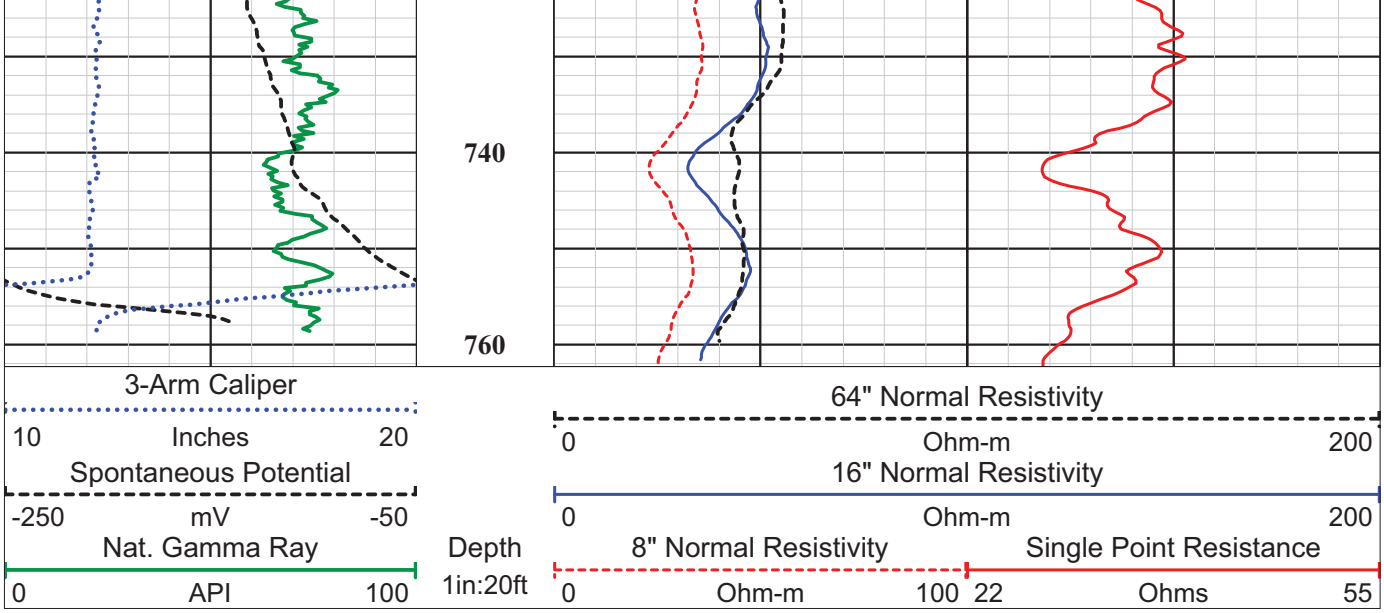

740
760
3-Arm Caliper
10
Inches
20
Spontaneous Potential
-250
mV
-50
Nat. Gamma Ray
0
API
100
Depth
1in:20ft
64" Normal Resistivity
0
Ohm-m
200
16" Normal Resistivity
0
Ohm-m
200
8" Normal Resistivity
0
Ohm-m
100
Single Point Resistance
22
Ohms
55

MW-05/TB-4

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	AMEC CONSULTANTS
WELL ID	TB-4 (MW-5)
FIELD	CAVE CREEK
COUNTY	MARICOPA STATE ARIZONA

TYPE OF LOGS: E-LOGS-GAMMA RAY
MORE:

OTHER SERVICES
CALIPER

LOCATION

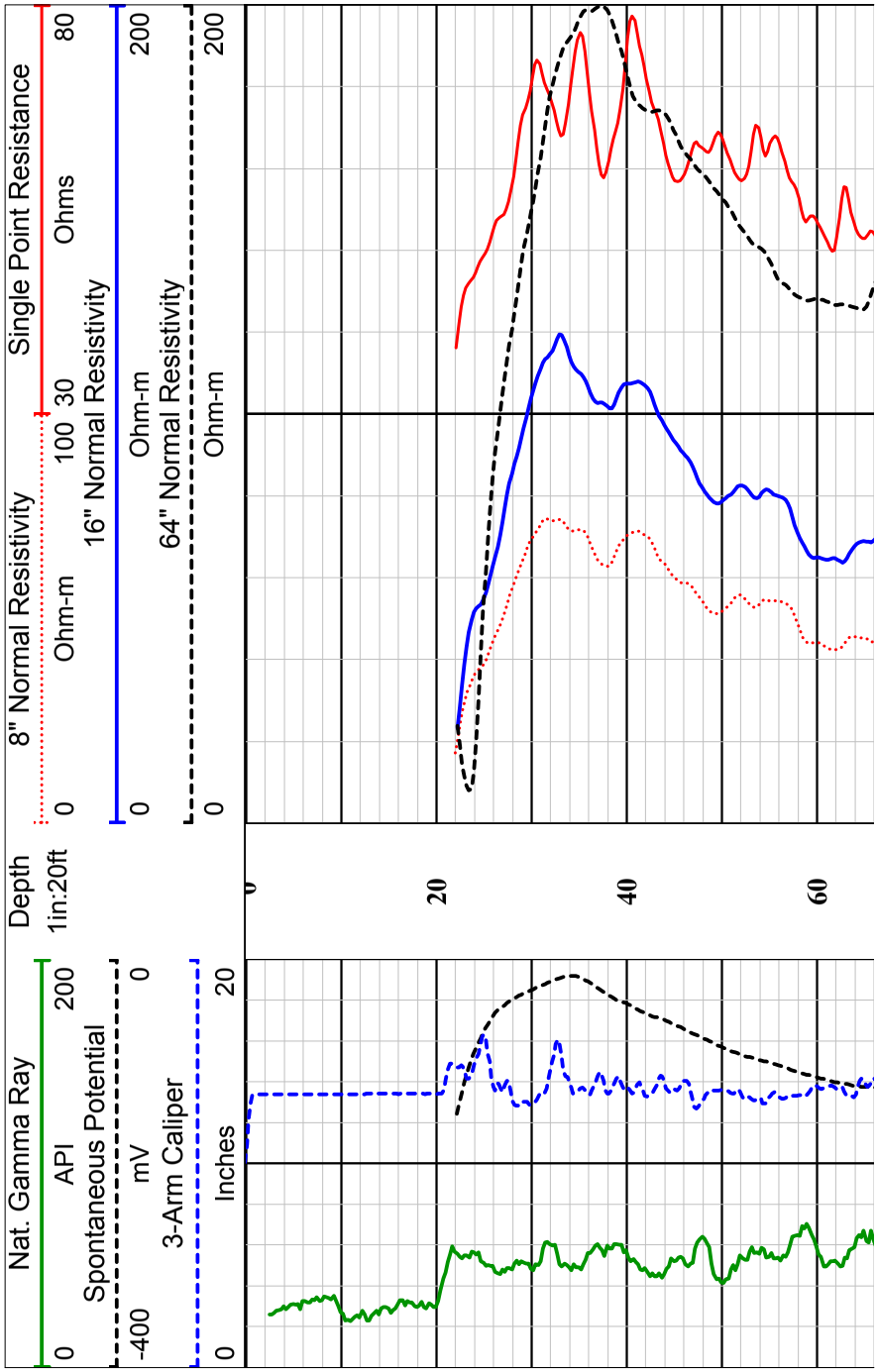
SEC TWP RGE

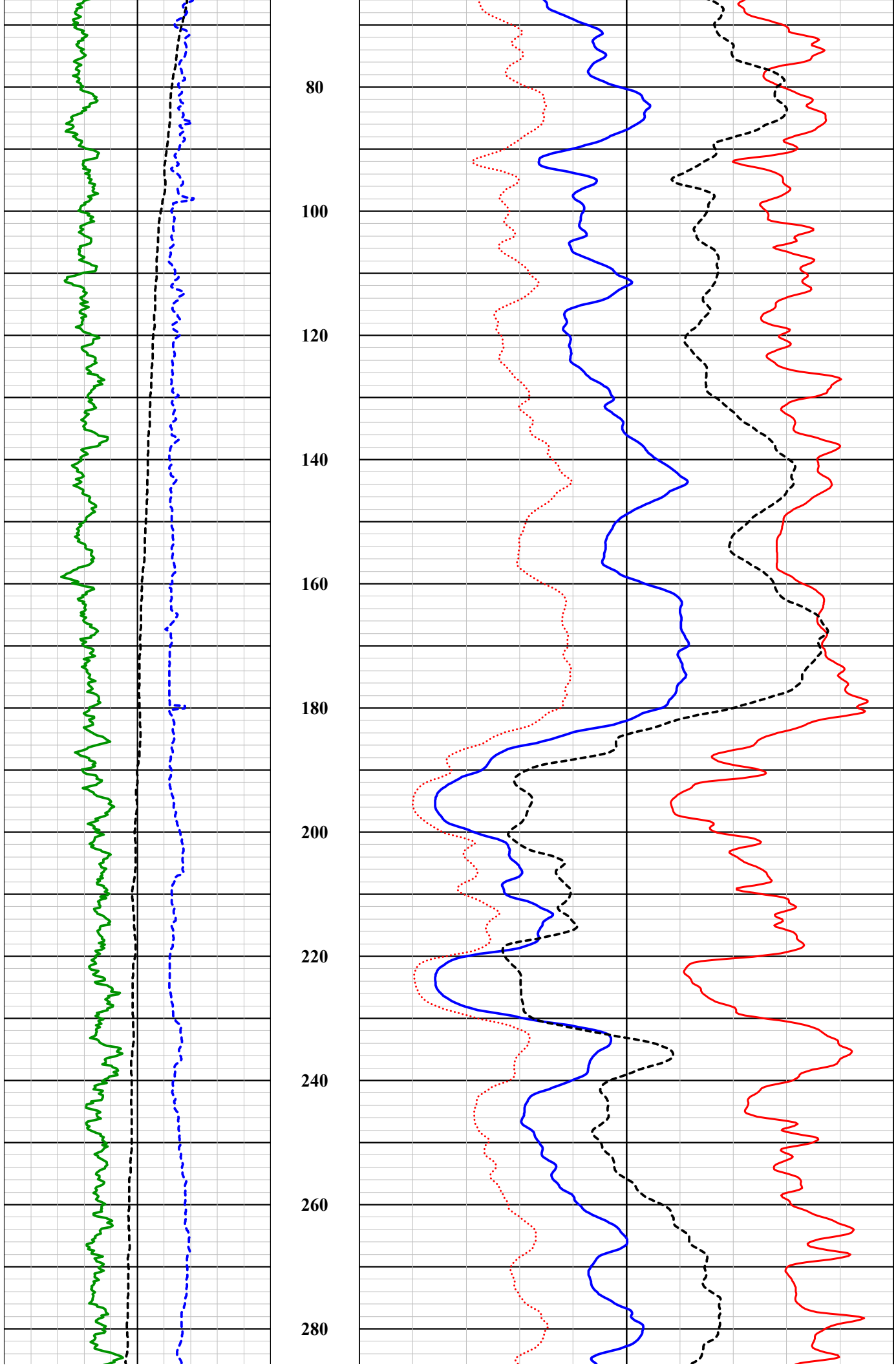
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	12-10-2010	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	E-LOGS-GAMMA-CALIPER	DENSITY	
DEPTH-DRILLER	767 FT	LEVEL	FULL
DEPTH-LOGGER	744 FT	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	744 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	.2 FT
DRILLER / RIG#	LAYNE	LOGGING TRUCK	TRUCK #400
RECORDED BY / Logging Eng.	C. NEFF /D.ECKMAN	TOOL STRING/SN	MSI-2PEA-F
WITNESSED BY	AMEC-KAREN	LOG TIME:ON SITE/OFF SITE	1300 1530

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	12 1/4"	20 FT	TOTAL DEPTH	14"		SURFACE	20 FT
2							

COMMENTS:

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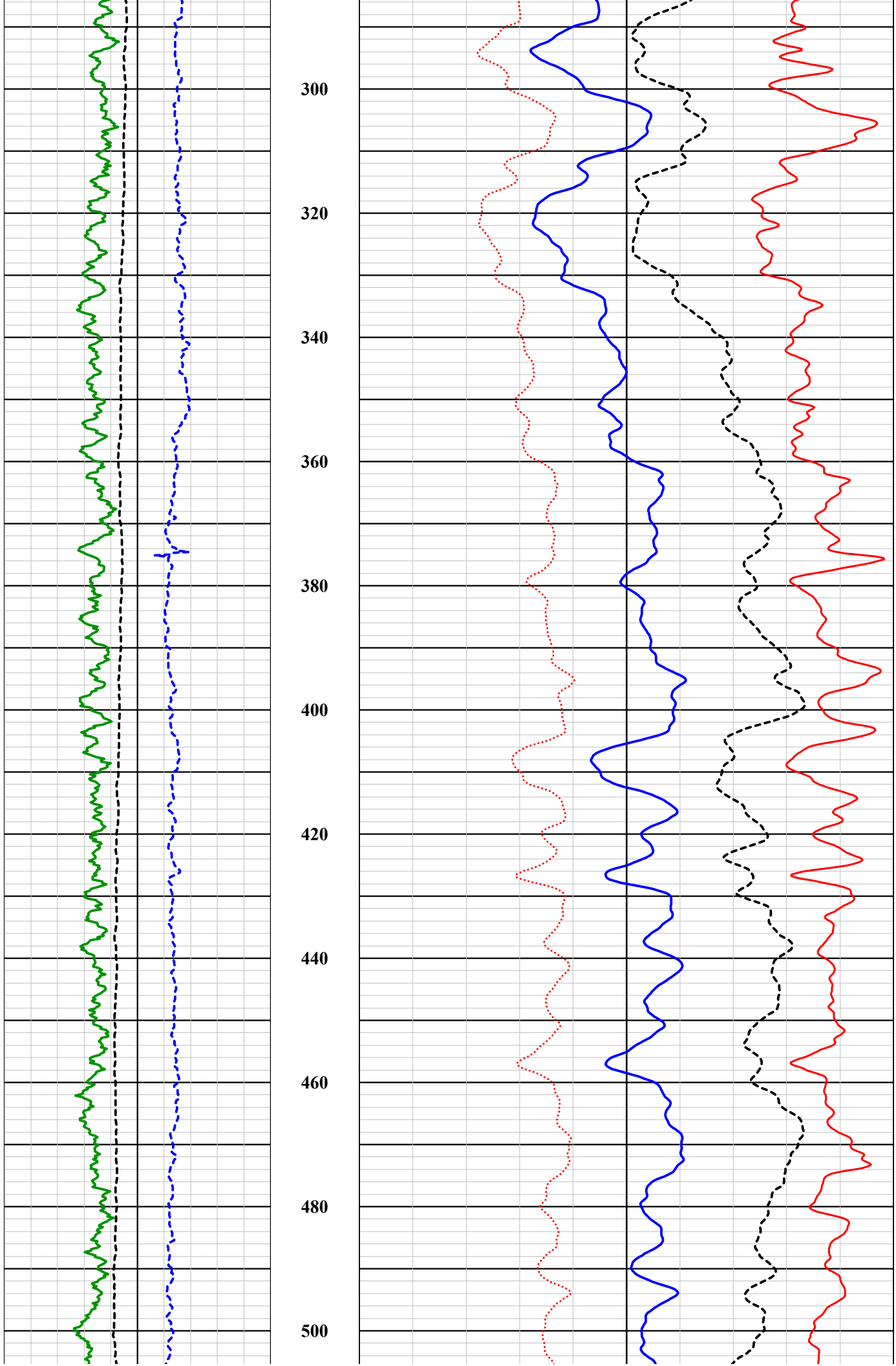
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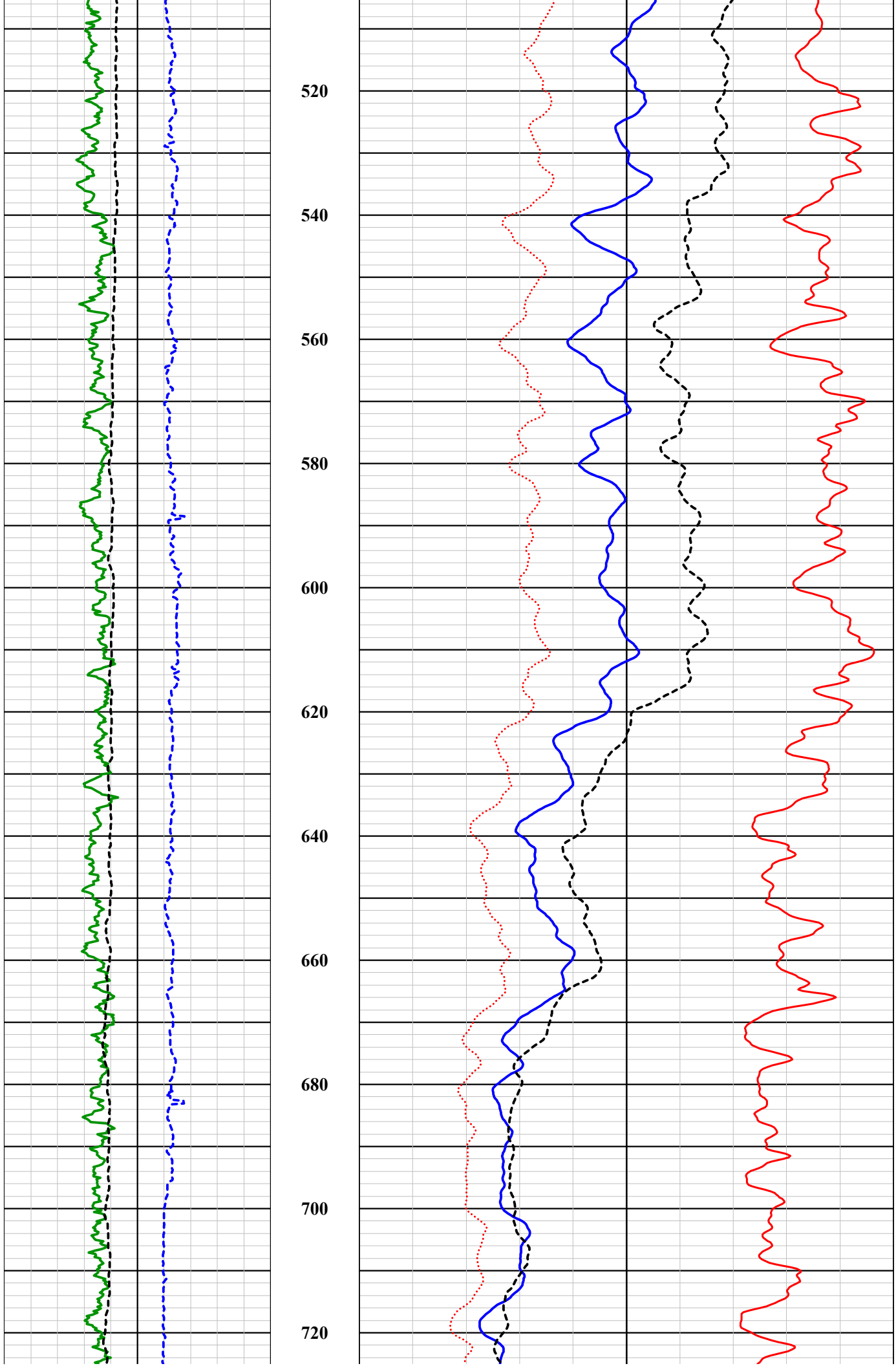
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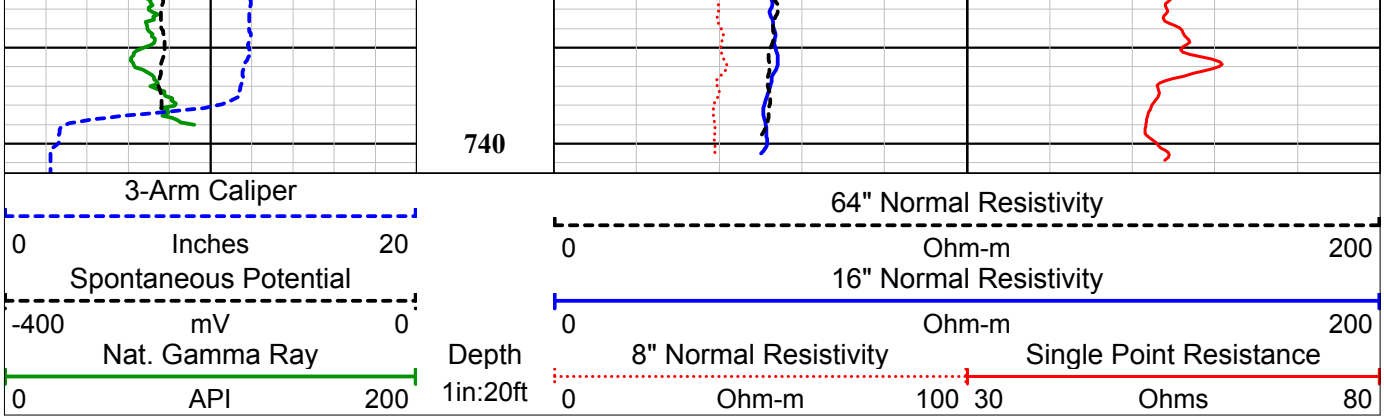

3-Arm Caliper

0 Inches 20

Spontaneous Potential

-400 mV 0

Nat. Gamma Ray

0 API 200

Depth

1in:20ft

64" Normal Resistivity

0 Ohm-m 200

16" Normal Resistivity

0 Ohm-m 200

8" Normal Resistivity

0 Ohm-m 100

Single Point Resistance

30 Ohms 80

MW-06/TB-2

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	AMEC CONSULTANTS
WELL ID	TB-2
FIELD	CAVE CREEK
COUNTY	MARICOPA STATE ARIZONA

TYPE OF LOGS: E-LOGS-GAMMA RAY
MORE:

OTHER SERVICES
CALIPER

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	5-1-11	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	E-LOGS-GAMMA-CALIPER	DENSITY	
DEPTH-DRILLER	770 FT	LEVEL	FULL
DEPTH-LOGGER	777 FT	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	777 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	.2 FT
DRILLER / RIG#	YELLOW JACKET	LOGGING TRUCK	TRUCK #107
RECORDED BY / Logging Eng.	D.ECKMAN	TOOL STRING/SN	MSI-2PEA-F, COMPROBE 2 1/8"
WITNESSED BY	AMEC-SHANDA WAGNER	LOG TIME:ON SITE/OFF SITE	1200 1430

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	?	SURFACE	20FT	14"		SURFACE	20 FT
2	10 5/8"	20 FT	TOTALDEPTH				

COMMENTS:

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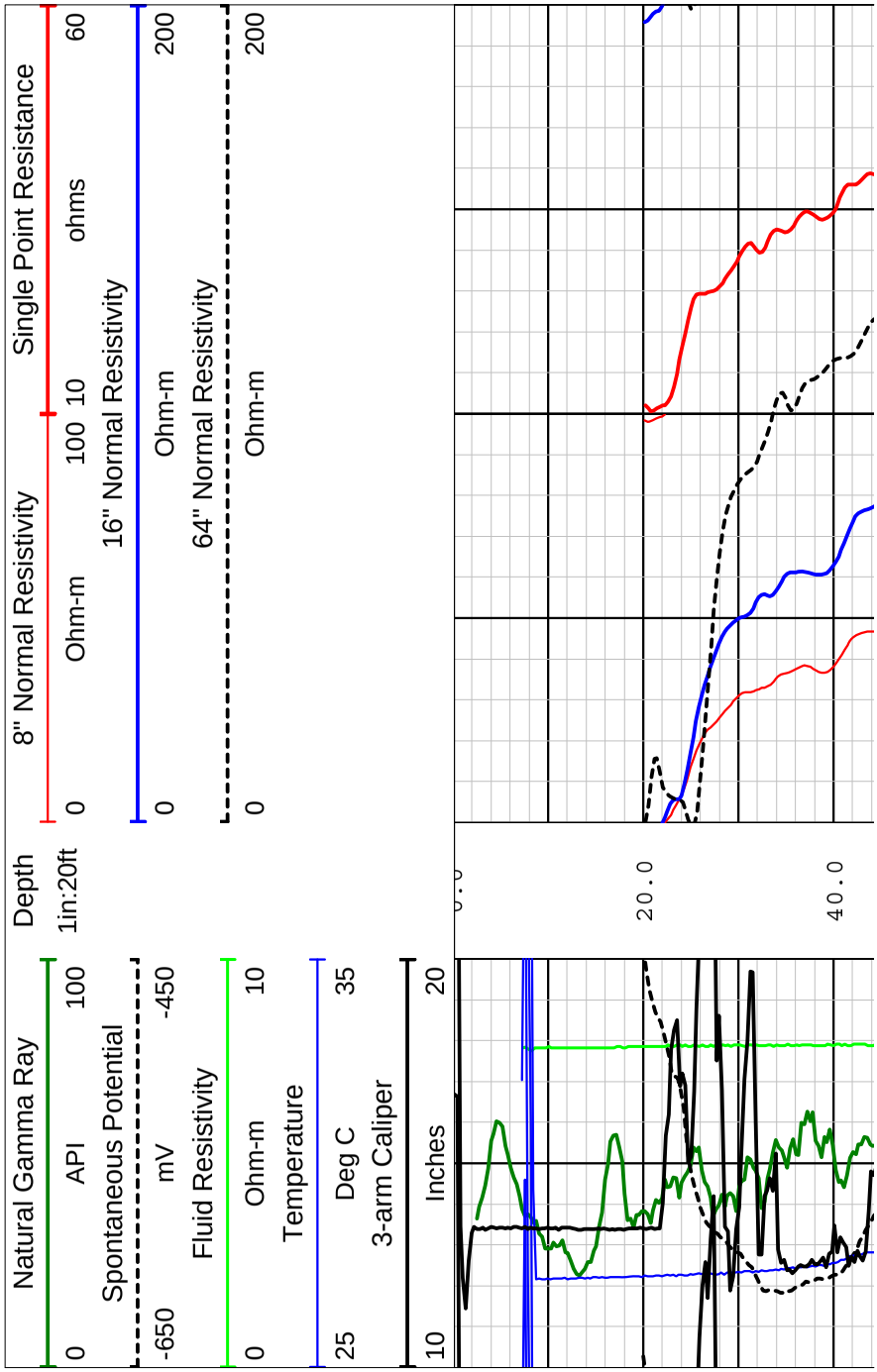

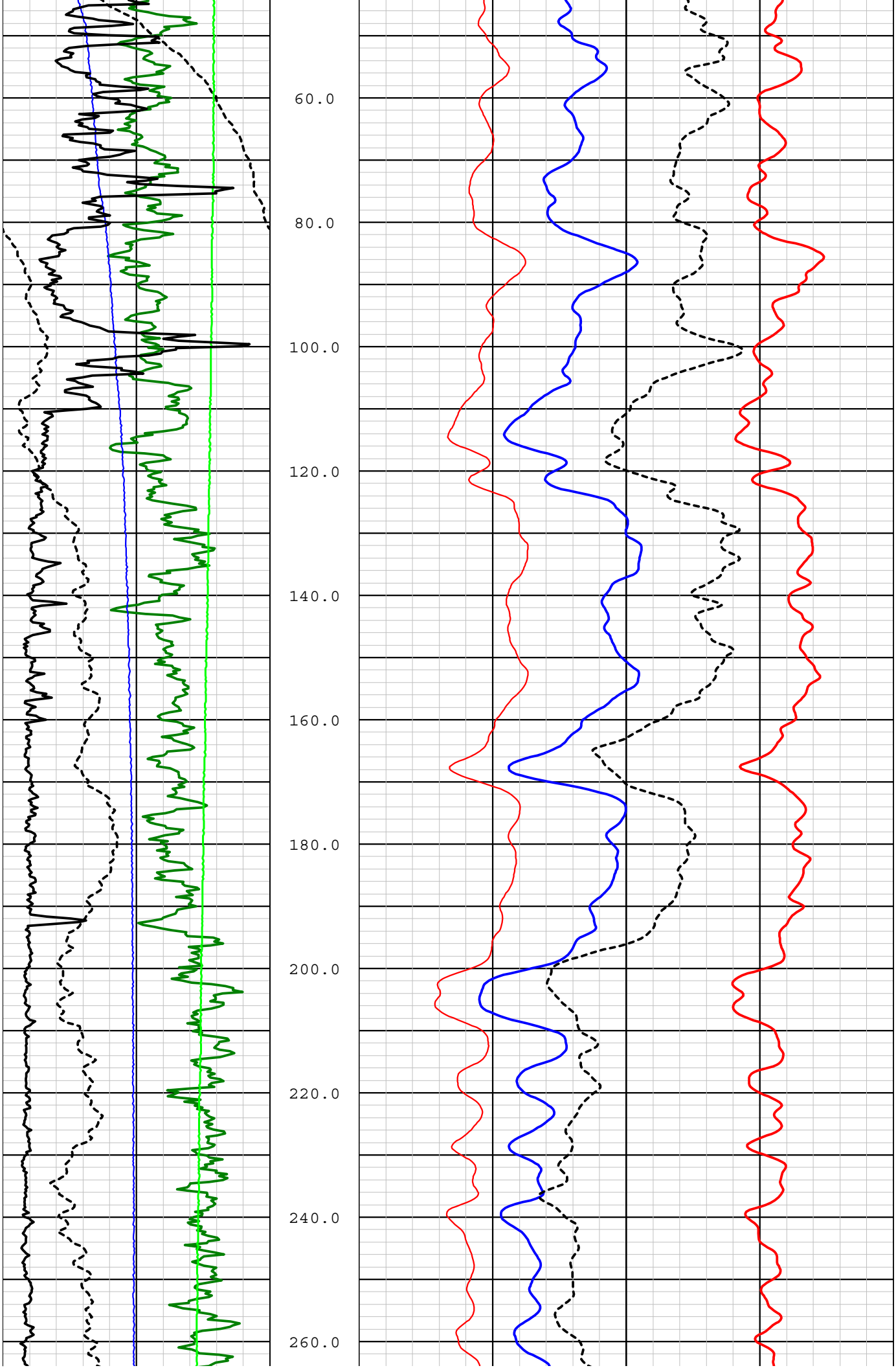
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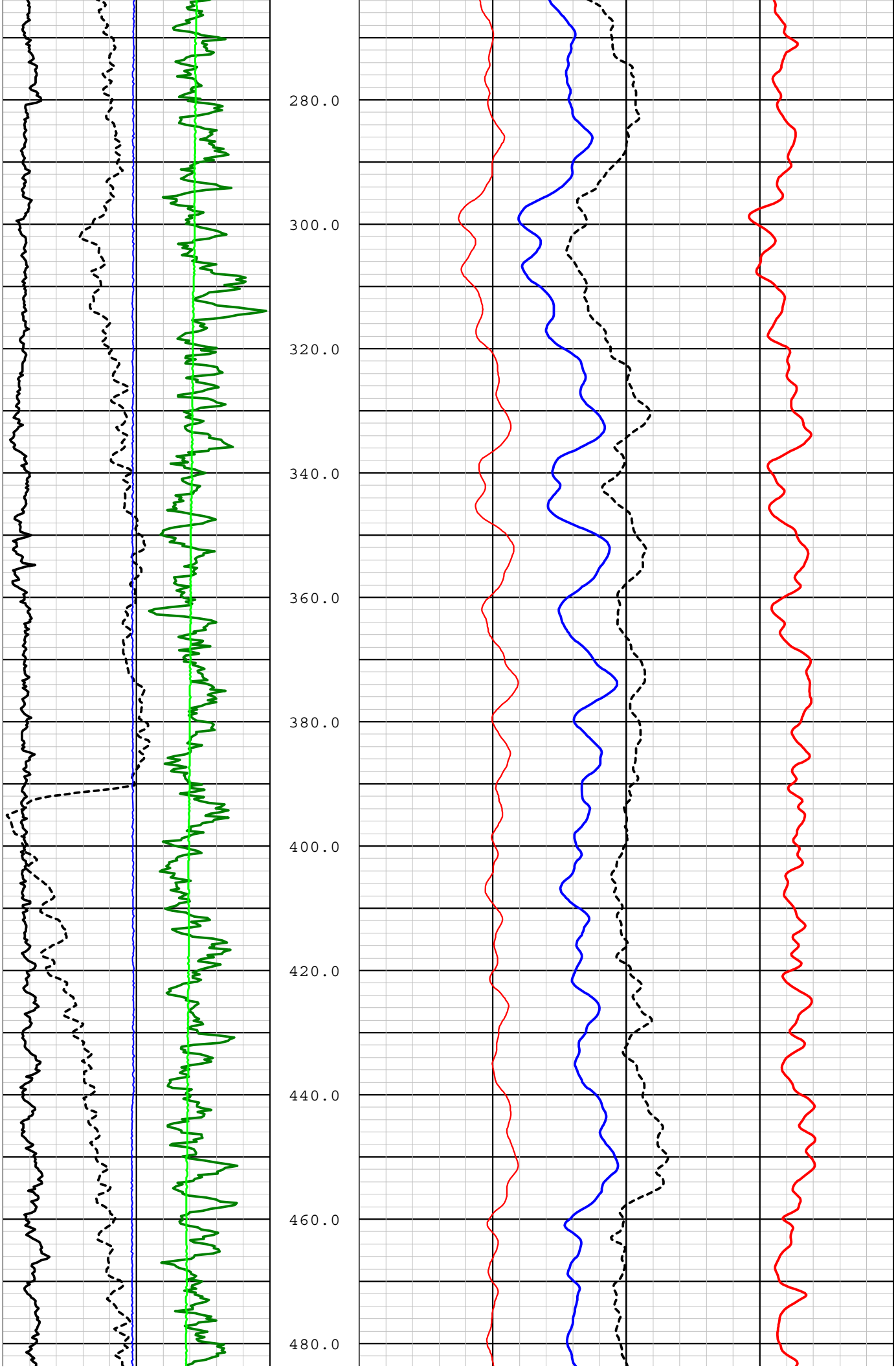
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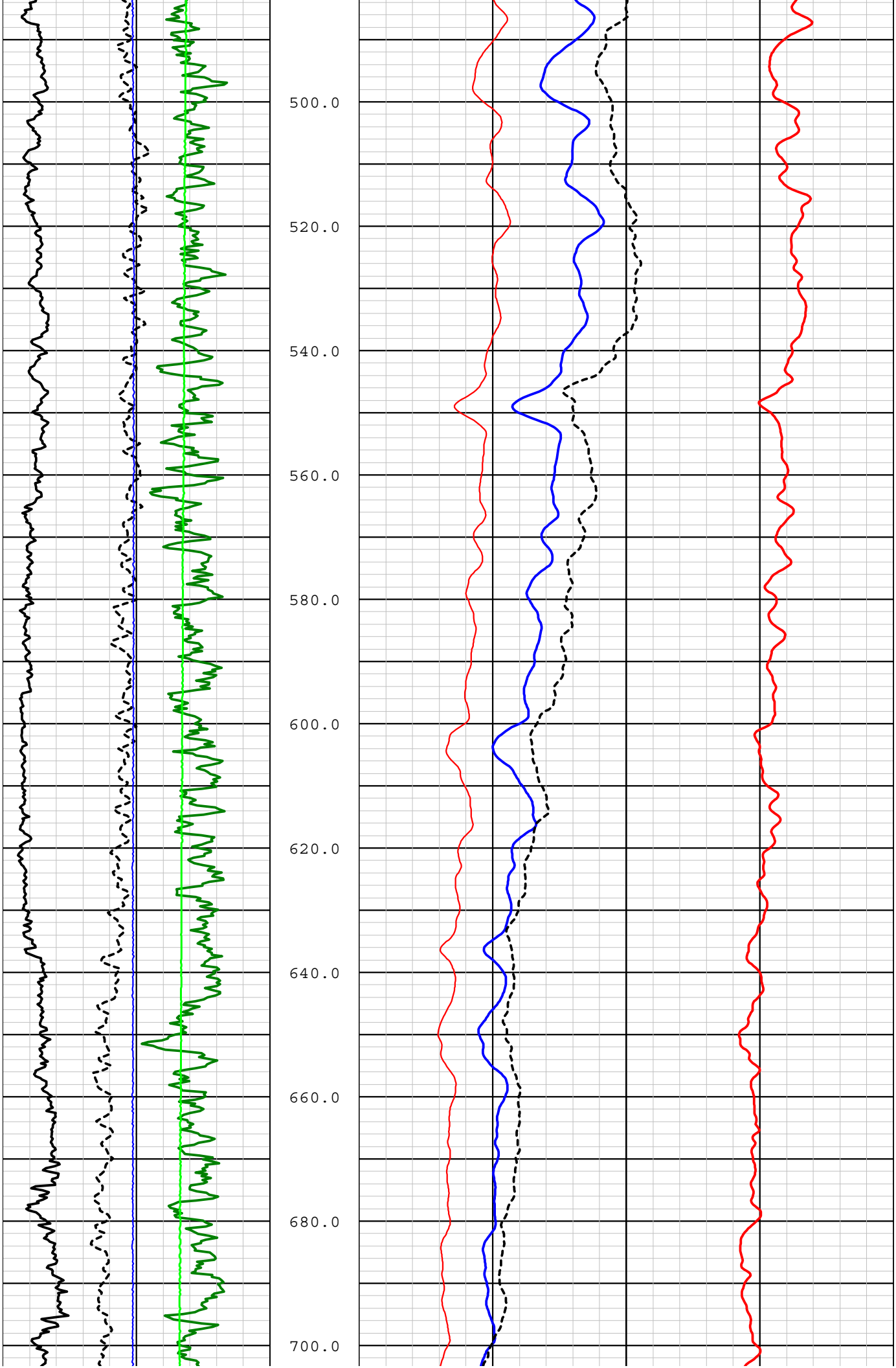
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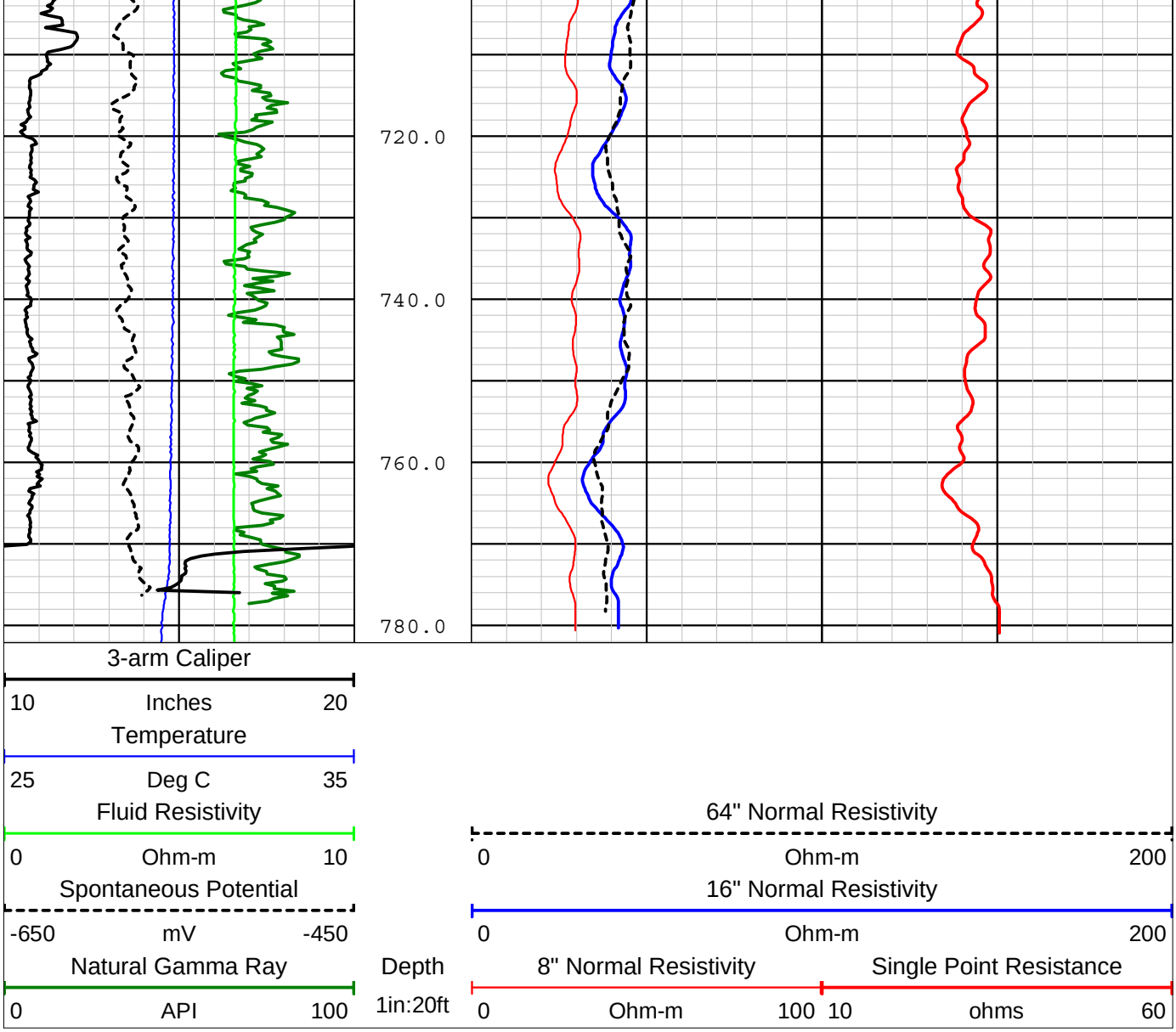
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Inches
20
Temperature
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Deg C
35
Fluid Resistivity
0
Ohm-m
10
Spontaneous Potential
-650
mV
-450
Natural Gamma Ray
0
API
100
Depth
1in:20ft
64" Normal Resistivity
0
Ohm-m
200
16" Normal Resistivity
0
Ohm-m
200
8" Normal Resistivity
0
Ohm-m
100
Single Point Resistance
10
ohms
60

MW-07/TB-1

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	AMEC EARTH AND ENVIRONMENTAL
WELL ID	MW-7
FIELD	CAVE CREEK
COUNTY	MARICOPA STATE ARIZONA

TYPE OF LOGS: GAMMA, E-LOGS
MORE: 3-ARM CALIPER

LOCATION

SEC TWP RGE

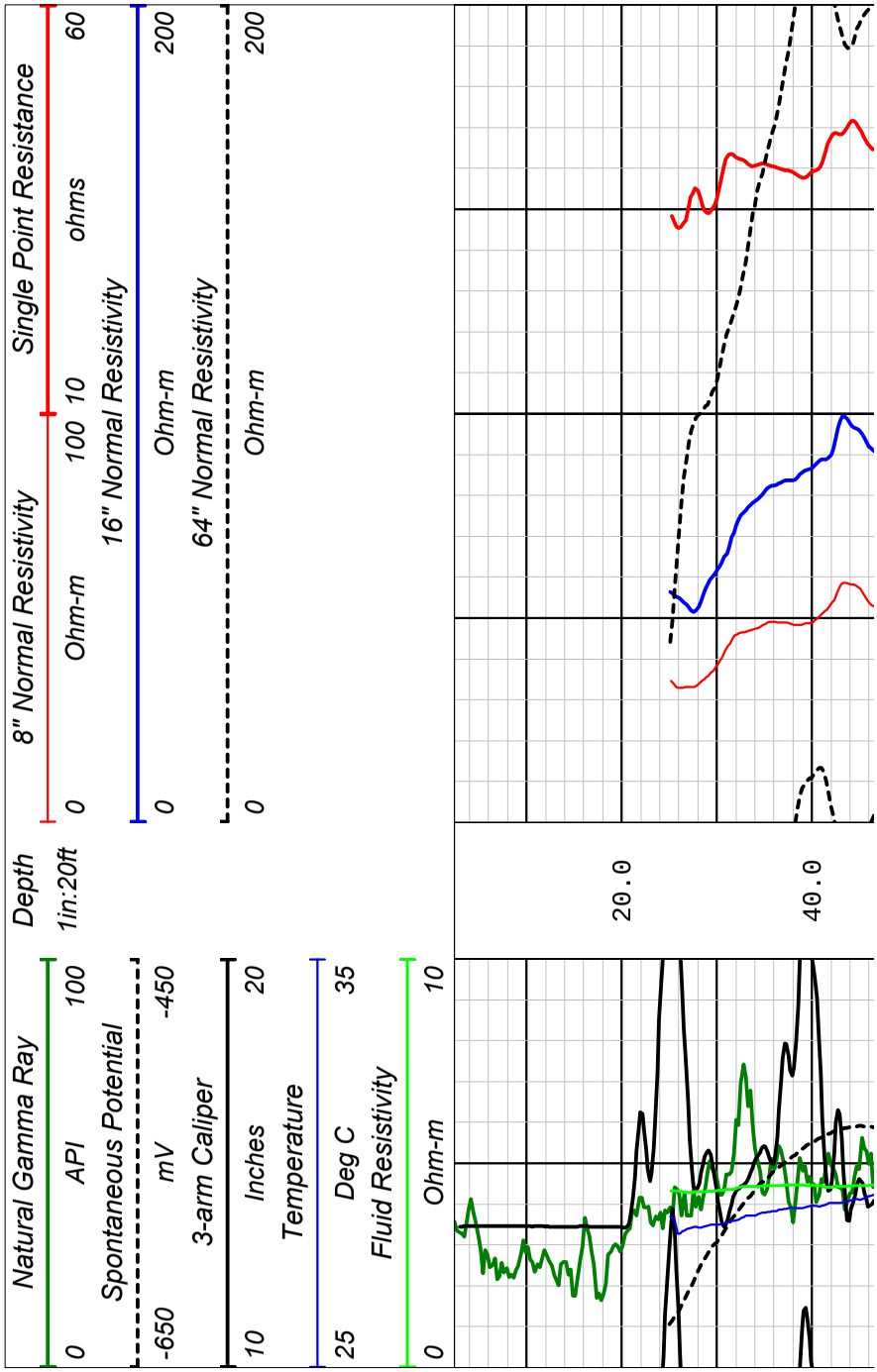
OTHER SERVICES
NONE

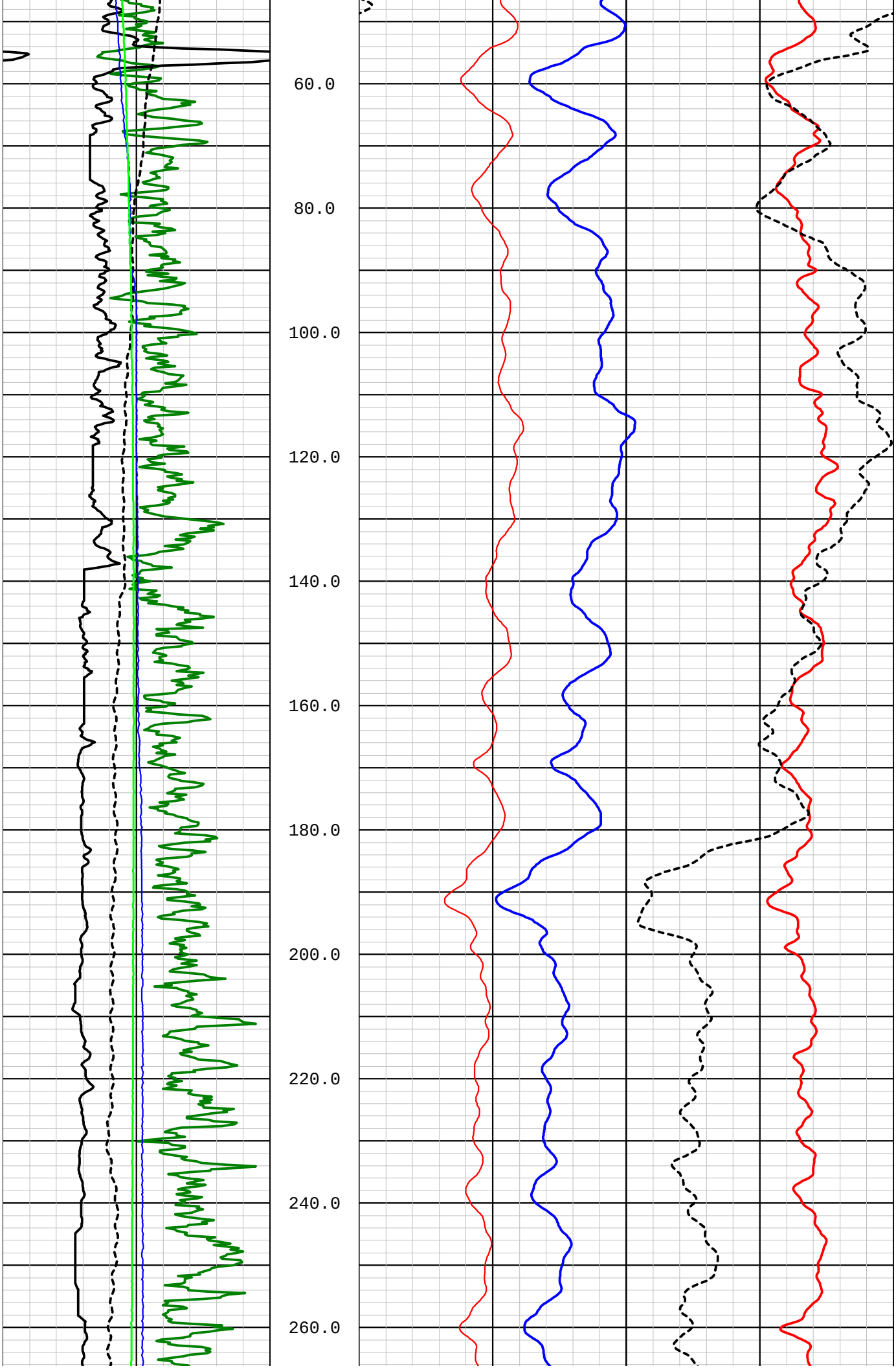
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	2-3-2012	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	GAMMA-ELOG-CAL	DENSITY	
DEPTH-DRILLER	765 FT	LEVEL	FULL
DEPTH-LOGGER	763.5 FT	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	763.5 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	.2 FT
DRILLER / RIG#	YELLOW JACKET	LOGGING TRUCK	TRUCK #400
RECORDED BY / Logging Eng.	E. TURNER	TOOL STRING/SN	2PEA/F, 2PCA
WITNESSED BY	AMEC	LOG TIME:ON SITE/OFF SITE	1100

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	20 "	0	20 FT	14"		SURFACE	20 FT
2	12 3/4"	20 FT	TOTAL DEPTH				

COMMENTS:

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200.0
220.0
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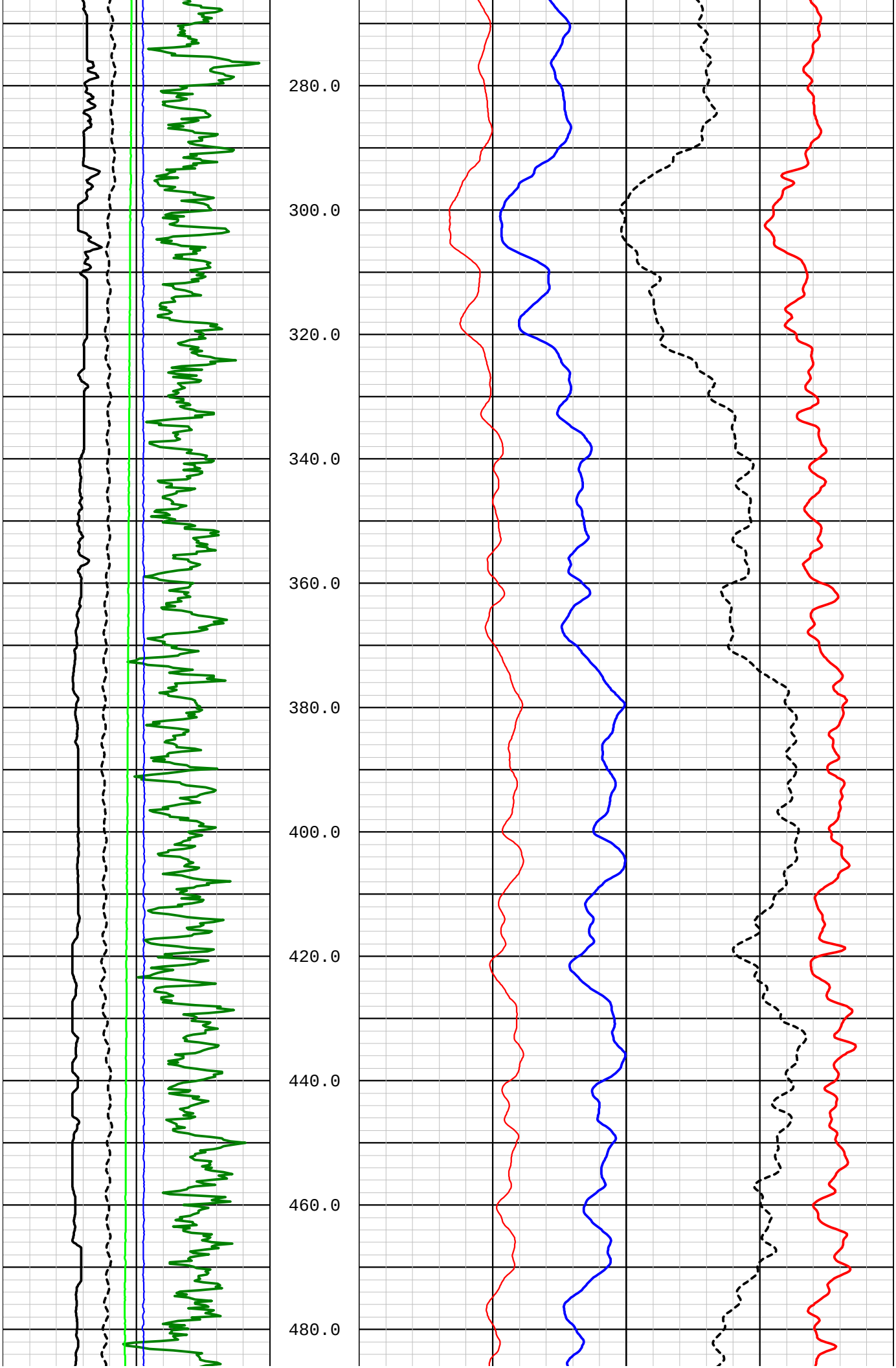
260.0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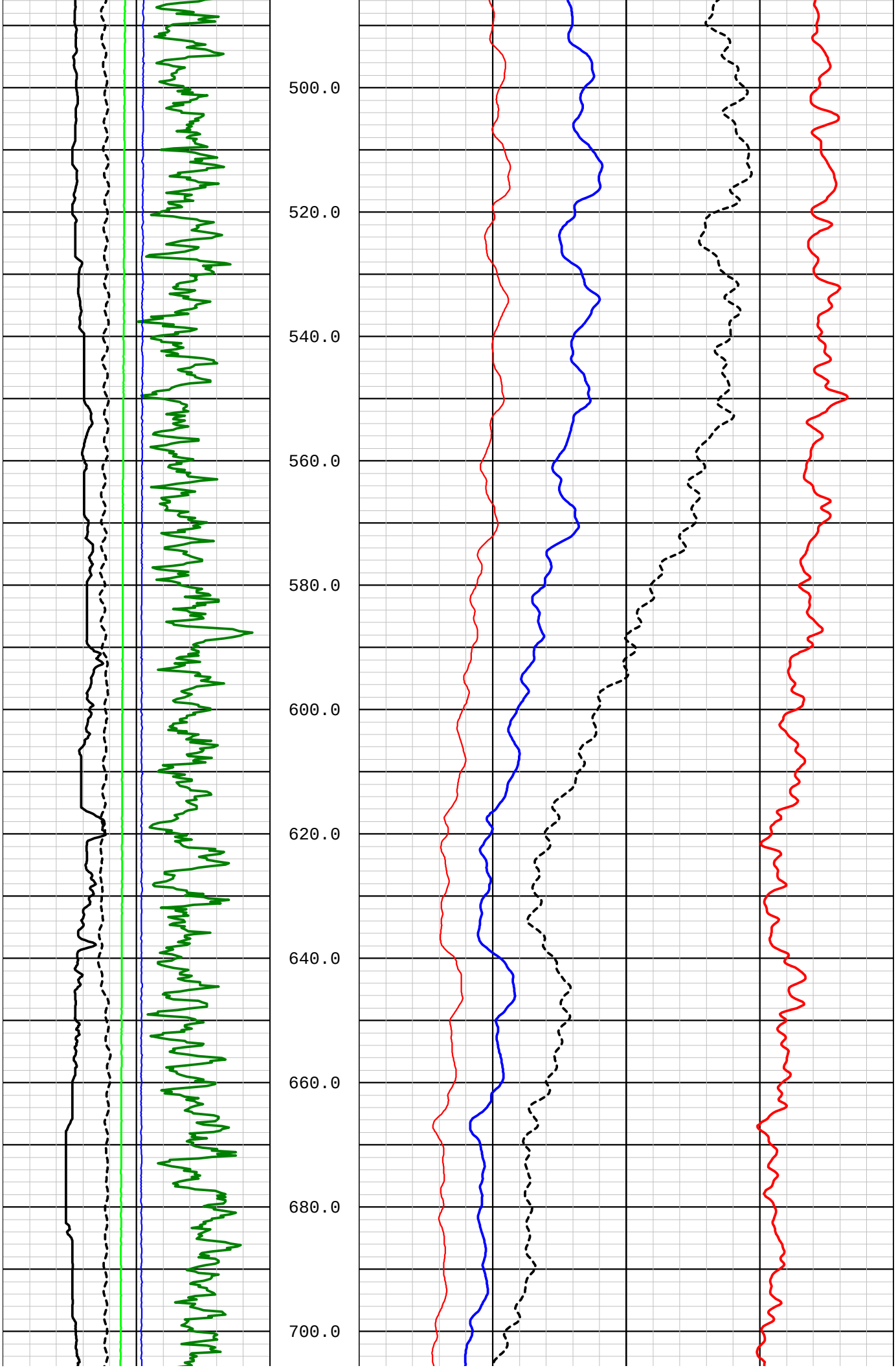
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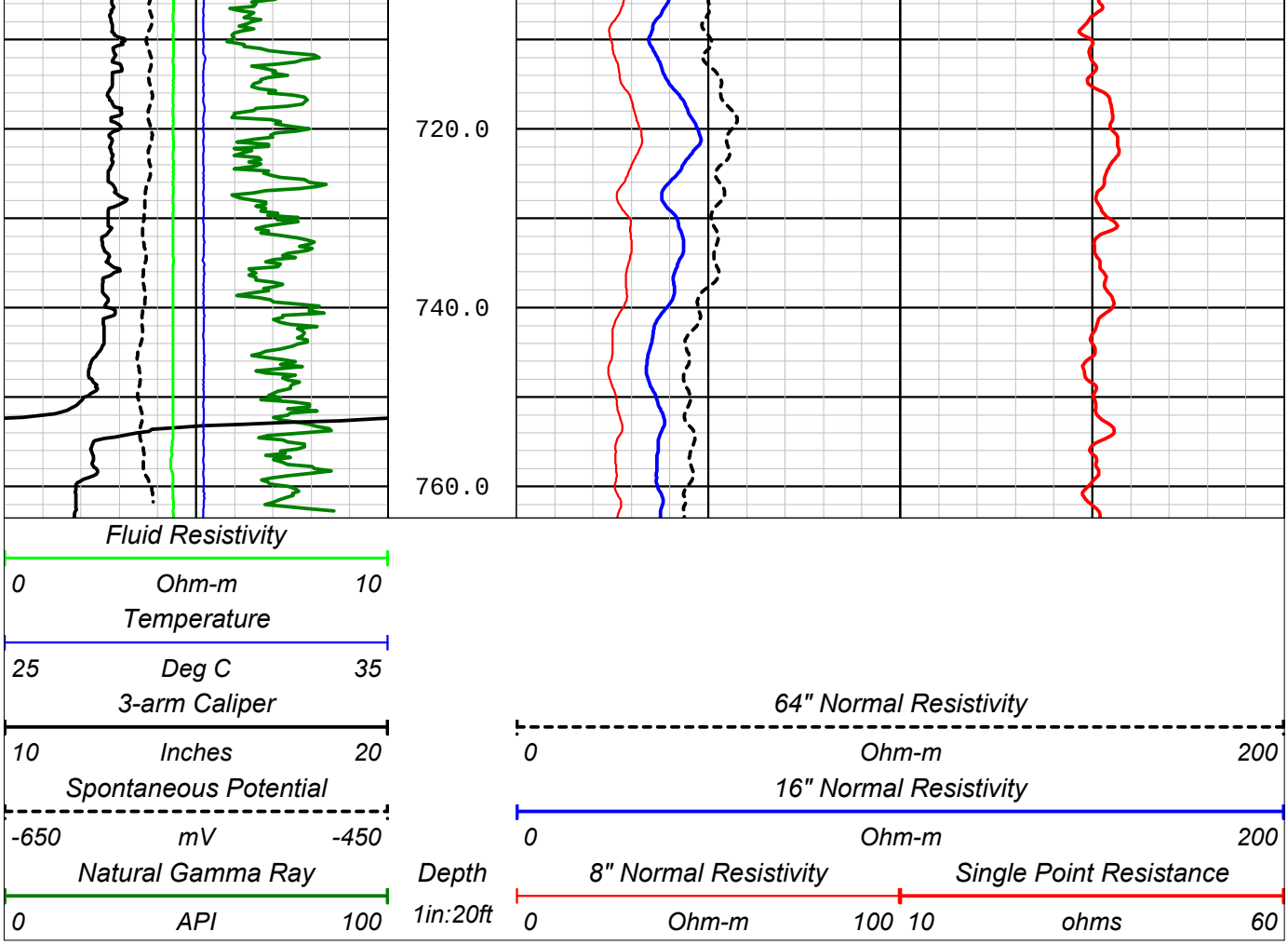
620.0
640.0
660.0
680.0
700.0


720.0
740.0
760.0
Fluid Resistivity
0
Ohm-m
10
Temperature
25
Deg C
35
3-arm Caliper
10
Inches
20
Spontaneous Potential
-650
mV
-450
Natural Gamma Ray
0
API
100
Depth
1in:20ft
64" Normal Resistivity
0
Ohm-m
200
16" Normal Resistivity
0
Ohm-m
200
8" Normal Resistivity
0
Ohm-m
100
Single Point Resistance
10
ohms
60

MW-08

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	AMEC CONSULTANTS
WELL ID	MW-8
FIELD	CAVE CREEK
COUNTY	MARICOPA
STATE	ARIZONA

TYPE OF LOGS: GAMMA, DUAL GUARD, CALIPER

MORE:

OTHER SERVICES
SONIC

LOCATION

SEC TWP RGE

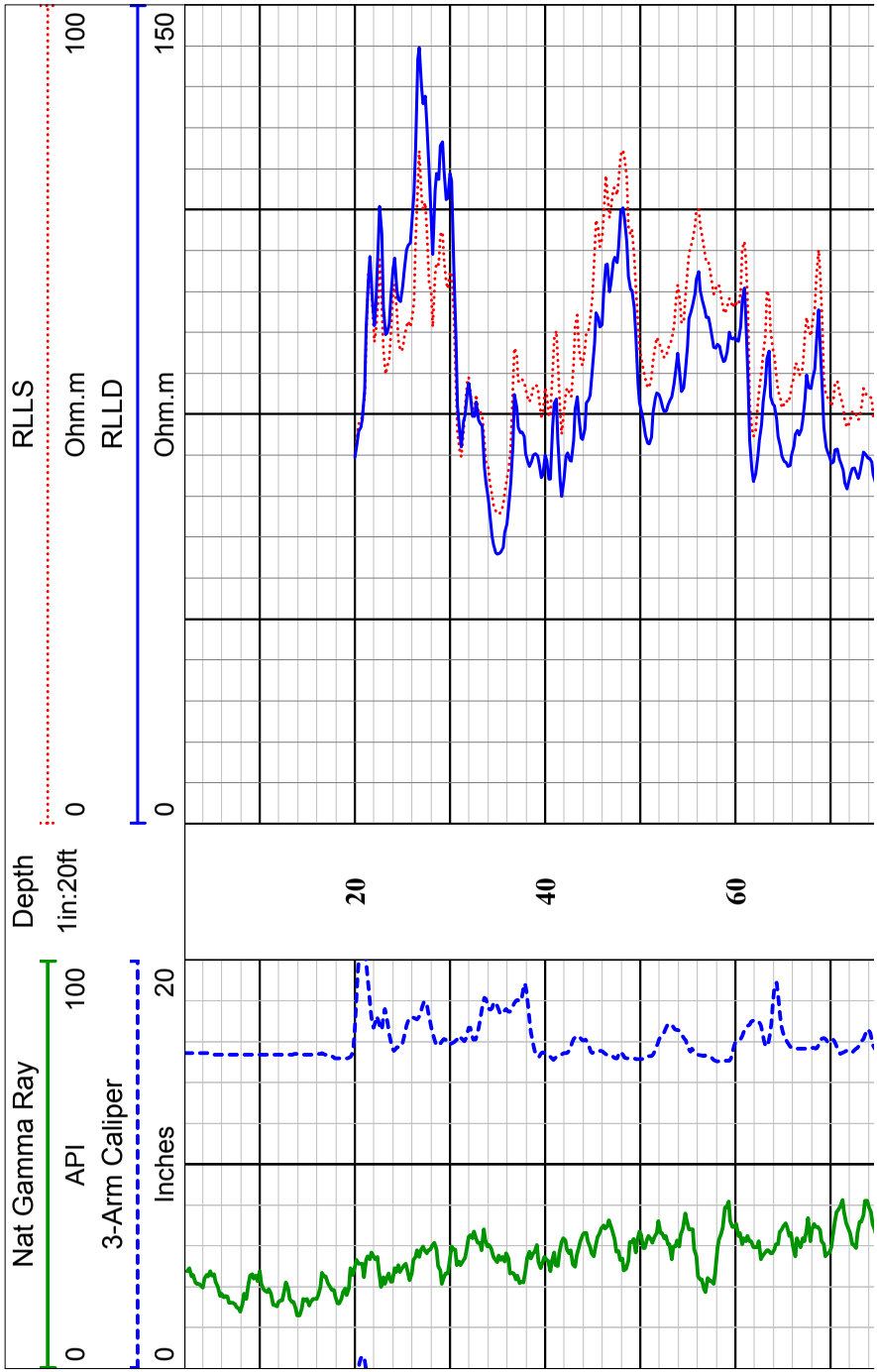
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

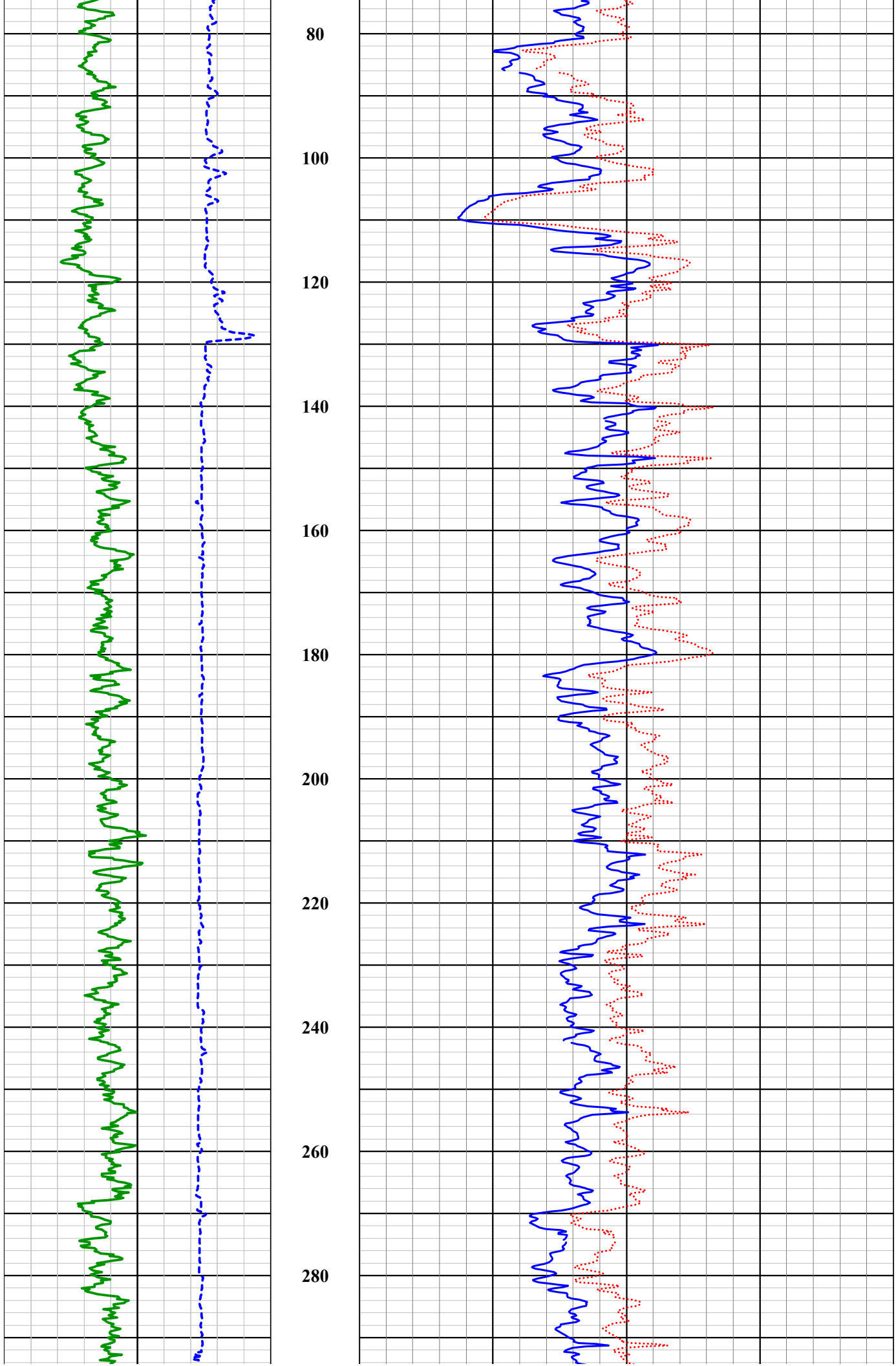
DATE	1-06-2012	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	GAMMA, GUARD CALIPER	DENSITY	
DEPTH-DRILLER	765 FT	LEVEL	N/A
DEPTH-LOGGER	766 FT	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	766 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	.2 FT
DRILLER / RIG#	YELLOW JACKET	LOGGING TRUCK	TRUCK #400
RECORDED BY / Logging Eng.	C. NEFF	TOOL STRING/SN	2PCA, GEOVISTA, COMPPROBE
WITNESSED BY	AMEC	LOG TIME:ON SITE/OFF SITE	0729 1800

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	20 "	0	20 FT	16"		SURFACE	19 FT
2	14 3/4"	20 FT	TOTAL DEPTH				

COMMENTS: E-LOG NOT OPERATIONAL. USED DUAL GUARD AND GAMMA-NEUTRON AS REPRESENTATIVE LOG

.

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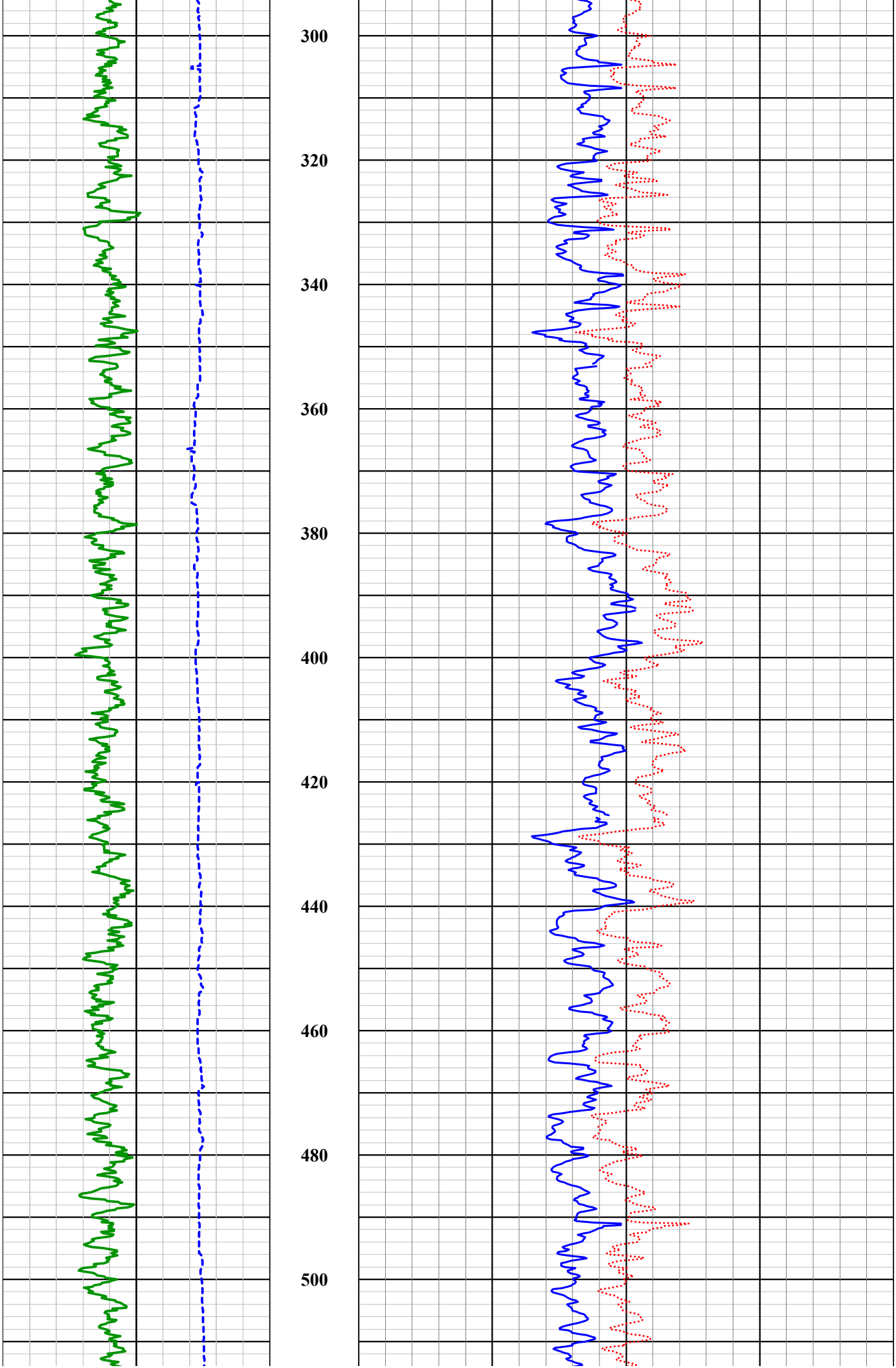
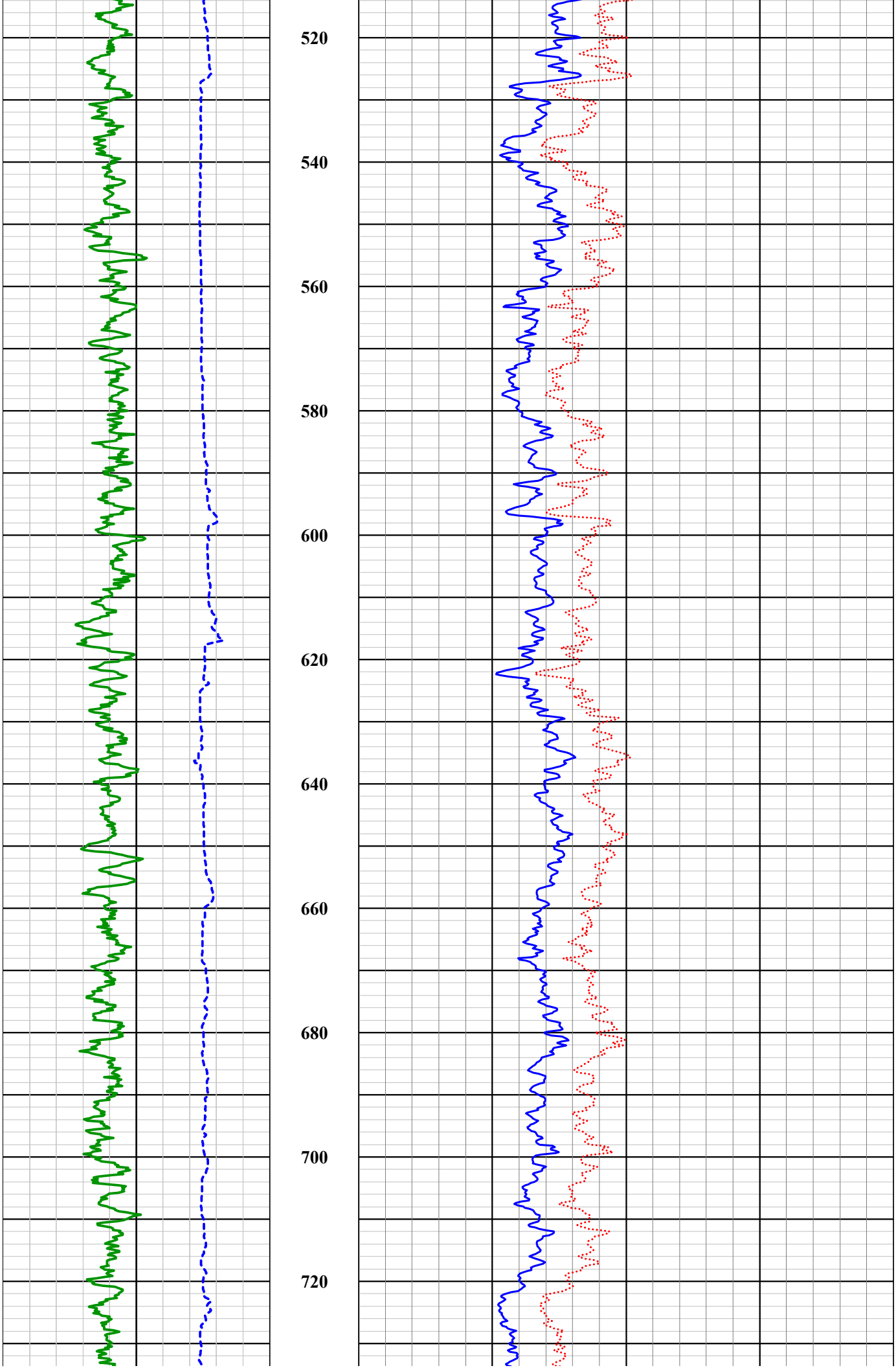
100
120
140
160
180
200
220
240
260
280


300
320
340
360
380
400
420
440
460
480
500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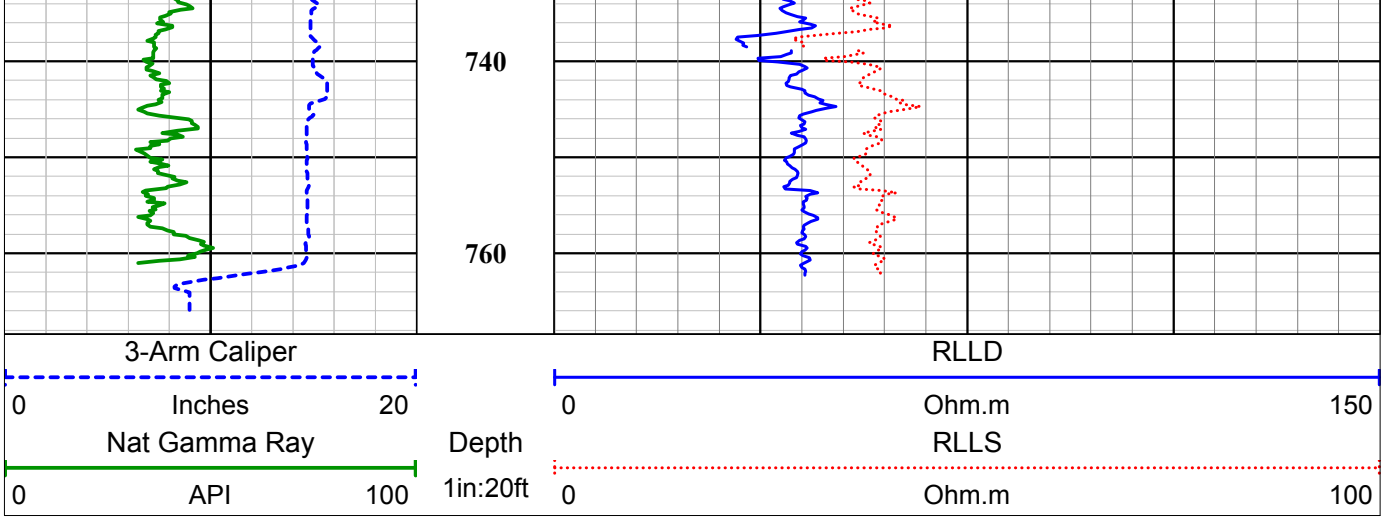
560
580
600
620
640
660
680
700
720


740
760
3-Arm Caliper
0
Inches
20
Nat Gamma Ray
0
API
100
Depth
1in:20ft
RLLD
0
Ohm.m
150
RLLS
0
Ohm.m
100

MW-08 (sonic)

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	AMEC CONSULTANTS
WELL ID	MW-8
FIELD	CAVE CREEK
COUNTY	MARICOPA STATE ARIZONA

TYPE OF LOGS: 60mm SONIC-CALIPER
MORE:

LOCATION

SEC TWP RGE

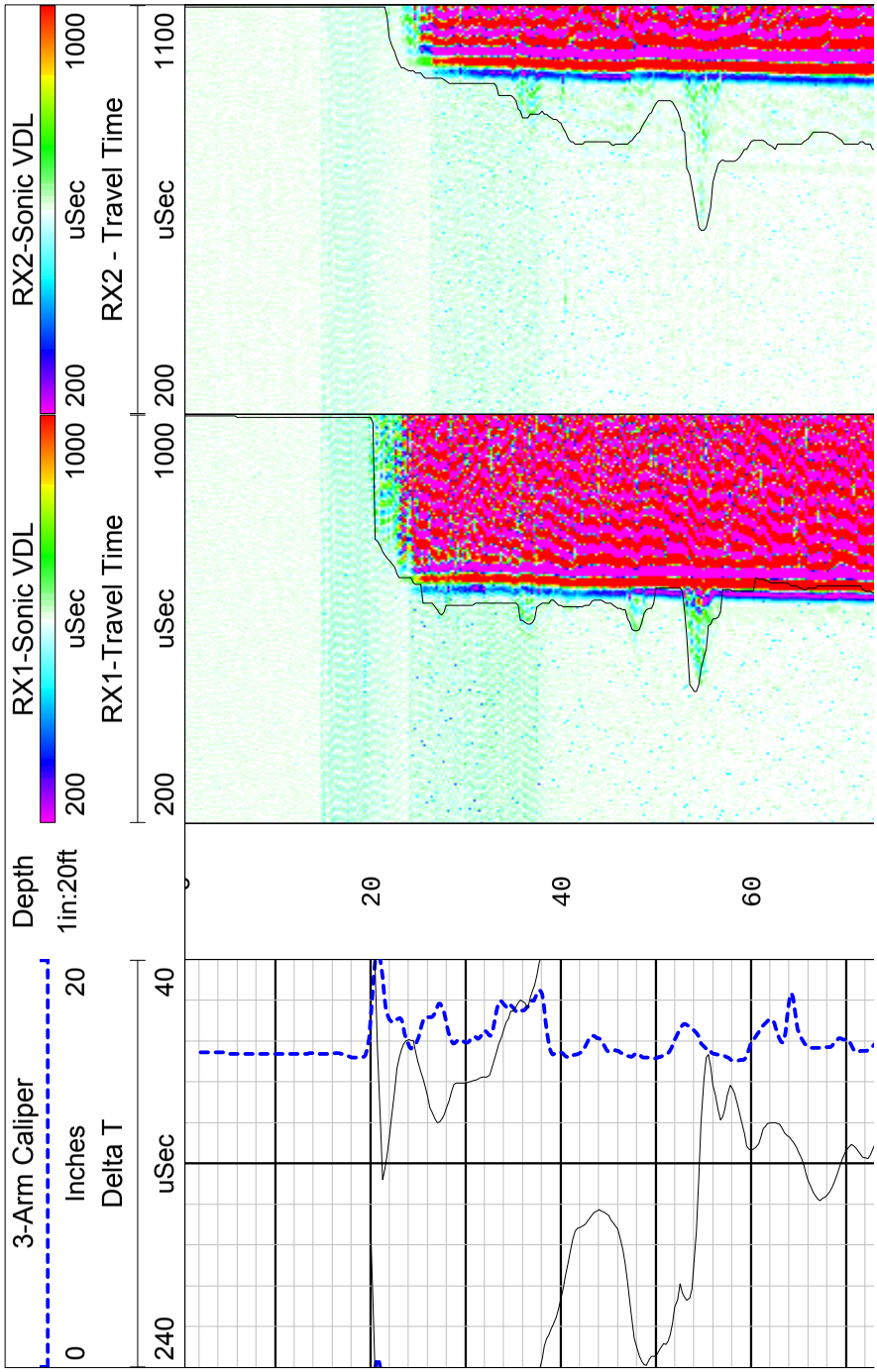
OTHER SERVICES
GAMMA
DUAL GUARD

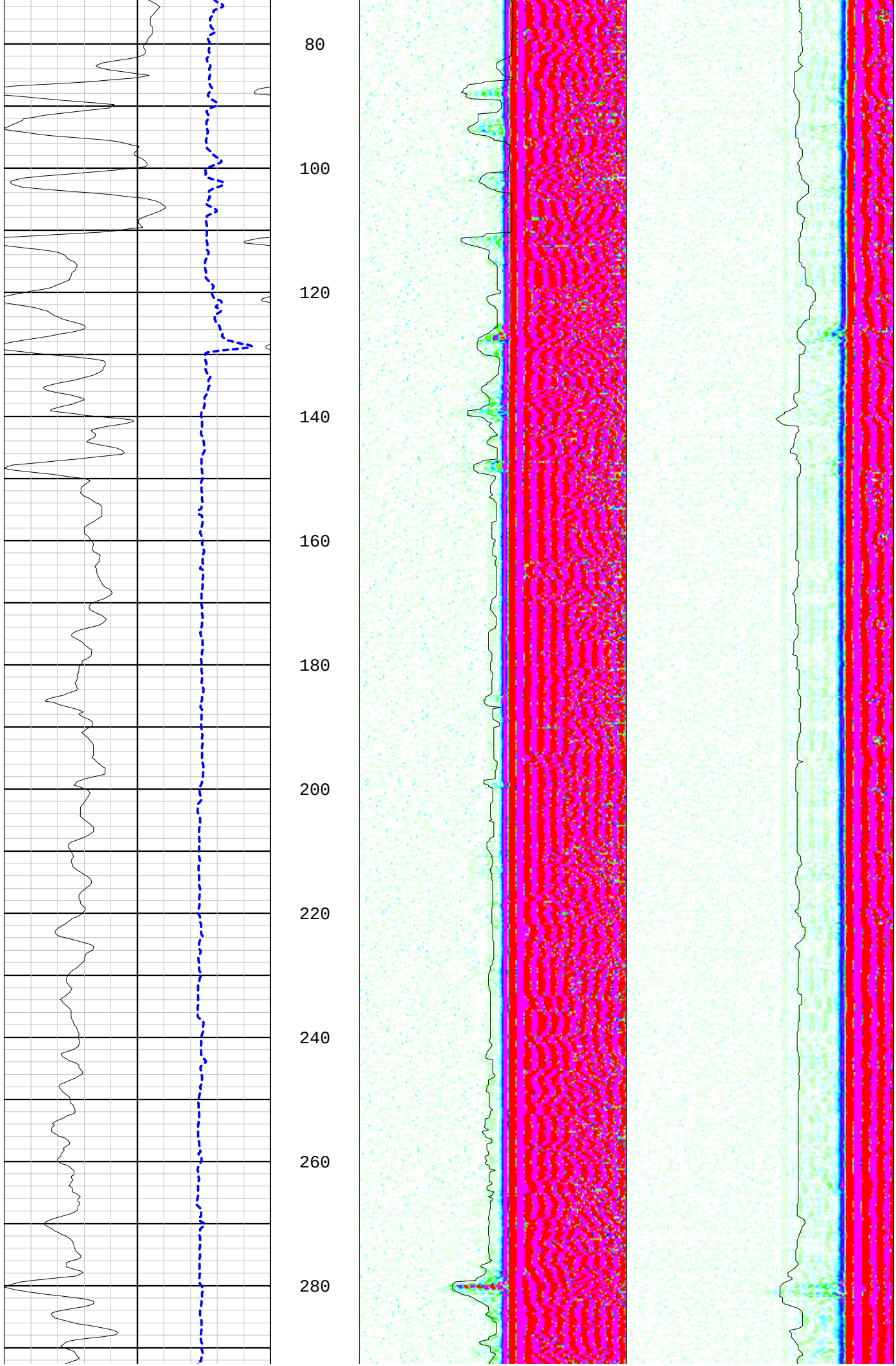
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	1-06-2012	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	60mm SONIC, CALIPER	DENSITY	
DEPTH-DRILLER	765 FT	LEVEL	N/A
DEPTH-LOGGER	761 FT	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	761 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	20 FT	SAMPLE INTERVAL	.2 FT
DRILLER / RIG#	YELLOW JACKET	LOGGING TRUCK	TRUCK #400
RECORDED BY / Logging Eng.	C. NEFF	TOOL STRING/SN	MSI FWS, 2CAA
WITNESSED BY	AMEC	LOG TIME:ON SITE/OFF SITE	0720 1800

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	20 "	0	20 FT	16"		SURFACE	19 FT
2	14 3/4"	20 FT	TOTAL DEPTH				

COMMENTS: SONIC USED TO DETERMINE STATIC WATER LEVEL

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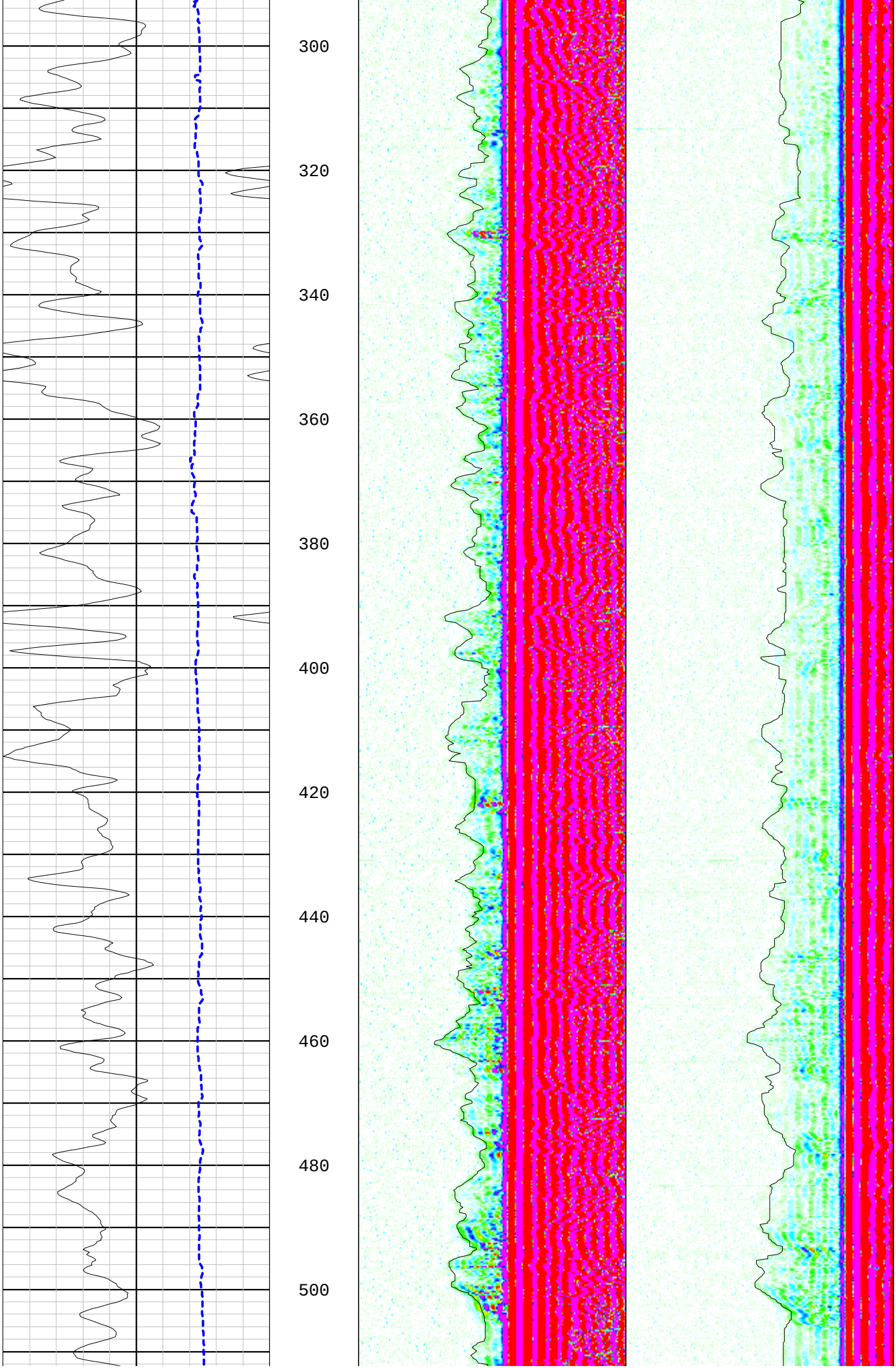
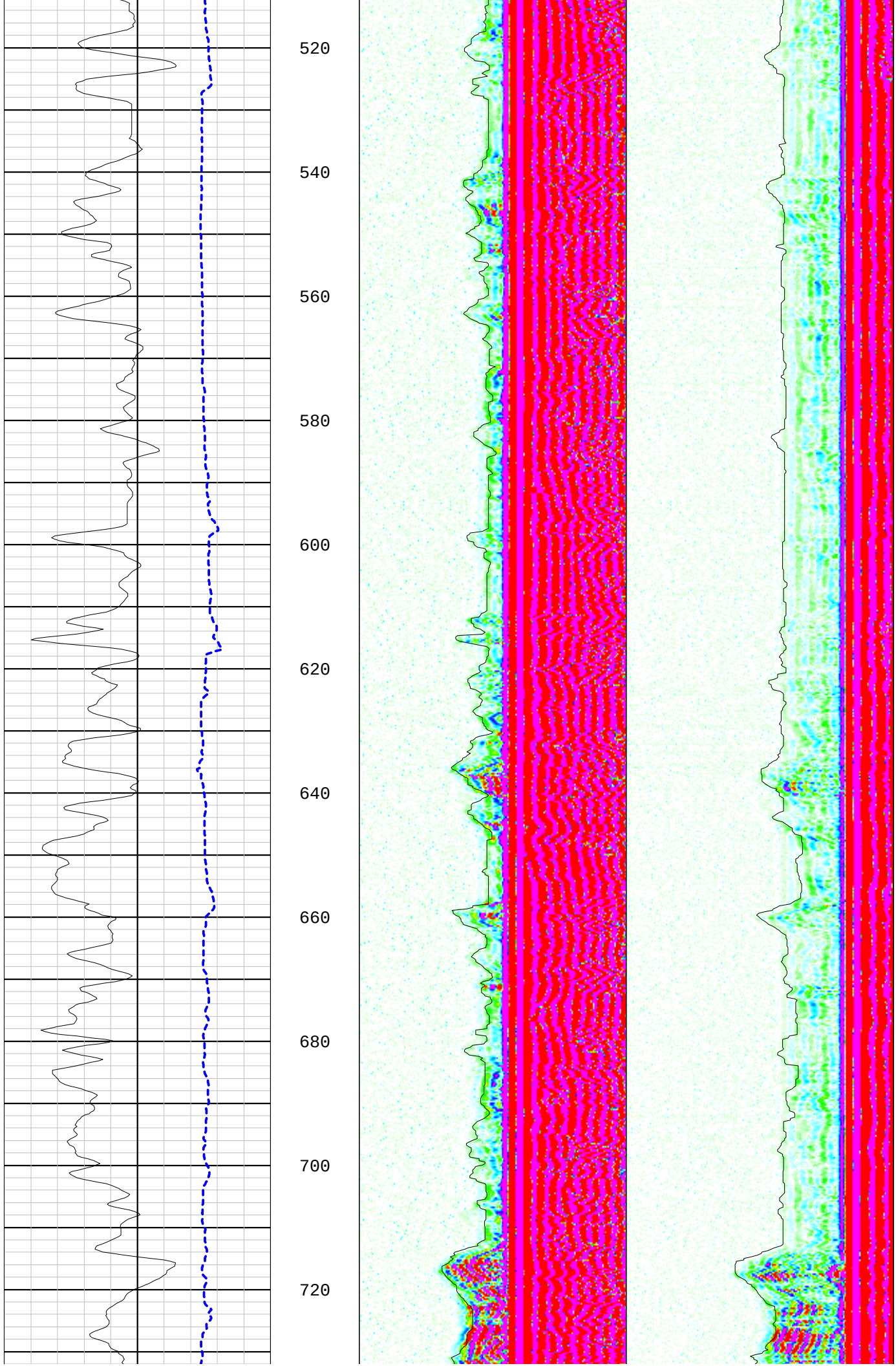
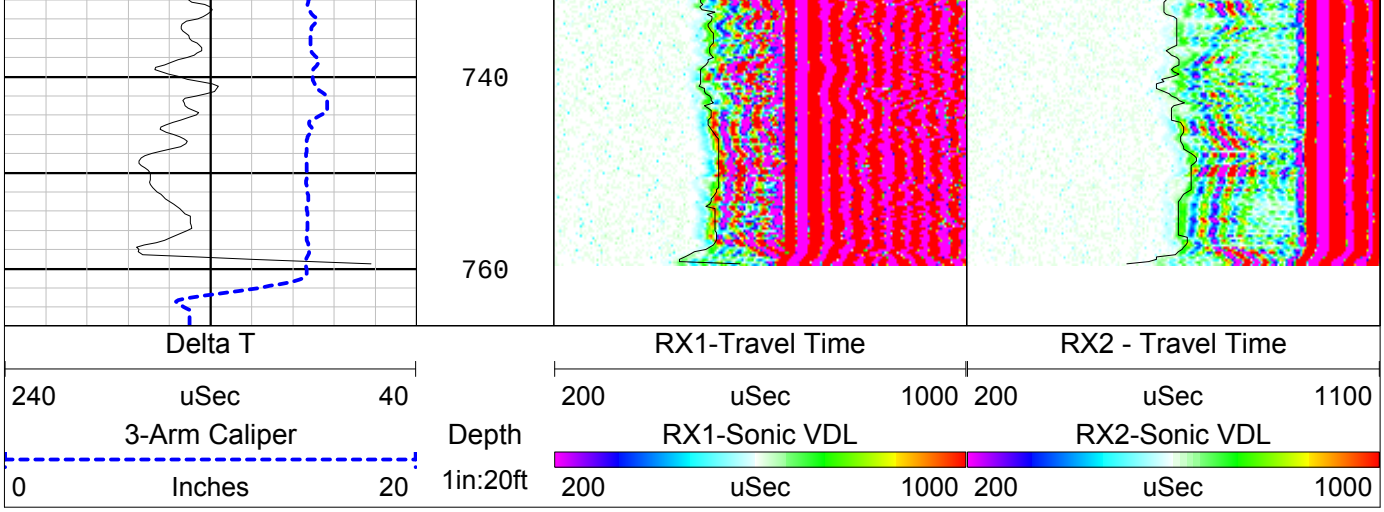
100
120
140
160
180
200
220
240
260
280

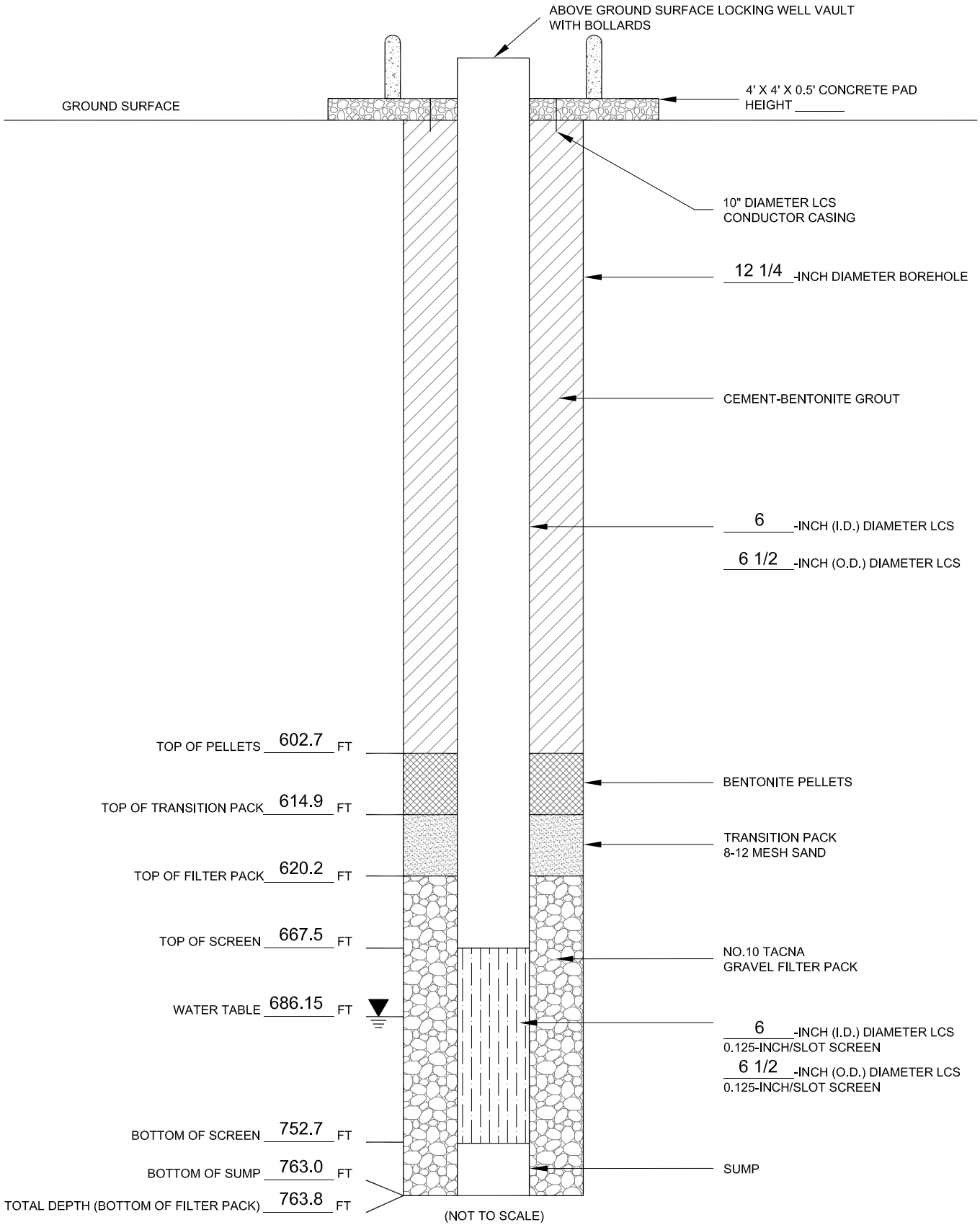

300
320
340
360
380
400
420
440
460
480
500


520
540
560
580
600
620
640
660
680
700
720


740
760
Delta T
RX1-Travel Time
RX2 - Travel Time
240
uSec
40
200
uSec
1000
200
uSec
1100
3-Arm Caliper
Depth
RX1-Sonic VDL
RX2-Sonic VDL
0
Inches
20
1in:20ft
200
uSec
1000
200
uSec
1000

APPENDIX C

WELL CONSTRUCTION LOGS

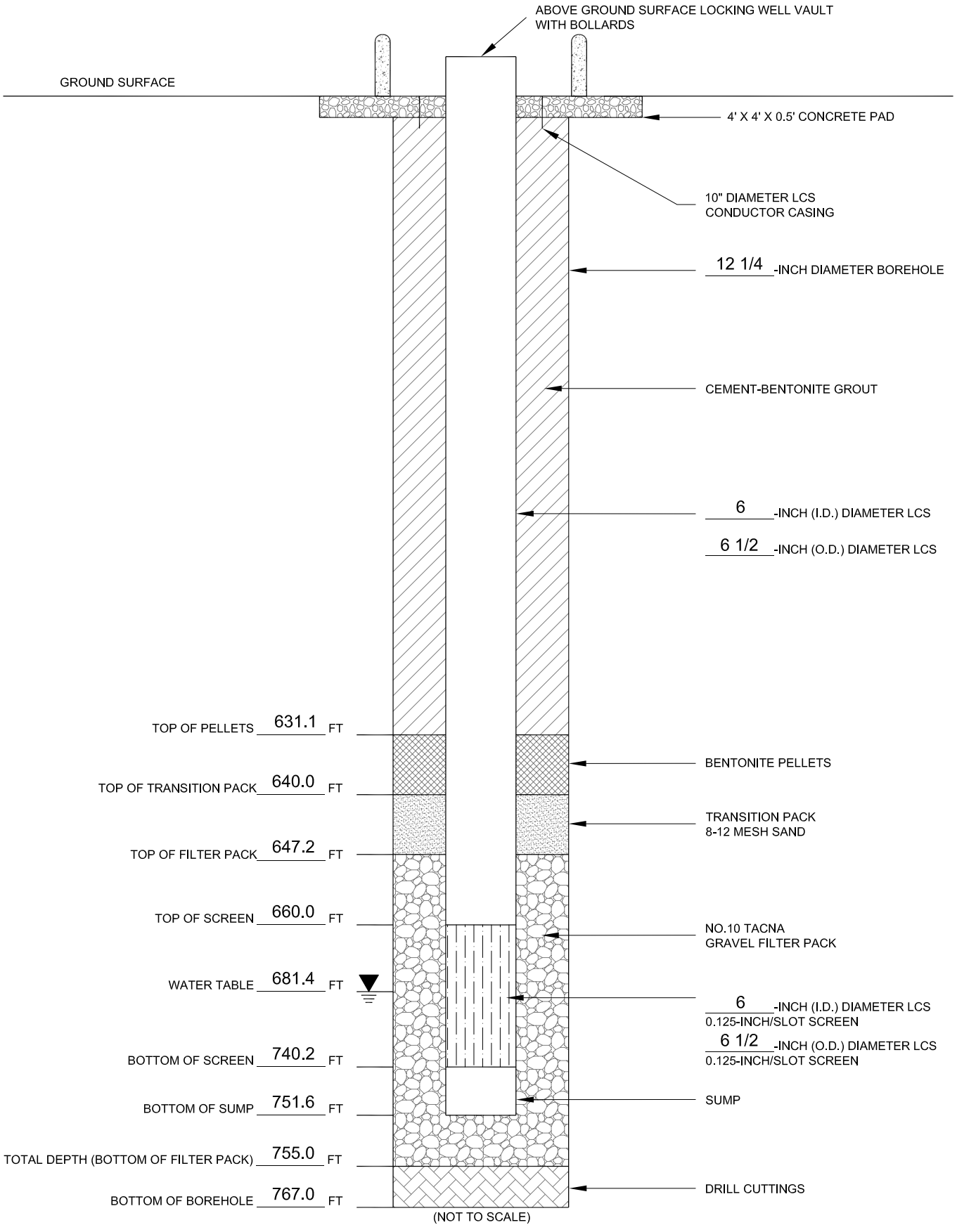


JOB NO.	14-2010-2022
DESIGN:	LM
DRAWN:	GWH
DATE:	9/2010
SCALE:	N.T.S.

AS-BUILT
WELL MW-4 (TB-5)
MONITOR WELL CONSTRUCTION
CAVE CREEK LANDFILL

amec
Environment & Infrastructure
4600 East Washington Street, Suite 600
Phoenix, Arizona

G:\Environmental-Development\2010 Projects\14-2010-2022 Cave Creek Landfill 2010-2011 Consulting\V_CAD\Well Construction Diagram.dwg

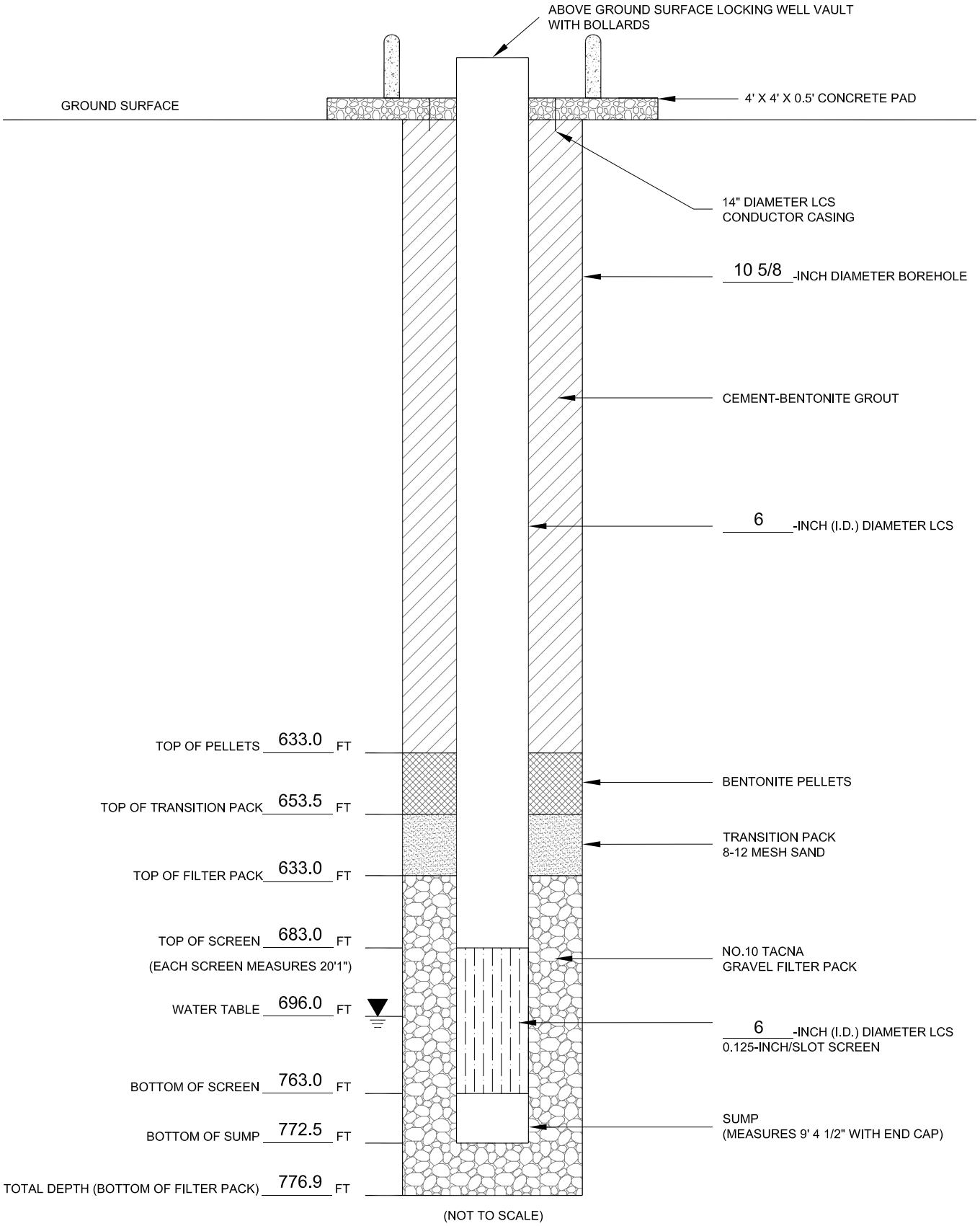


JOB NO.	14-2010-2022
DESIGN:	LM
DRAWN:	GWH
DATE:	12/2010
SCALE:	N.T.S.

AS-BUILT
WELL MW-5 (TB-4)
MONITOR WELL CONSTRUCTION
CAVE CREEK LANDFILL

amec
Environment & Infrastructure
4600 East Washington Street, Suite 600
Phoenix, Arizona

G:\Environmental-Development\2010 Projects\14-2010-2022 Cave Creek Landfill 2010-2011 Consulting\V_CAD\Well Construction Diagram.dwg



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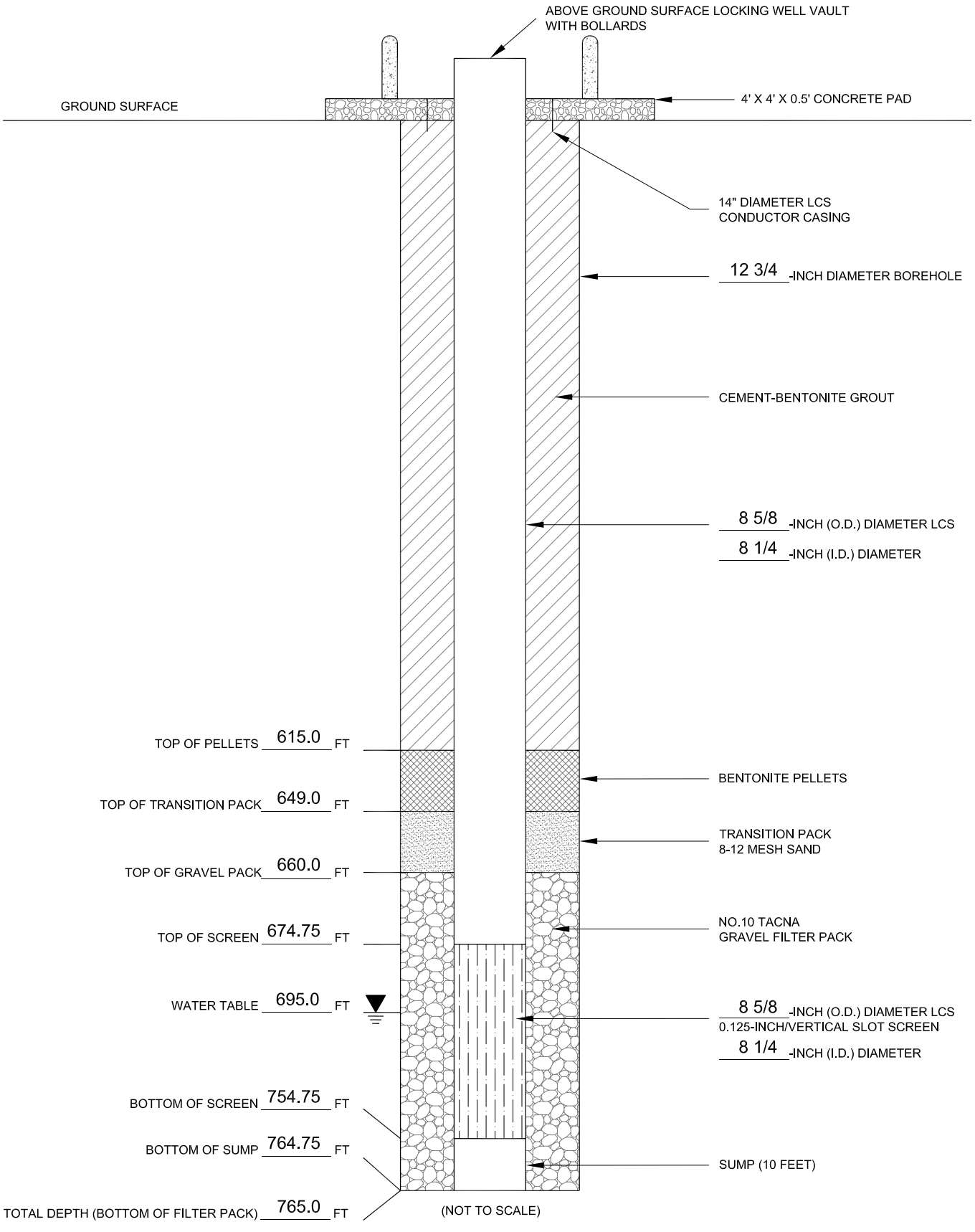
DRAWN:	GWH
DATE:	4/27/11
SCALE:	N.T.S.

AS-BUILT
WELL MW-6 (TB-2)
MONITOR WELL CONSTRUCTION
CAVE CREEK LANDFILL

amec
Environment & Infrastructure
4600 East Washington Street, Suite 600
Phoenix, Arizona

G:\Environmental-Development\2010 Projects\14-2010-2022 Cave Creek Landfill 2010-2011 Consulting\V_CAD\Well Construction Diagram.dwg

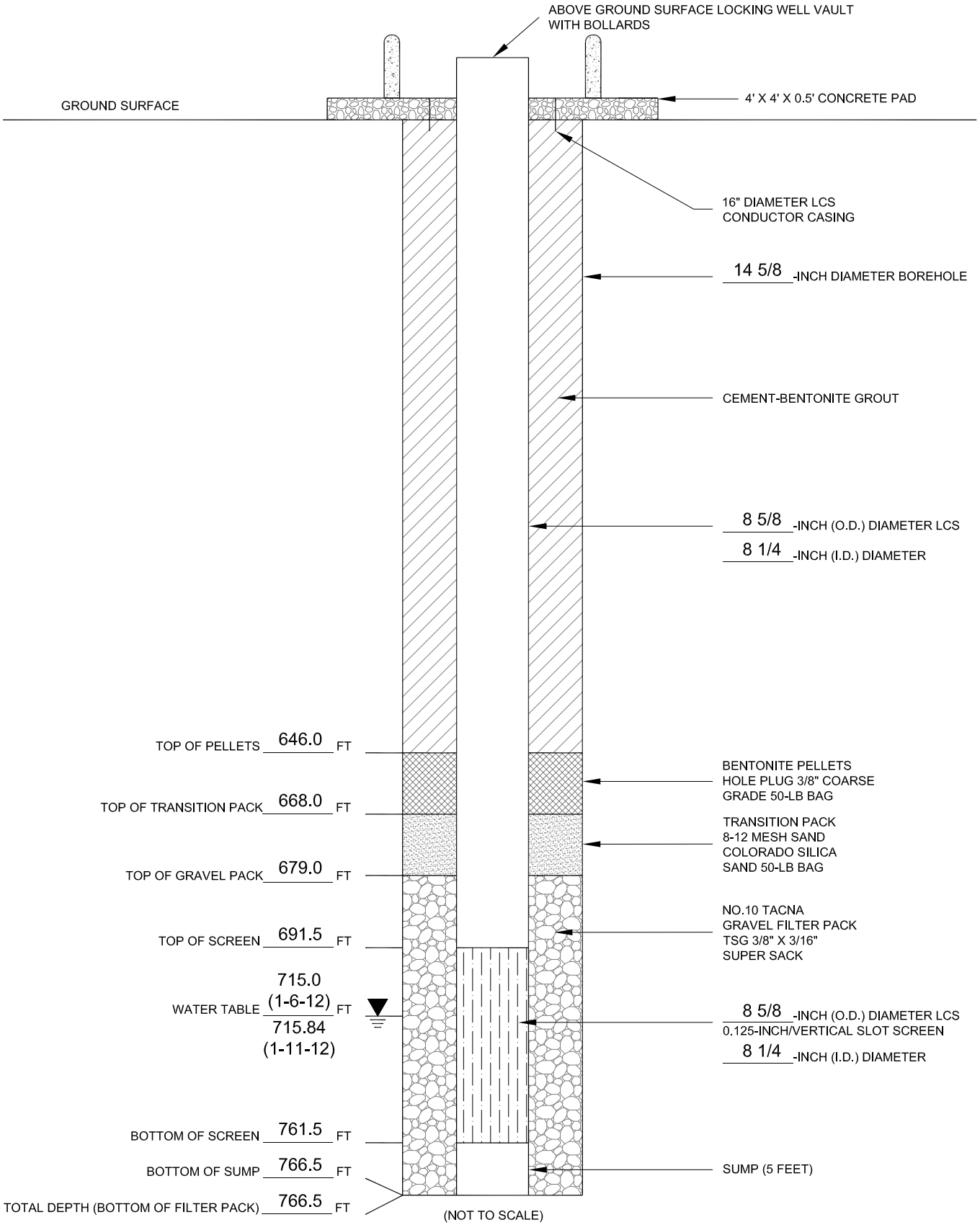


JOB NO.	14-2011-2023
DESIGN:	LM
DRAWN:	GWH
DATE:	3/2012
SCALE:	N.T.S.

WELL MW-7
GROUNDWATER WELL CONSTRUCTION
CAVE CREEK LANDFILL

amec
Environment & Infrastructure
4600 East Washington Street, Suite 600
Phoenix, Arizona

G:\Environmental-Development\2010 Projects\14-2010-2022 Cave Creek Landfill 2010-2011 Consulting\V_CAD\Well Construction Diagram.dwg

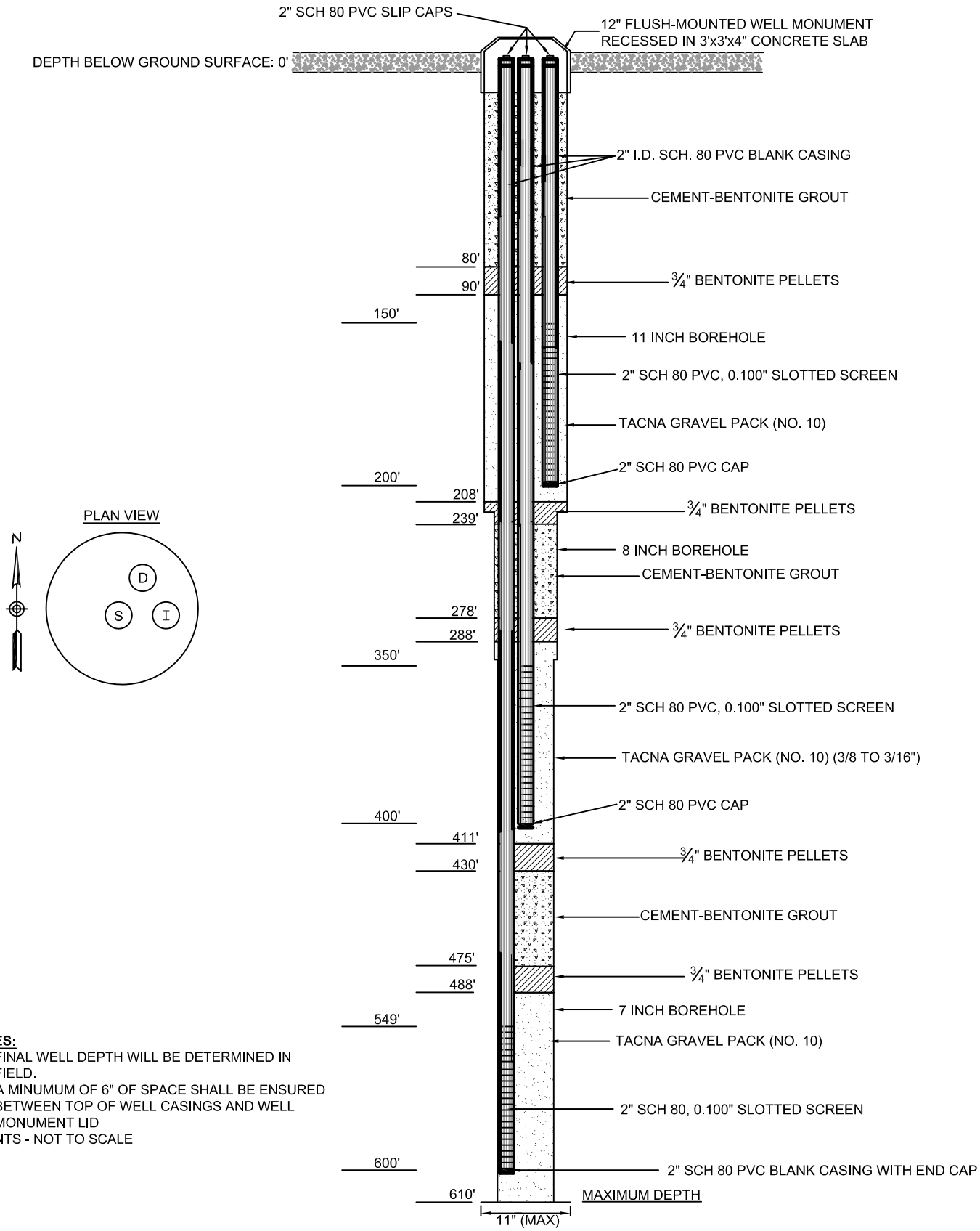


JOB NO.	14-2010-2022
DESIGN:	LM
DRAWN:	GWH
DATE:	2/2012
SCALE:	N.T.S.

WELL MW-8
GROUNDWATER WELL CONSTRUCTION
CAVE CREEK LANDFILL

amec
Environment & Infrastructure
4600 East Washington Street, Suite 600
Phoenix, Arizona

G:\Environmental-Development\2010 Projects\14-2010-2022 Cave Creek Landfill 2010-2011 Consulting\V_CAD\Well Construction Diagram.dwg



NOTES:

1. FINAL WELL DEPTH WILL BE DETERMINED IN FIELD.
2. A MINUMUM OF 6" OF SPACE SHALL BE ENSURED BETWEEN TOP OF WELL CASINGS AND WELL MONUMENT LID
3. NTS - NOT TO SCALE

JOB NO.	14-2011-2023
DESIGN:	MLD
DRAWN:	SRH
DATE:	01/2010
SCALE:	NTS

FINAL SOIL VAPOR NESTED WELL DIAGRAM

CAVE CREEK LANDFILL
PHOENIX, ARIZONA

FIGURE
5

amec
Environment & Infrastructure, Inc.
4600 East Washington Street, Suite 600
Phoenix, Arizona

G:\Environmental-Development\2009 Projects\09-114-03000 Cave Creek LF\CAD\Well Detail.dwg

APPENDIX D

GROUNDWATER ELEVATION DATA

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-01						
	4/18/2003	703.0	1,895.6	1,192.6	1,200.6	-
	3/2/2005	716.9	1,895.6	1,178.7	1,200.6	-
	3/9/2005	716.7	1,895.6	1,179.0	1,155.6	23.4
	3/21/2005	713.8	1,895.6	1,181.8	1,155.6	26.2
	4/8/2005	702.8	1,895.6	1,192.8	1,155.6	37.2
	6/1/2005	715.8	1,895.6	1,179.8	1,155.6	24.2
	6/14/2005	719.0	1,895.6	1,176.6	1,155.6	21.0
	6/30/2005	719.0	1,895.6	1,176.6	1,155.6	21.0
	7/7/2005	719.1	1,895.6	1,176.5	1,155.6	20.9
	7/14/2005	719.1	1,895.6	1,176.5	1,155.6	20.9
	7/21/2005	717.7	1,895.6	1,177.9	1,155.6	22.3
	7/28/2005	717.1	1,895.6	1,178.6	1,155.6	22.9
	8/5/2005	714.3	1,895.6	1,181.4	1,155.6	25.8
	8/12/2005	714.3	1,895.6	1,181.4	1,155.6	25.8
	8/19/2005	715.9	1,895.6	1,179.7	1,155.6	24.1
	8/26/2005	711.6	1,895.6	1,184.0	1,155.6	28.4
	9/2/2005	710.4	1,895.6	1,185.3	1,155.6	29.6
	9/8/2005	708.6	1,895.6	1,187.0	1,155.6	31.4
	9/15/2005	708.0	1,895.6	1,187.6	1,155.6	32.0
	9/22/2005	707.0	1,895.6	1,188.6	1,155.6	33.0
	9/29/2005	706.3	1,895.6	1,189.3	1,155.6	33.7
	10/6/2005	706.2	1,895.6	1,189.5	1,155.6	33.8
	10/13/2005	705.9	1,895.6	1,189.8	1,155.6	34.1
	10/20/2005	719.6	1,895.6	1,176.0	1,155.6	20.4
	10/20/2005	719.6	1,895.6	1,176.0	1,155.6	20.4
	10/27/2005	719.6	1,895.6	1,176.0	1,155.6	20.4
	10/27/2005	719.6	1,895.6	1,176.0	1,155.6	20.4
	11/3/2005	719.6	1,895.6	1,176.0	1,155.6	20.4
	11/3/2005	719.6	1,895.6	1,176.0	1,155.6	20.4
	11/10/2005	719.8	1,895.6	1,175.8	1,155.6	20.2
	11/10/2005	719.8	1,895.6	1,175.8	1,155.6	20.2
	12/8/2005	718.9	1,895.6	1,176.7	1,155.6	21.1
	12/8/2005	718.9	1,895.6	1,176.7	1,155.6	21.1
	1/12/2006	718.0	1,895.6	1,177.6	1,155.6	22.0
	1/12/2006	718.0	1,895.6	1,177.6	1,155.6	22.0
	2/10/2006	720.2	1,895.6	1,175.4	1,155.6	19.8
	2/10/2006	720.2	1,895.6	1,175.4	1,155.6	19.8
	3/10/2006	720.2	1,895.6	1,175.5	1,155.6	19.9
	3/10/2006	720.2	1,895.6	1,175.5	1,155.6	19.9
	4/13/2006	720.5	1,895.6	1,175.2	1,155.6	19.6
	4/13/2006	720.5	1,895.6	1,175.2	1,155.6	19.6
	5/9/2006	720.6	1,895.6	1,175.0	1,155.6	19.4
	5/9/2006	720.6	1,895.6	1,175.0	1,155.6	19.4
	6/20/2006	720.3	1,895.6	1,175.4	1,155.6	19.8
	6/20/2006	720.3	1,895.6	1,175.4	1,155.6	19.8
	7/13/2006	720.3	1,895.6	1,175.3	1,155.6	19.7
	7/13/2006	720.3	1,895.6	1,175.3	1,155.6	19.7
	8/16/2006	721.0	1,895.6	1,174.6	1,155.6	19.0
	8/16/2006	721.0	1,895.6	1,174.6	1,155.6	19.0
	9/19/2006	720.4	1,895.6	1,175.2	1,155.6	19.6

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-01						
	9/19/2006	720.4	1,895.6	1,175.2	1,155.6	19.6
	10/13/2006	721.1	1,895.6	1,174.5	1,155.6	18.9
	10/13/2006	721.1	1,895.6	1,174.5	1,155.6	18.9
	11/13/2006	724.2	1,895.6	1,171.4	1,155.6	15.8
	11/13/2006	724.2	1,895.6	1,171.4	1,155.6	15.8
	12/13/2006	721.8	1,895.6	1,173.9	1,155.6	18.3
	12/13/2006	721.8	1,895.6	1,173.9	1,155.6	18.3
	1/18/2007	722.1	1,895.6	1,173.6	1,155.6	17.9
	1/18/2007	722.1	1,895.6	1,173.6	1,155.6	17.9
	2/21/2007	722.6	1,895.6	1,173.1	1,155.6	17.4
	2/21/2007	722.6	1,895.6	1,173.1	1,155.6	17.4
	3/20/2007	722.8	1,895.6	1,172.9	1,155.6	17.2
	3/20/2007	722.8	1,895.6	1,172.9	1,155.6	17.2
	4/16/2007	723.0	1,895.6	1,172.7	1,155.6	17.0
	4/16/2007	723.0	1,895.6	1,172.7	1,155.6	17.0
	5/22/2007	723.2	1,895.6	1,172.4	1,155.6	16.8
	5/22/2007	723.2	1,895.6	1,172.4	1,155.6	16.8
	6/12/2007	723.6	1,895.6	1,172.1	1,155.6	16.4
	6/12/2007	723.6	1,895.6	1,172.1	1,155.6	16.4
	7/18/2007	723.6	1,895.6	1,172.0	1,155.6	16.4
	7/18/2007	723.6	1,895.6	1,172.0	1,155.6	16.4
MW-02						
	4/12/2001	680.0	1,856.0	1,176.0	1,181.0	-
	5/23/2001	680.0	1,856.0	1,176.0	1,181.0	-
	9/21/2001	658.0	1,856.0	1,198.0	1,181.0	17.0
	10/2/2001	675.0	1,856.0	1,181.0	1,181.0	-
	1/28/2002	675.0	1,856.0	1,181.0	1,181.0	-
	3/22/2002	675.0	1,856.0	1,181.0	1,181.0	-
	4/18/2003	670.0	1,856.0	1,186.0	1,181.0	5.0
	7/17/2003	673.0	1,856.0	1,183.0	1,181.0	2.0
	1/12/2004	673.0	1,856.0	1,183.0	1,181.0	2.0
	3/17/2004	676.5	1,856.0	1,179.5	1,181.0	-
	4/23/2004	676.5	1,856.0	1,179.5	1,181.0	-
	3/2/2005	677.7	1,856.0	1,178.4	1,152.0	26.3
	3/9/2005	679.9	1,856.0	1,176.1	1,152.0	24.1
	3/21/2005	675.3	1,856.0	1,180.7	1,152.0	28.7
	4/8/2005	665.8	1,856.0	1,190.2	1,152.0	38.2
	6/1/2005	678.3	1,856.0	1,177.7	1,152.0	25.7
	6/14/2005	681.6	1,856.0	1,174.4	1,152.0	22.4
	6/30/2005	680.5	1,856.0	1,175.5	1,152.0	23.5
	7/7/2005	680.7	1,856.0	1,175.3	1,152.0	23.3
	7/14/2005	680.8	1,856.0	1,175.3	1,152.0	23.2
	7/21/2005	679.3	1,856.0	1,176.8	1,152.0	24.8
	7/28/2005	678.7	1,856.0	1,177.3	1,152.0	25.3
	8/5/2005	675.1	1,856.0	1,180.9	1,152.0	28.9
	8/12/2005	675.3	1,856.0	1,180.8	1,152.0	28.8
	8/19/2005	678.6	1,856.0	1,177.5	1,152.0	25.4
	8/26/2005	674.0	1,856.0	1,182.0	1,152.0	30.0
	9/2/2005	671.7	1,856.0	1,184.4	1,152.0	32.3
	9/8/2005	671.4	1,856.0	1,184.6	1,152.0	32.6

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-02						
	9/15/2005	671.3	1,856.0	1,184.7	1,152.0	32.7
	9/22/2005	670.4	1,856.0	1,185.6	1,152.0	33.6
	9/29/2005	669.9	1,856.0	1,186.2	1,152.0	34.1
	10/6/2005	670.0	1,856.0	1,186.1	1,152.0	34.1
	10/13/2005	669.6	1,856.0	1,186.4	1,152.0	34.4
	10/20/2005	681.3	1,856.0	1,174.7	1,152.0	22.7
	10/20/2005	681.3	1,856.0	1,174.7	1,152.0	22.7
	10/27/2005	681.3	1,856.0	1,174.7	1,152.0	22.7
	10/27/2005	681.3	1,856.0	1,174.7	1,152.0	22.7
	11/3/2005	681.3	1,856.0	1,174.8	1,152.0	22.8
	11/3/2005	681.3	1,856.0	1,174.8	1,152.0	22.8
	11/10/2005	681.5	1,856.0	1,174.6	1,152.0	22.6
	11/10/2005	681.5	1,856.0	1,174.6	1,152.0	22.6
	12/8/2005	680.8	1,856.0	1,175.2	1,152.0	23.2
	12/8/2005	680.8	1,856.0	1,175.2	1,152.0	23.2
	1/12/2006	681.8	1,856.0	1,174.2	1,152.0	22.2
	1/12/2006	681.8	1,856.0	1,174.2	1,152.0	22.2
	2/10/2006	682.0	1,856.0	1,174.0	1,152.0	22.0
	2/10/2006	682.0	1,856.0	1,174.0	1,152.0	22.0
	3/10/2006	681.9	1,856.0	1,174.2	1,152.0	22.2
	3/10/2006	681.9	1,856.0	1,174.2	1,152.0	22.2
	4/13/2006	682.2	1,856.0	1,173.8	1,152.0	21.8
	4/13/2006	682.2	1,856.0	1,173.8	1,152.0	21.8
	5/9/2006	682.4	1,856.0	1,173.7	1,152.0	21.7
	5/9/2006	682.4	1,856.0	1,173.7	1,152.0	21.7
	6/20/2006	682.5	1,856.0	1,173.5	1,152.0	21.5
	6/20/2006	682.5	1,856.0	1,173.5	1,152.0	21.5
	7/13/2006	682.6	1,856.0	1,173.5	1,152.0	21.5
	7/13/2006	682.6	1,856.0	1,173.5	1,152.0	21.5
	8/16/2006	683.2	1,856.0	1,172.8	1,152.0	20.8
	8/16/2006	683.2	1,856.0	1,172.8	1,152.0	20.8
	9/19/2006	682.2	1,856.0	1,173.9	1,152.0	21.9
	9/19/2006	682.2	1,856.0	1,173.9	1,152.0	21.9
	10/13/2006	683.6	1,856.0	1,172.4	1,152.0	20.4
	10/13/2006	683.6	1,856.0	1,172.4	1,152.0	20.4
	11/13/2006	689.4	1,856.0	1,166.6	1,152.0	14.6
	11/13/2006	689.4	1,856.0	1,166.6	1,152.0	14.6
	12/13/2006	684.1	1,856.0	1,171.9	1,152.0	19.9
	12/13/2006	684.1	1,856.0	1,171.9	1,152.0	19.9
	1/18/2007	683.9	1,856.0	1,172.2	1,152.0	20.2
	1/18/2007	683.9	1,856.0	1,172.2	1,152.0	20.2
	2/21/2007	684.7	1,856.0	1,171.3	1,152.0	19.3
	2/21/2007	684.7	1,856.0	1,171.3	1,152.0	19.3
	3/20/2007	684.8	1,856.0	1,171.2	1,152.0	19.2
	3/20/2007	684.8	1,856.0	1,171.2	1,152.0	19.2
	4/16/2007	685.1	1,856.0	1,170.9	1,152.0	18.9
	4/16/2007	685.1	1,856.0	1,170.9	1,152.0	18.9
	5/22/2007	685.4	1,856.0	1,170.7	1,152.0	18.6
	5/22/2007	685.4	1,856.0	1,170.7	1,152.0	18.6
	6/12/2007	685.7	1,856.0	1,170.3	1,152.0	18.3

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-02						
	6/12/2007	685.7	1,856.0	1,170.3	1,152.0	18.3
	7/18/2007	686.0	1,856.0	1,170.1	1,152.0	18.0
	7/18/2007	686.0	1,856.0	1,170.1	1,152.0	18.0
	9/18/2007	686.4	1,856.0	1,169.6	1,152.0	17.6
	9/18/2007	686.4	1,856.0	1,169.6	1,152.0	17.6
	10/24/2007	686.9	1,856.0	1,169.2	1,152.0	17.1
	10/24/2007	686.9	1,856.0	1,169.2	1,152.0	17.1
	11/16/2007	687.1	1,856.0	1,168.9	1,152.0	16.9
	11/16/2007	687.1	1,856.0	1,168.9	1,152.0	16.9
	12/19/2007	687.4	1,856.0	1,168.6	1,152.0	16.6
	12/19/2007	687.4	1,856.0	1,168.6	1,152.0	16.6
	1/12/2008	687.8	1,856.0	1,168.2	1,152.0	16.2
	1/12/2008	687.8	1,856.0	1,168.2	1,152.0	16.2
	2/20/2008	687.8	1,856.0	1,168.2	1,152.0	16.2
	2/20/2008	687.8	1,856.0	1,168.2	1,152.0	16.2
	3/12/2008	687.8	1,856.0	1,168.2	1,152.0	16.2
	3/12/2008	687.8	1,856.0	1,168.2	1,152.0	16.2
	4/16/2008	688.5	1,856.0	1,167.5	1,152.0	15.5
	4/16/2008	688.5	1,856.0	1,167.5	1,152.0	15.5
	5/20/2008	688.1	1,856.0	1,167.9	1,152.0	15.9
	5/20/2008	688.1	1,856.0	1,167.9	1,152.0	15.9
	6/16/2008	688.0	1,856.0	1,168.0	1,152.0	16.0
	6/16/2008	688.0	1,856.0	1,168.0	1,152.0	16.0
	7/18/2008	689.0	1,856.0	1,167.0	1,152.0	15.0
	7/18/2008	689.0	1,856.0	1,167.0	1,152.0	15.0
	8/13/2008	688.9	1,856.0	1,167.1	1,152.0	15.1
	8/13/2008	688.9	1,856.0	1,167.1	1,152.0	15.1
	9/15/2008	687.6	1,856.0	1,168.4	1,152.0	16.4
	9/15/2008	687.6	1,856.0	1,168.4	1,152.0	16.4
	10/16/2008	689.0	1,856.0	1,167.0	1,152.0	15.0
	10/16/2008	689.0	1,856.0	1,167.0	1,152.0	15.0
	11/14/2008	689.0	1,856.0	1,167.0	1,152.0	15.0
	11/14/2008	689.0	1,856.0	1,167.0	1,152.0	15.0
	12/12/2008	688.0	1,856.0	1,168.0	1,152.0	16.0
	12/12/2008	688.0	1,856.0	1,168.0	1,152.0	16.0
	1/13/2009	688.5	1,856.0	1,167.5	1,152.0	15.5
	1/13/2009	688.5	1,856.0	1,167.5	1,152.0	15.5
	2/12/2009	690.2	1,856.0	1,165.8	1,152.0	13.8
	2/12/2009	690.2	1,856.0	1,165.8	1,152.0	13.8
	3/12/2009	690.4	1,856.0	1,165.6	1,152.0	13.6
	3/12/2009	690.4	1,856.0	1,165.6	1,152.0	13.6
	7/15/2009	690.8	1,856.0	1,165.2	1,142.0	23.2
	7/15/2009	690.8	1,856.0	1,165.2	1,142.0	23.2
	8/14/2009	691.0	1,856.0	1,165.0	1,142.0	23.0
	9/17/2009	691.2	1,856.0	1,164.8	1,142.0	22.8
	10/15/2009	691.4	1,856.0	1,164.6	1,142.0	22.6
	11/12/2009	691.4	1,856.0	1,164.6	1,142.0	22.6
	12/11/2009	691.6	1,856.0	1,164.4	1,142.0	22.4
	1/13/2010	691.7	1,856.0	1,164.4	1,142.0	22.4
	2/17/2010	690.0	1,856.0	1,166.0	1,142.0	24.0

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-02						
	3/10/2010	692.1	1,856.0	1,163.9	1,142.0	21.9
	4/16/2010	692.3	1,856.0	1,163.7	1,142.0	21.7
	5/20/2010	692.4	1,856.0	1,163.6	1,142.0	21.6
	6/16/2010	692.2	1,856.0	1,163.9	1,142.0	21.9
	7/20/2010	692.8	1,856.0	1,163.3	1,142.0	21.3
	8/13/2010	692.7	1,856.0	1,163.3	1,142.0	21.3
	9/13/2010	692.5	1,856.0	1,163.5	1,142.0	21.5
	10/15/2010	692.8	1,856.0	1,163.3	1,142.0	21.3
	11/16/2010	692.8	1,856.0	1,163.2	1,142.0	21.2
	12/16/2010	692.8	1,856.0	1,163.3	1,142.0	21.3
	1/11/2011	693.0	1,856.0	1,163.1	1,142.0	21.1
	2/15/2011	692.9	1,856.0	1,163.2	1,142.0	21.1
	3/9/2011	692.8	1,856.0	1,163.2	1,142.0	21.2
	4/30/2011	692.7	1,856.0	1,163.3	1,142.0	21.3
	4/30/2011	692.7	1,856.0	1,163.3	1,142.0	21.3
	5/26/2011	692.7	1,856.0	1,163.4	1,142.0	21.4
	5/26/2011	692.7	1,856.0	1,163.4	1,142.0	21.4
	6/30/2011	692.8	1,856.0	1,163.2	1,142.0	21.2
	7/12/2011	692.8	1,856.0	1,163.2	1,142.0	21.2
	8/18/2011	692.9	1,856.0	1,163.1	1,142.0	21.1
	9/16/2011	693.0	1,856.0	1,163.1	1,142.0	21.1
	10/24/2011	693.0	1,856.0	1,163.1	1,142.0	21.0
	11/22/2011	693.4	1,856.0	1,162.6	1,142.0	20.6
	12/19/2011	693.2	1,856.0	1,162.8	1,142.0	20.8
	1/30/2012	692.9	1,856.0	1,163.2	1,142.0	21.1
	2/15/2012	693.1	1,856.0	1,162.9	1,142.0	20.9
	3/14/2012	693.0	1,856.0	1,163.0	1,142.0	21.0
	4/30/2012	692.7	1,856.0	1,163.4	1,142.0	21.3
	5/8/2012	693.3	1,856.0	1,162.7	1,142.0	20.7
	6/13/2012	693.3	1,856.0	1,162.7	1,142.0	20.7
	7/23/2012	693.7	1,856.0	1,162.3	1,142.0	20.3
	8/22/2012	693.5	1,856.0	1,162.5	1,142.0	20.5
	9/17/2012	694.0	1,856.0	1,162.0	1,142.0	20.0
	10/18/2012	694.1	1,856.0	1,161.9	1,142.0	19.9
MW-03						
	2/20/2008	697.4	1,866.6	1,169.2	1,089.6	79.6
	2/20/2008	697.4	1,866.6	1,169.2	1,089.6	79.6
	3/12/2008	696.6	1,866.6	1,170.0	1,089.6	80.4
	3/12/2008	696.6	1,866.6	1,170.0	1,089.6	80.4
	4/16/2008	697.6	1,866.6	1,169.0	1,089.6	79.4
	4/16/2008	697.6	1,866.6	1,169.0	1,089.6	79.4
	5/20/2008	698.0	1,866.6	1,168.6	1,089.6	79.0
	5/20/2008	698.0	1,866.6	1,168.6	1,089.6	79.0
	6/16/2008	699.4	1,866.6	1,167.2	1,089.6	77.6
	6/16/2008	699.4	1,866.6	1,167.2	1,089.6	77.6
	7/18/2008	698.4	1,866.6	1,168.2	1,089.6	78.6
	7/18/2008	698.4	1,866.6	1,168.2	1,089.6	78.6
	8/13/2008	698.8	1,866.6	1,167.8	1,089.6	78.2
	8/13/2008	698.8	1,866.6	1,167.8	1,089.6	78.2
	9/15/2008	698.6	1,866.6	1,168.0	1,089.6	78.4

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-03						
	9/15/2008	698.6	1,866.6	1,168.0	1,089.6	78.4
	10/16/2008	699.2	1,866.6	1,167.4	1,089.6	77.8
	10/16/2008	699.2	1,866.6	1,167.4	1,089.6	77.8
	11/14/2008	699.5	1,866.6	1,167.1	1,089.6	77.5
	11/14/2008	699.5	1,866.6	1,167.1	1,089.6	77.5
	12/12/2008	699.3	1,866.6	1,167.3	1,089.6	77.7
	12/12/2008	699.3	1,866.6	1,167.3	1,089.6	77.7
	1/13/2009	699.7	1,866.6	1,166.9	1,089.6	77.3
	1/13/2009	699.7	1,866.6	1,166.9	1,089.6	77.3
	2/12/2009	699.9	1,866.6	1,166.7	1,089.6	77.1
	2/12/2009	699.9	1,866.6	1,166.7	1,089.6	77.1
	3/12/2009	699.5	1,866.6	1,167.1	1,089.6	77.5
	3/12/2009	699.5	1,866.6	1,167.1	1,089.6	77.5
	7/15/2009	699.0	1,866.6	1,167.6	1,142.6	25.0
	7/15/2009	699.0	1,866.6	1,167.6	1,142.6	25.0
	8/14/2009	702.9	1,866.6	1,163.7	1,142.6	21.1
	9/17/2009	701.1	1,866.6	1,165.5	1,142.6	22.9
	10/15/2009	701.4	1,866.6	1,165.2	1,142.6	22.6
	11/12/2009	701.2	1,866.6	1,165.4	1,142.6	22.8
	12/11/2009	701.4	1,866.6	1,165.2	1,142.6	22.6
	1/13/2010	699.9	1,866.6	1,166.7	1,142.6	24.1
	2/17/2010	699.1	1,866.6	1,167.5	1,142.6	24.9
	3/10/2010	702.2	1,866.6	1,164.4	1,142.6	21.8
	4/16/2010	702.3	1,866.6	1,164.3	1,142.6	21.7
	5/20/2010	702.4	1,866.6	1,164.2	1,142.6	21.6
	6/16/2010	702.5	1,866.6	1,164.1	1,142.6	21.6
	7/20/2010	702.6	1,866.6	1,164.0	1,142.6	21.4
	8/13/2010	702.5	1,866.6	1,164.1	1,142.6	21.5
	9/13/2010	702.8	1,866.6	1,163.8	1,142.6	21.3
	10/15/2010	702.6	1,866.6	1,164.0	1,142.6	21.4
	11/16/2010	702.5	1,866.6	1,164.1	1,142.6	21.5
	12/16/2010	702.0	1,866.6	1,164.6	1,142.6	22.0
	1/11/2011	702.6	1,866.6	1,164.0	1,142.6	21.4
	2/15/2011	701.6	1,866.6	1,165.0	1,142.6	22.5
	3/9/2011	702.5	1,866.6	1,164.1	1,142.6	21.6
	4/30/2011	702.3	1,866.6	1,164.3	1,142.6	21.7
	4/30/2011	702.3	1,866.6	1,164.3	1,142.6	21.7
	5/26/2011	702.4	1,866.6	1,164.2	1,142.6	21.6
	5/26/2011	702.4	1,866.6	1,164.2	1,142.6	21.6
	6/30/2011	702.5	1,866.6	1,164.1	1,142.6	21.5
	7/12/2011	702.5	1,866.6	1,164.1	1,142.6	21.5
	8/18/2011	702.7	1,866.6	1,163.9	1,142.6	21.4
	9/16/2011	702.6	1,866.6	1,163.9	1,142.6	21.4
	10/24/2011	701.5	1,866.6	1,165.1	1,142.6	22.5
	11/22/2011	703.2	1,866.6	1,163.4	1,142.6	20.9
	12/19/2011	703.4	1,866.6	1,163.2	1,142.6	20.6
	1/30/2012	692.9	1,866.6	1,173.7	1,142.6	31.1
	2/15/2012	702.4	1,866.6	1,164.2	1,142.6	21.6
	3/14/2012	702.9	1,866.6	1,163.7	1,142.6	21.2
	4/30/2012	703.2	1,866.6	1,163.4	1,142.6	20.8

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-03						
	5/8/2012	703.4	1,866.6	1,163.2	1,142.6	20.6
	6/13/2012	701.7	1,866.6	1,164.9	1,142.6	22.3
	7/23/2012	702.2	1,866.6	1,164.4	1,142.6	21.9
	8/21/2012	702.8	1,866.6	1,163.8	1,142.6	21.3
	9/17/2012	703.9	1,866.6	1,162.7	1,142.6	20.1
	10/18/2012	704.3	1,866.6	1,162.3	1,142.6	19.8
MW-04						
	11/16/2010	687.4	1,850.0	1,162.6	1,132.0	30.7
	12/16/2010	687.4	1,850.0	1,162.6	1,132.0	30.6
	1/11/2011	687.6	1,850.0	1,162.4	1,132.0	30.4
	2/15/2011	687.0	1,850.0	1,163.0	1,132.0	31.0
	3/9/2011	687.4	1,850.0	1,162.6	1,132.0	30.6
	4/30/2011	687.3	1,850.0	1,162.7	1,132.0	30.8
	4/30/2011	687.3	1,850.0	1,162.7	1,132.0	30.8
	5/26/2011	687.3	1,850.0	1,162.7	1,132.0	30.7
	5/26/2011	687.3	1,850.0	1,162.7	1,132.0	30.7
	6/30/2011	687.5	1,850.0	1,162.5	1,132.0	30.6
	7/12/2011	687.5	1,850.0	1,162.5	1,132.0	30.5
	8/18/2011	687.6	1,850.0	1,162.4	1,132.0	30.5
	9/16/2011	687.6	1,850.0	1,162.4	1,132.0	30.4
	10/24/2011	687.7	1,850.0	1,162.3	1,132.0	30.3
	11/22/2011	688.1	1,850.0	1,161.9	1,132.0	30.0
	12/19/2011	688.0	1,850.0	1,162.0	1,132.0	30.0
	1/30/2012	687.2	1,850.0	1,162.7	1,132.0	30.8
	2/15/2012	687.5	1,850.0	1,162.5	1,132.0	30.5
	3/14/2012	687.7	1,850.0	1,162.2	1,132.0	30.3
	4/30/2012	687.4	1,850.0	1,162.6	1,132.0	30.6
	5/8/2012	687.8	1,850.0	1,162.2	1,132.0	30.2
	6/13/2012	687.9	1,850.0	1,162.0	1,132.0	30.1
	7/23/2012	688.2	1,850.0	1,161.8	1,132.0	29.8
	8/22/2012	688.3	1,850.0	1,161.6	1,132.0	29.7
	9/17/2012	688.6	1,850.0	1,161.4	1,132.0	29.5
	10/18/2012	688.9	1,850.0	1,161.1	1,132.0	29.1
MW-05						
	1/11/2011	683.2	1,845.2	1,162.0	1,144.2	17.8
	2/15/2011	682.6	1,845.2	1,162.6	1,144.2	18.4
	3/9/2011	683.2	1,845.2	1,162.0	1,144.2	17.8
	4/30/2011	683.0	1,845.2	1,162.2	1,144.2	18.0
	4/30/2011	683.0	1,845.2	1,162.2	1,144.2	18.0
	5/26/2011	683.1	1,845.2	1,162.2	1,144.2	18.0
	5/26/2011	683.1	1,845.2	1,162.2	1,144.2	18.0
	6/30/2011	679.5	1,845.2	1,165.7	1,144.2	21.5
	7/12/2011	679.5	1,845.2	1,165.7	1,144.2	21.5
	8/18/2011	682.2	1,845.2	1,163.0	1,144.2	18.8
	9/16/2011	683.3	1,845.2	1,161.9	1,144.2	17.7
	10/24/2011	682.9	1,845.2	1,162.3	1,144.2	18.1
	11/22/2011	687.3	1,845.2	1,158.0	1,144.2	13.8
	12/19/2011	687.4	1,845.2	1,157.9	1,144.2	13.7
	1/30/2012	683.2	1,845.2	1,162.0	1,144.2	17.8
	2/15/2012	683.2	1,845.2	1,162.0	1,144.2	17.8

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
MW-05						
	3/14/2012	683.4	1,845.2	1,161.8	1,144.2	17.6
	4/30/2012	684.3	1,845.2	1,160.9	1,144.2	16.7
	5/8/2012	683.6	1,845.2	1,161.6	1,144.2	17.4
	6/13/2012	683.6	1,845.2	1,161.6	1,144.2	17.4
	7/23/2012	683.9	1,845.2	1,161.3	1,144.2	17.1
	8/20/2012	684.0	1,845.2	1,161.3	1,144.2	17.1
	9/17/2012	684.3	1,845.2	1,160.9	1,144.2	16.7
	10/18/2012	684.6	1,845.2	1,160.7	1,144.2	16.5
MW-06						
	5/26/2011	696.0	1,860.8	1,164.8	1,141.3	23.5
	5/26/2011	696.0	1,860.8	1,164.8	1,141.3	23.5
	6/30/2011	699.5	1,860.8	1,161.3	1,141.3	20.0
	7/12/2011	699.9	1,860.8	1,161.0	1,141.3	19.7
	8/18/2011	700.0	1,860.8	1,160.8	1,141.3	19.5
	9/16/2011	700.0	1,860.8	1,160.8	1,141.3	19.5
	10/24/2011	700.2	1,860.8	1,160.6	1,141.3	19.3
	11/22/2011	700.3	1,860.8	1,160.5	1,141.3	19.2
	12/19/2011	700.4	1,860.8	1,160.5	1,141.3	19.2
	1/30/2012	699.6	1,860.8	1,161.2	1,141.3	19.9
	2/15/2012	700.0	1,860.8	1,160.8	1,141.3	19.5
	3/14/2012	700.1	1,860.8	1,160.8	1,141.3	19.4
	4/30/2012	700.2	1,860.8	1,160.6	1,141.3	19.3
	5/8/2012	700.3	1,860.8	1,160.5	1,141.3	19.2
	6/13/2012	700.7	1,860.8	1,160.1	1,141.3	18.8
	7/23/2012	700.7	1,860.8	1,160.1	1,141.3	18.8
	8/20/2012	700.7	1,860.8	1,160.2	1,141.3	18.9
	9/17/2012	700.1	1,860.8	1,160.7	1,141.3	19.4
	10/18/2012	701.3	1,860.8	1,159.5	1,141.3	18.2
MW-07						
	3/14/2012	697.5	1,859.7	1,162.2	1,142.2	20.0
	4/30/2012	697.4	1,859.7	1,162.3	1,142.2	20.1
	5/8/2012	697.4	1,859.7	1,162.3	1,142.2	20.1
	6/13/2012	697.7	1,859.7	1,162.0	1,142.2	19.8
	7/23/2012	698.1	1,859.7	1,161.6	1,142.2	19.4
	8/21/2012	697.7	1,859.7	1,162.0	1,142.2	19.8
	9/17/2012	697.7	1,859.7	1,162.0	1,142.2	19.9
	10/18/2012	698.9	1,859.7	1,160.8	1,142.2	18.7
MW-08						
	3/14/2012	719.2	1,889.2	1,170.0	1,153.7	16.3
	4/30/2012	719.5	1,889.2	1,169.8	1,153.7	16.0
	5/8/2012	719.5	1,889.2	1,169.7	1,153.7	16.0
	6/13/2012	719.7	1,889.2	1,169.6	1,153.7	15.8
	7/23/2012	720.1	1,889.2	1,169.1	1,153.7	15.4
	8/20/2012	720.2	1,889.2	1,169.0	1,153.7	15.3
	9/17/2012	720.8	1,889.2	1,168.4	1,153.7	14.7
	10/18/2012	721.2	1,889.2	1,168.1	1,153.7	14.4
PW						
	4/12/2001	675.5	1,881.4	1,205.9	1,131.4	74.5
	5/23/2001	675.0	1,881.4	1,206.4	1,131.4	75.0
	9/21/2001	675.0	1,881.4	1,206.4	1,131.4	75.0

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
PW						
	10/2/2001	678.0	1,881.4	1,203.4	1,131.4	72.0
	1/28/2002	682.0	1,881.4	1,199.4	1,131.4	68.0
	3/22/2002	682.0	1,881.4	1,199.4	1,131.4	68.0
	4/30/2002	682.0	1,881.4	1,199.4	1,131.4	68.0
	9/23/2002	686.0	1,881.4	1,195.4	1,131.4	64.0
	1/10/2003	686.0	1,881.4	1,195.4	1,131.4	64.0
	2/14/2003	686.0	1,881.4	1,195.4	1,131.4	64.0
	3/11/2003	686.0	1,881.4	1,195.4	1,131.4	64.0
	4/18/2003	686.0	1,881.4	1,195.4	1,131.4	64.0
	5/16/2003	688.0	1,881.4	1,193.4	1,131.4	62.0
	7/17/2003	688.0	1,881.4	1,193.4	1,131.4	62.0
	9/6/2003	688.0	1,881.4	1,193.4	1,131.4	62.0
	1/12/2004	688.0	1,881.4	1,193.4	1,131.4	62.0
	2/9/2004	688.0	1,881.4	1,193.4	1,131.4	62.0
	3/17/2004	688.0	1,881.4	1,193.4	1,131.4	62.0
	4/23/2004	688.0	1,881.4	1,193.4	1,131.4	62.0
	3/2/2005	695.1	1,881.4	1,186.3	1,131.4	54.9
	3/9/2005	693.2	1,881.4	1,188.2	1,131.4	56.8
	3/21/2005	692.3	1,881.4	1,189.1	1,131.4	57.7
	4/8/2005	691.0	1,881.4	1,190.4	1,131.4	59.0
	6/1/2005	692.0	1,881.4	1,189.4	1,131.4	58.0
	6/14/2005	696.2	1,881.4	1,185.2	1,131.4	53.8
	6/30/2005	697.2	1,881.4	1,184.2	1,131.4	52.8
	7/7/2005	697.4	1,881.4	1,184.0	1,131.4	52.6
	7/14/2005	698.5	1,881.4	1,182.9	1,131.4	51.5
	7/21/2005	695.1	1,881.4	1,186.3	1,131.4	54.9
	7/28/2005	695.7	1,881.4	1,185.8	1,131.4	54.3
	8/5/2005	691.0	1,881.4	1,190.4	1,131.4	59.0
	8/12/2005	694.3	1,881.4	1,187.2	1,131.4	55.8
	8/19/2005	693.5	1,881.4	1,187.9	1,131.4	56.5
	8/26/2005	690.8	1,881.4	1,190.6	1,131.4	59.2
	9/2/2005	689.9	1,881.4	1,191.5	1,131.4	60.1
	9/8/2005	687.5	1,881.4	1,194.0	1,131.4	62.6
	9/15/2005	687.5	1,881.4	1,193.9	1,131.4	62.5
	9/22/2005	686.4	1,881.4	1,195.1	1,131.4	63.6
	9/29/2005	685.8	1,881.4	1,195.6	1,131.4	64.2
	10/6/2005	685.9	1,881.4	1,195.6	1,131.4	64.1
	10/13/2005	685.7	1,881.4	1,195.7	1,131.4	64.3
	10/20/2005	698.2	1,881.4	1,183.3	1,131.4	51.9
	10/20/2005	698.2	1,881.4	1,183.3	1,131.4	51.9
	10/27/2005	698.2	1,881.4	1,183.3	1,131.4	51.9
	10/27/2005	698.2	1,881.4	1,183.3	1,131.4	51.9
	11/3/2005	698.1	1,881.4	1,183.3	1,131.4	51.9
	11/3/2005	698.1	1,881.4	1,183.3	1,131.4	51.9
	11/10/2005	698.3	1,881.4	1,183.2	1,131.4	51.8
	11/10/2005	698.3	1,881.4	1,183.2	1,131.4	51.8
	12/8/2005	698.0	1,881.4	1,183.5	1,131.4	52.1
	12/8/2005	698.0	1,881.4	1,183.5	1,131.4	52.1
	1/12/2006	698.0	1,881.4	1,183.4	1,131.4	52.0
	1/12/2006	698.0	1,881.4	1,183.4	1,131.4	52.0

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
PW						
	2/10/2006	698.9	1,881.4	1,182.5	1,131.4	51.1
	2/10/2006	698.9	1,881.4	1,182.5	1,131.4	51.1
	3/10/2006	698.8	1,881.4	1,182.6	1,131.4	51.2
	3/10/2006	698.8	1,881.4	1,182.6	1,131.4	51.2
	4/13/2006	699.1	1,881.4	1,182.4	1,131.4	51.0
	4/13/2006	699.1	1,881.4	1,182.4	1,131.4	51.0
	5/9/2006	699.3	1,881.4	1,182.1	1,131.4	50.7
	5/9/2006	699.3	1,881.4	1,182.1	1,131.4	50.7
	6/20/2006	699.2	1,881.4	1,182.3	1,131.4	50.8
	6/20/2006	699.2	1,881.4	1,182.3	1,131.4	50.8
	7/13/2006	699.2	1,881.4	1,182.2	1,131.4	50.8
	7/13/2006	699.2	1,881.4	1,182.2	1,131.4	50.8
	8/16/2006	700.1	1,881.4	1,181.3	1,131.4	49.9
	8/16/2006	700.1	1,881.4	1,181.3	1,131.4	49.9
	9/19/2006	699.1	1,881.4	1,182.3	1,131.4	50.9
	9/19/2006	699.1	1,881.4	1,182.3	1,131.4	50.9
	10/13/2006	700.0	1,881.4	1,181.4	1,131.4	50.0
	10/13/2006	700.0	1,881.4	1,181.4	1,131.4	50.0
	11/13/2006	701.8	1,881.4	1,179.6	1,131.4	48.2
	11/13/2006	701.8	1,881.4	1,179.6	1,131.4	48.2
	12/13/2006	700.8	1,881.4	1,180.7	1,131.4	49.3
	12/13/2006	700.8	1,881.4	1,180.7	1,131.4	49.3
	1/18/2007	701.2	1,881.4	1,180.2	1,131.4	48.8
	1/18/2007	701.2	1,881.4	1,180.2	1,131.4	48.8
	2/21/2007	701.7	1,881.4	1,179.8	1,131.4	48.3
	2/21/2007	701.7	1,881.4	1,179.8	1,131.4	48.3
	3/20/2007	701.9	1,881.4	1,179.5	1,131.4	48.1
	3/20/2007	701.9	1,881.4	1,179.5	1,131.4	48.1
	4/16/2007	702.1	1,881.4	1,179.3	1,131.4	47.9
	4/16/2007	702.1	1,881.4	1,179.3	1,131.4	47.9
	5/22/2007	702.4	1,881.4	1,179.1	1,131.4	47.6
	5/22/2007	702.4	1,881.4	1,179.1	1,131.4	47.6
	6/12/2007	702.8	1,881.4	1,178.7	1,131.4	47.2
	6/12/2007	702.8	1,881.4	1,178.7	1,131.4	47.2
	7/18/2007	702.9	1,881.4	1,178.6	1,131.4	47.1
	7/18/2007	702.9	1,881.4	1,178.6	1,131.4	47.1
	9/18/2007	703.8	1,881.4	1,177.7	1,131.4	46.3
	9/18/2007	703.8	1,881.4	1,177.7	1,131.4	46.3
	10/24/2007	704.0	1,881.4	1,177.5	1,131.4	46.1
	10/24/2007	704.0	1,881.4	1,177.5	1,131.4	46.1
	11/16/2007	704.3	1,881.4	1,177.2	1,131.4	45.8
	11/16/2007	704.3	1,881.4	1,177.2	1,131.4	45.8
	12/19/2007	704.7	1,881.4	1,176.8	1,131.4	45.4
	12/19/2007	704.7	1,881.4	1,176.8	1,131.4	45.4
	1/12/2008	705.5	1,881.4	1,175.9	1,131.4	44.5
	1/12/2008	705.5	1,881.4	1,175.9	1,131.4	44.5
	2/20/2008	705.1	1,881.4	1,176.3	1,131.4	44.9
	2/20/2008	705.1	1,881.4	1,176.3	1,131.4	44.9
	3/12/2008	706.0	1,881.4	1,175.4	1,131.4	44.0
	3/12/2008	706.0	1,881.4	1,175.4	1,131.4	44.0

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
PW						
	4/16/2008	706.5	1,881.4	1,174.9	1,131.4	43.5
	4/16/2008	706.5	1,881.4	1,174.9	1,131.4	43.5
	5/20/2008	704.3	1,881.4	1,177.1	1,131.4	45.7
	5/20/2008	704.3	1,881.4	1,177.1	1,131.4	45.7
	6/16/2008	705.5	1,881.4	1,175.9	1,131.4	44.5
	6/16/2008	705.5	1,881.4	1,175.9	1,131.4	44.5
	7/18/2008	705.7	1,881.4	1,175.7	1,131.4	44.3
	7/18/2008	705.7	1,881.4	1,175.7	1,131.4	44.3
	8/13/2008	707.1	1,881.4	1,174.3	1,131.4	42.9
	8/13/2008	707.1	1,881.4	1,174.3	1,131.4	42.9
	9/15/2008	706.8	1,881.4	1,174.6	1,131.4	43.2
	9/15/2008	706.8	1,881.4	1,174.6	1,131.4	43.2
	10/16/2008	707.6	1,881.4	1,173.8	1,131.4	42.4
	10/16/2008	707.6	1,881.4	1,173.8	1,131.4	42.4
	11/14/2008	707.6	1,881.4	1,173.8	1,131.4	42.4
	11/14/2008	707.6	1,881.4	1,173.8	1,131.4	42.4
	12/12/2008	706.8	1,881.4	1,174.6	1,131.4	43.2
	12/12/2008	706.8	1,881.4	1,174.6	1,131.4	43.2
	1/13/2009	707.0	1,881.4	1,174.4	1,131.4	43.0
	1/13/2009	707.0	1,881.4	1,174.4	1,131.4	43.0
	2/12/2009	708.2	1,881.4	1,173.2	1,131.4	41.8
	2/12/2009	708.2	1,881.4	1,173.2	1,131.4	41.8
	3/12/2009	707.8	1,881.4	1,173.6	1,131.4	42.2
	3/12/2009	707.8	1,881.4	1,173.6	1,131.4	42.2
	7/15/2009	708.4	1,881.4	1,173.1	1,152.4	20.7
	7/15/2009	708.4	1,881.4	1,173.1	1,152.4	20.7
	8/14/2009	708.8	1,881.4	1,172.6	1,152.4	20.2
	9/17/2009	708.7	1,881.4	1,172.8	1,152.4	20.4
	10/15/2009	708.8	1,881.4	1,172.6	1,152.4	20.2
	11/12/2009	708.8	1,881.4	1,172.6	1,152.4	20.2
	12/11/2009	708.7	1,881.4	1,172.7	1,152.4	20.3
	1/13/2010	709.3	1,881.4	1,172.2	1,152.4	19.8
	2/17/2010	707.9	1,881.4	1,173.5	1,152.4	21.1
	3/10/2010	709.7	1,881.4	1,171.7	1,152.4	19.3
	4/16/2010	710.0	1,881.4	1,171.5	1,152.4	19.1
	5/20/2010	709.8	1,881.4	1,171.6	1,152.4	19.2
	6/16/2010	709.8	1,881.4	1,171.6	1,152.4	19.2
	7/20/2010	709.7	1,881.4	1,171.7	1,152.4	19.3
	8/13/2010	709.7	1,881.4	1,171.7	1,152.4	19.3
	9/13/2010	709.8	1,881.4	1,171.6	1,152.4	19.2
	10/15/2010	709.6	1,881.4	1,171.9	1,152.4	19.4
	11/16/2010	709.6	1,881.4	1,171.8	1,152.4	19.4
	12/16/2010	709.7	1,881.4	1,171.8	1,152.4	19.4
	1/11/2011	709.7	1,881.4	1,171.8	1,152.4	19.3
	2/15/2011	709.6	1,881.4	1,171.8	1,152.4	19.4
	3/9/2011	709.7	1,881.4	1,171.7	1,152.4	19.3
	4/30/2011	709.7	1,881.4	1,171.8	1,152.4	19.4
	4/30/2011	709.7	1,881.4	1,171.8	1,152.4	19.4
	5/26/2011	709.7	1,881.4	1,171.7	1,152.4	19.3
	5/26/2011	709.7	1,881.4	1,171.7	1,152.4	19.3

Well Name	Sample Date	Depth to Water (ft bgs)	TOC (ft amsl)	Water Level Elevation (ft amsl)	Pump Intake Elevation (ft amsl)	Depth of Water Above Pump (ft below top of water table)
PW						
	6/30/2011	710.1	1,881.4	1,171.3	1,152.4	18.9
	7/12/2011	710.1	1,881.4	1,171.3	1,152.4	18.9
	8/18/2011	710.2	1,881.4	1,171.2	1,152.4	18.8
	9/16/2011	710.3	1,881.4	1,171.1	1,152.4	18.7
	10/24/2011	710.5	1,881.4	1,171.0	1,152.4	18.5
	11/22/2011	710.1	1,881.4	1,171.3	1,152.4	18.9
	12/19/2011	710.2	1,881.4	1,171.3	1,152.4	18.9
	1/30/2012	710.4	1,881.4	1,171.0	1,152.4	18.6
	2/15/2012	711.6	1,881.4	1,169.8	1,152.4	17.4
	3/14/2012	710.7	1,881.4	1,170.8	1,152.4	18.3
	4/30/2012	710.4	1,881.4	1,171.1	1,152.4	18.6
	5/8/2012	711.0	1,881.4	1,170.4	1,152.4	18.0
	6/13/2012	711.1	1,881.4	1,170.3	1,152.4	17.9
	7/23/2012	711.5	1,881.4	1,169.9	1,152.4	17.5
	8/22/2012	711.8	1,881.4	1,169.6	1,152.4	17.2
	9/17/2012	712.1	1,881.4	1,169.3	1,152.4	16.9
	10/18/2012	712.5	1,881.4	1,169.0	1,152.4	16.6

Notes: TOC - Top of Casing
ft bgs - Feet below ground surface
ft amsl - Feet above mean sea level

APPENDIX E

GROUNDWATER ANALYTICAL RESULTS
SUMMARY OF ORGANIC DATA

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
MW-01																	
	6/14/1993	1,200.6	µg/L	<2	<2	<2	<5	-	<2	<2	<2	<2	<2	<2	<2	<5	--
	6/22/1993	1,200.6	µg/L	<0.5	<0.5	<1	<1	-	<1	<0.5	-	-	<1	<1	<0.5	<2	--
	12/17/1997	1,200.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	**15**	-	--
	5/28/1998	1,200.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	**11**	-	--
	3/26/1999	1,200.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	--
	8/12/1999	1,200.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	2	-	--
	8/30/1999	1,200.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	--
	3/9/2005	1,155.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	**5.2**	-	--
	4/8/2005	1,155.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	**7.1**	-	--
	5/11/2005	1,155.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	**7.4**	-	--
	7/13/2005	1,155.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	**9.9**	-	--
	8/12/2005	1,155.6	µg/L	-	-	-	-	-	-	-	-	-	-	-	**10.6**	-	--
	1/12/2006	1,155.6	µg/L	<1	1.6	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**17**	<0.5	--
	2/10/2006	1,155.6	µg/L	<1	1.8	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**17**	<0.5	--
	4/7/2006	1,155.6	µg/L	<1	2	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**20**	<0.5	--
	5/9/2006	1,155.6	µg/L	<1	1.7	<0.5	<1	<0.5	<0.5	<0.5	<0.5	0.6	<3	<0.5	**24**	<0.5	--
	6/20/2006	1,155.6	µg/L	<1	2	<0.5	<1	<0.5	<0.5	<0.5	<0.5	0.7	<3	<0.5	**29**	<0.5	--
	8/16/2006	1,155.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	1.3	<0.5	--
	9/19/2006	1,155.6	µg/L	<1	0.9	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**11**	<0.5	--
	11/17/2006	1,155.6	µg/L	<1	2.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	1	<3	<0.5	**40**	<0.5	--
	12/13/2006	1,155.6	µg/L	<1	1.6	<0.5	<1	<0.5	<0.5	<0.5	0.5	0.6	<3	<0.5	**22**	<0.5	--
	2/21/2007	1,155.6	µg/L	<1	2.8	<0.5	<1	<0.5	<0.5	<0.5	<0.5	1.3	<3	<0.5	**63**	<0.5	--
	3/20/2007	1,155.6	µg/L	<1	2.7	<0.5	<1	<0.5	<0.5	<0.5	<0.5	1.4	<3	<0.5	**66**	<0.5	--
	4/16/2007	1,155.6	µg/L	<1	2.9	<0.5	<1	<0.5	<0.5	<0.5	<0.5	1.6	<3	<0.5	**75**	<0.5	--
	5/22/2007	1,155.6	µg/L	<1	2.4	<0.5	<1	<0.5	<0.5	<0.5	0.7	1.4	<3	<0.5	**57**	<0.5	--
	6/12/2007	1,155.6	µg/L	<1	2.1	<0.5	<1	<0.5	<0.5	<0.5	0.5	1.3	<3	<0.5	**57**	<0.5	--
MW-02																	
	6/14/1993	1,181.0	µg/L	<2	<2	<2	<5	-	<2	<2	<2	<2	<2	<2	<2	<5	--
	6/22/1993	1,181.0	µg/L	<0.5	<0.5	<1	<1	-	<1	<0.5	-	-	<1	<1	<0.5	<2	--
	12/17/1997	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	2.5	-	--
	5/28/1998	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	2.5	-	--
	11/17/1998	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**7**	-	--
	3/26/1999	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**6.3**	-	--
	8/12/1999	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**34**	-	--
	8/30/1999	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**6.3**	-	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
MW-02																	
	1/19/2000	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**28**	-	--
	2/25/2000	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.7	-	--
	8/18/2000	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**11**	-	--
	9/22/2000	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**12**	-	--
	11/22/2000	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	**12**	-	--
	12/6/2000	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	--
	1/19/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	--
	1/22/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	--
	3/7/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	2.3	-	--
	3/27/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	2.3	-	--
	4/12/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	2.5	-	--
	5/23/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.6	-	--
	6/1/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.6	-	--
	7/20/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	1.7	-	--
	10/2/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.6	-	--
	11/27/2001	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.6	-	--
	3/22/2002	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	--
	4/1/2002	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	--
	3/1/2003	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	--
	5/27/2004	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	--
	6/30/2004	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	--
	7/27/2004	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	--
	8/24/2004	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	9/28/2004	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	11/4/2004	1,181.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	3/9/2005	1,152.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	4/8/2005	1,152.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	5/11/2005	1,152.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	7/13/2005	1,152.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	8/12/2005	1,152.0	µg/L	-	-	-	-	-	-	-	-	-	-	-	<2	-	--
	1/12/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	<0.5	<0.5	--
	2/10/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	<0.5	<0.5	--
	4/7/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	0.5	<0.5	--
	5/9/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	0.7	<0.5	--
	6/20/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	1	<0.5	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
MW-02																	
	8/16/2006	1,152.0	µg/L	<1	2	<0.5	<1	<0.5	<0.5	<0.5	<0.5	0.7	<3	<0.5	**29**	<0.5	--
	9/19/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	1.4	<0.5	--
	11/17/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	2.6	<0.5	--
	12/13/2006	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	2.9	<0.5	--
	2/21/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**5.9**	<0.5	--
	3/20/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**7.2**	<0.5	--
	4/16/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**9.9**	<0.5	--
	5/22/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**12**	<0.5	--
	6/12/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**15**	<0.5	--
	7/18/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**18**	<0.5	--
	9/18/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**32**	<0.5	--
	10/24/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**39**	<0.5	--
	11/16/2007	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	**44**	<0.5	--
	1/22/2008	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.5	<0.5	<3	<0.5	**65**	<0.5	--
	3/12/2008	1,152.0	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<1	<0.5	<3	<0.5	**130**	<1	--
	4/17/2008	1,152.0	µg/L	<1	0.5	<0.5	<1	<0.5	<0.5	<0.5	0.7	0.7	<3	<0.5	**120**	<0.5	--
	5/20/2008	1,152.0	µg/L	<1	0.9	<0.5	<1	<0.5	<0.5	<0.5	1.6	0.8	<3	<0.5	**120**	<0.5	--
	6/16/2008	1,152.0	µg/L	<1	0.9	<0.5	<1	<0.5	<0.5	<0.5	1.6	1.1	<3	<0.5	**150**	<0.5	--
	8/13/2008	1,152.0	µg/L	<1	1.3	<0.5	<1	<0.5	<0.5	<0.5	1.8	1.4	<2	<0.5	**190**	<0.5	--
	9/15/2008	1,152.0	µg/L	<1	1.1	<0.5	<1	<0.5	<0.5	<0.5	1.4	1	<2	<0.5	**140**	<0.5	--
	10/16/2008	1,152.0	µg/L	<1	1.3	<0.5	<1	<0.5	<0.5	<0.5	1.8	1.4	<2	<0.5	**190**	<0.5	--
	11/14/2008	1,152.0	µg/L	<1	1.3	<0.5	<1	<0.5	<0.5	<0.5	3.1	1.3	<2	<0.5	**150**	<0.5	--
	12/12/2008	1,152.0	µg/L	<1	1.6	<0.5	<1	<0.5	<0.5	<0.5	2	2	<2	<0.5	**240**	<0.5	--
	1/13/2009	1,152.0	µg/L	<1	1.7	<0.5	<1	<0.5	<0.5	<0.5	2.5	2	<2	<0.5	**320**	<0.5	--
	2/12/2009	1,152.0	µg/L	<1	1.5	<0.5	<1	<0.5	<0.5	<0.5	1.8	2.1	<2	<0.5	**270**	<0.5	--
	3/12/2009	1,152.0	µg/L	<1	1.6	<0.5	<1	<0.5	<0.5	<0.5	2.9	2.7	<2	<0.5	**280**	<0.5	--
	4/10/2009	1,152.0	µg/L	<1	2.2	<0.5	<1	<0.5	<0.5	<0.5	3.5	2.5	<2	<0.5	**330**	<0.5	--
	5/12/2009	1,152.0	µg/L	<1	2.3	<0.5	<1	<0.5	<0.5	<0.5	5.9	3	<2	<0.5	**290**	<0.5	--
	6/9/2009	1,161.0	µg/L	<1	2.5	<0.5	<1	<0.5	<0.5	<0.5	13	2.3	<2	<0.5	**190**	<0.5	PDB sample was collected at 695 feet bgs.
	6/9/2009	1,161.0	µg/L	<1	2.4	<0.5	<1	<0.5	<0.5	<0.5	13	2.6	<2	<0.5	**150**	<0.5	PDB sample was collected at 695 feet bgs.
	6/9/2009	1,141.0	µg/L	<1	2.5	<0.5	<1	<0.5	<0.5	<0.5	14	2.5	<2	<0.5	**170**	<0.5	PDB sample was collected at 715 feet bgs.
	6/9/2009	1,121.0	µg/L	<1	2.2	<0.5	<1	<0.5	<0.5	<0.5	14	2.2	<2	<0.5	**99**	<0.5	PDB sample was collected at 735 feet bgs.
	7/16/2009	1,142.0	µg/L	<1	3.3	<0.5	<1	<0.5	<0.5	<0.5	6.9	4.2	<2	<0.5	**380**	<0.5	--
	8/14/2009	1,142.0	µg/L	<1	2.6	<0.5	<1	<0.5	<0.5	<0.5	4.5	4.1	<2	<0.5	**390**	<0.5	--
	9/17/2009	1,142.0	µg/L	<1	3.6	<0.5	<1	<0.5	<0.5	<0.5	6.4	4.2	<2	<0.5	**400**	<0.5	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
MW-02																	
	10/15/2009	1,142.0	µg/L	<1	3.4	<0.5	<1	<0.5	<0.5	<0.5	5.2	4.9	<2	<0.5	**430**	<0.5	--
	11/12/2009	1,142.0	µg/L	<1	3.1	<0.5	<1	<0.5	<0.5	<0.5	3.8	4.4	<2	<0.5	**340**	<0.5	--
	12/11/2009	1,142.0	µg/L	<1	3.9	<0.5	<1	<0.5	<0.5	0.5	3.4	**5.5**	<2	<0.5	**410**	<0.5	--
	1/13/2010	1,142.0	µg/L	<1	3.5	<0.5	<1	<0.5	<0.5	<0.5	5.8	4.8	<2	<0.5	**400**	<0.5	--
	2/17/2010	1,142.0	µg/L	<1	1.4	<0.5	<1	<0.5	<0.5	<0.5	3.4	4.8	<2	<0.5	**410**	<0.5	--
	3/10/2010	1,142.0	µg/L	<0.5	3.5	<0.5	<1	<0.5	<0.5	<0.5	5.5	4.9	<2	<0.5	**340**	<0.5	--
	4/16/2010	1,142.0	µg/L	0.5	4.4	<0.5	<1	<0.5	<0.5	<0.5	5.6	**6.1**	<2	<0.5	**450**	<0.5	--
	6/16/2010	1,142.0	µg/L	0.6	5.4	<0.5	<1	<0.5	<0.5	<0.5	8.3	**6.1**	<2	<0.5	**420**	<0.5	--
	9/10/2010	1,142.0	µg/L	<0.5	4.8	<0.5	<1	<0.5	<0.5	<0.5	2.9	**6.2**	<2	<0.5	**428**	<0.5	--
	11/19/2010	1,142.0	µg/L	<0.5	4.4	<0.5	<1	<0.5	<0.5	<0.5	3.1	**7.5**	<2	<0.5	**412**	<0.5	--
	11/24/2010	1,142.0	µg/L	0.5	6	<0.5	<1	<0.5	<0.5	<0.5	6.1	**6.3**	<2	<0.5	**264**	<0.5	--
	3/8/2011	1,142.0	µg/L	<0.5	5.6	<0.5	<1	<0.5	<0.5	<0.5	2.8	4.8	<2	<0.5	**215**	<0.5	--
	3/30/2011	1,142.0	µg/L	<0.5	6.8	<0.5	<1	<0.5	<0.5	<0.5	2.6	**5.5**	<2	<0.5	**303**	<0.5	--
	5/26/2011	1,142.0	µg/L	<0.5	**7.1**	<0.5	<1	<0.5	<0.5	<0.5	2.2	**5.5**	<2	<0.5	**315**	<0.5	--
	8/23/2011	1,142.0	µg/L	<0.5	**9.1**	<0.5	<1	<0.5	<0.5	<0.5	2.1	5	<2	<0.5	**228**	<0.5	--
	11/22/2011	1,142.0	µg/L	<0.5	**10.9**	<0.5	<1	<0.5	<0.5	<0.5	<0.5	4.3	<2	<0.5	**198**	<0.5	--
	2/21/2012	1,142.0	µg/L	<0.5	**8.5**	<0.5	<1	<0.5	<0.5	<0.5	1.5	3.1	<2	<0.5	**127**	<0.5	--
	5/10/2012	1,142.0	µg/L	<5	**8.2**	<200	<10	<50	<5	<40	<50	**6.1**	<20	<5	**135**	<10	--
	8/22/2012	1,142.0	µg/L	<5	5.8	<5	<5	<50	<5	<5	<5	<5	<5	<5	**105**	<2	--
MW-03																	
	1/22/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	<0.5	<0.5	--
	3/12/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<1	<0.5	<3	<0.5	<0.5	<1	--
	4/17/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	<0.5	<0.5	--
	5/20/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	<0.5	<0.5	--
	6/16/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	0.6	<0.5	<0.5	<0.5	<0.5	<3	<0.5	<0.5	<0.5	--
	8/13/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	9/15/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	10/16/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	11/14/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	12/12/2008	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	1/13/2009	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	2/12/2009	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	3/12/2009	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	4/10/2009	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	5/12/2009	1,089.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
MW-03																	
	7/16/2009	1,142.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	8/14/2009	1,142.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	9/17/2009	1,142.6	µg/L	<1	<0.5	<0.5	<1	0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	0.9	<0.5	--
	10/15/2009	1,142.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	11/12/2009	1,142.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	12/11/2009	1,142.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	0.8	<0.5	--
	1/13/2010	1,142.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	2/17/2010	1,142.6	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	3/10/2010	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	0.5	<0.5	--
	4/16/2010	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	6/16/2010	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	1.4	<0.5	--
	9/10/2010	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	0.7	<0.5	--
	11/19/2010	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	0.7	<0.5	--
	11/24/2010	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	1.6	<0.5	--
	3/8/2011	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	0.9	<0.5	--
	5/26/2011	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	1	<0.5	--
	8/19/2011	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	2.4	<0.5	--
	11/22/2011	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	2.6	<0.5	--
	2/16/2012	1,142.6	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	1.5	<0.5	--
	5/10/2012	1,142.6	µg/L	<0.5	<0.5	<20	<1	<5	<0.5	<4	<5	<0.5	<2	<0.5	1.9	<1	--
	8/21/2012	1,142.6	µg/L	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5	<2	--
MW-04																	
	11/19/2010	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	12.4	<0.5	**5.2**	<0.5	--
	11/24/2010	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	5.2	<0.5	**5.3**	<0.5	--
	3/8/2011	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	**5.9**	<0.5	--
	5/26/2011	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	4.7	<0.5	--
	8/19/2011	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	**12.5**	<0.5	--
	11/22/2011	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	**19.9**	<0.5	--
	2/16/2012	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	**12.9**	<0.5	--
	5/8/2012	1,132.0	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	**18.1**	<0.5	--
	8/22/2012	1,132.0	µg/L	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	**32.6**	<2	--
MW-05																	
	3/8/2011	1,144.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	31.2	<0.5	<0.5	<0.5	--
	5/26/2011	1,144.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	8.5	<0.5	<0.5	<0.5	--
	8/18/2011	1,144.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	10.7	<0.5	<0.5	<0.5	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
MW-05																	
	11/21/2011	1,144.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	7.6	<0.5	<0.5	<0.5	--
	2/15/2012	1,144.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	4.2	<0.5	<0.5	<0.5	--
	5/9/2012	1,144.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	4.5	<0.5	<0.5	<0.5	--
	8/20/2012	1,144.2	µg/L	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5	<2	--
MW-06																	
	5/26/2011	1,141.3	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	2	<0.5	0.9	<0.5	--
	8/19/2011	1,141.3	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	1.3	<0.5	--
	11/21/2011	1,141.3	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	1.8	<0.5	--
	2/15/2012	1,141.3	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	2	<0.5	--
	5/9/2012	1,141.3	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	2	<0.5	--
	8/20/2012	1,141.3	µg/L	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5	<2	--
MW-07																	
	2/17/2012	1,142.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	--
	4/19/2012	1,142.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	5/8/2012	1,142.2	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	8/21/2012	1,142.2	µg/L	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5	<2	--
MW-08																	
	2/28/2012	1,153.7	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	33	<0.5	<0.5	<0.5	--
	4/19/2012	1,153.7	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	4.9	<0.5	<0.5	<0.5	--
	5/8/2012	1,153.7	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	--
	8/20/2012	1,153.7	µg/L	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5	<2	--
PW																	
	9/19/1985	1,131.4	µg/L	<4.7	<2.8	<4.4	<4.7	-	<6	<1.6	-	<4.1	8.2	<1.6	**9.8**	<10	--
	9/27/1985	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**9.8**	-	--
	10/7/1985	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**9.8**	-	--
	11/18/1985	1,131.4	µg/L	<4.7	<2.8	<4.4	<4.7	-	<6	<1.6	-	<4.1	<6	<1.6	<1.9	<10	--
	11/27/1985	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	<1.9	-	--
	12/6/1985	1,131.4	µg/L	<1	<1	<1	<1	-	<1	<1	-	3.3	<1	<1	<1	<1	--
	7/16/1986	1,131.4	µg/L	-	-	-	-	-	-	-	-	<1	<1	-	<1	-	--
	8/4/1986	1,131.4	µg/L	-	-	2.3	-	-	-	-	-	-	-	-	<1	-	--
	6/8/1987	1,131.4	µg/L	-	-	-	-	-	-	-	-	<1	<1	-	<1	-	--
	6/10/1987	1,131.4	µg/L	-	-	-	-	-	-	-	-	<1	<1	-	<1	-	--
	10/23/1987	1,131.4	µg/L	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	4.3	<0.5	<0.5	<0.5	<0.5	--
	5/25/1988	1,131.4	µg/L	<1	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	--
	3/19/1990	1,131.4	µg/L	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
PW																	
	3/21/1990	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	<1	-	--
	8/14/1991	1,131.4	µg/L	<1	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	--
	11/20/1991	1,131.4	µg/L	<1	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	--
	7/22/1992	1,131.4	µg/L	<0.5	<0.5	<1	<1	-	<1	<0.5	-	-	<1	<1	<1	<2	--
	7/31/1992	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	<1	-	--
	12/17/1997	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	<1	-	--
	5/28/1998	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**8.9**	-	--
	7/28/1998	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**8.5**	-	--
	11/17/1998	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**12**	-	--
	3/26/1999	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**17**	-	--
	8/12/1999	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**22**	-	--
	8/30/1999	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**17**	-	--
	1/19/2000	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.6	-	--
	2/25/2000	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.3	-	--
	6/19/2000	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**9.1**	-	--
	8/18/2000	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**9.6**	-	--
	9/22/2000	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**10**	-	--
	11/22/2000	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**10**	-	--
	12/6/2000	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**13**	-	--
	1/19/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**31**	-	--
	1/22/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**31**	-	--
	3/7/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**16**	-	--
	3/27/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**16**	-	--
	4/12/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**22**	-	--
	5/23/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**6.7**	-	--
	6/1/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**13**	-	--
	7/20/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**7.9**	-	--
	10/2/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.4	-	--
	11/27/2001	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	3.8	-	--
	1/28/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.8	-	--
	2/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.8	-	--
	3/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**7**	-	--
	3/22/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**7**	-	--
	4/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.9	-	--
	4/30/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.9	-	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
PW																	
	6/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.4	-	--
	6/3/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	4.4	-	--
	8/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**8.3**	-	--
	8/7/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**8.3**	-	--
	9/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**8**	-	--
	10/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**8.6**	-	--
	10/21/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**9.1**	-	--
	12/1/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**16**	-	--
	12/4/2002	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**16**	-	--
	1/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**15**	-	--
	1/10/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**15**	-	--
	3/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**18**	-	--
	3/11/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**18**	-	--
	4/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**17**	-	--
	4/18/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**17**	-	--
	5/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**21**	-	--
	5/16/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**21**	-	--
	6/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**18**	-	--
	6/13/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**18**	-	--
	7/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**18**	-	--
	7/17/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**18**	-	--
	9/16/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**16**	-	--
	10/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**20**	-	--
	10/24/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**20**	-	--
	11/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**21**	-	--
	12/1/2003	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**22**	-	--
	1/1/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**22**	-	--
	1/12/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**22**	-	--
	2/1/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**23**	-	--
	2/9/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**23**	-	--
	3/1/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**25**	-	--
	3/17/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**25**	-	--
	4/1/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**27**	-	--
	4/23/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**27**	-	--
	5/1/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**25**	-	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
PW																	
	6/1/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**26**	-	--
	7/1/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**26**	-	--
	7/27/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**24**	-	--
	8/24/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**30**	-	--
	9/28/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**23**	-	--
	11/4/2004	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**24**	-	--
	3/9/2005	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	3.4	-	--
	4/8/2005	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	1.4	-	--
	5/11/2005	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	3	-	--
	7/13/2005	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	2.6	-	--
	8/12/2005	1,131.4	µg/L	-	-	-	-	-	-	-	-	-	-	-	**7.8**	-	--
	1/12/2006	1,131.4	µg/L	<1	<0.5	<0.5	2.4	<0.5	<0.5	<0.5	0.5	0.8	<3	<0.5	**16**	<0.5	--
	2/10/2006	1,131.4	µg/L	<1	1.5	<0.5	<1	<0.5	<0.5	<0.5	1.8	2.1	<3	<0.5	**44**	<0.5	--
	4/7/2006	1,131.4	µg/L	<1	0.6	<0.5	<1	<0.5	<0.5	<0.5	0.6	0.8	<3	<0.5	**15**	<0.5	--
	5/9/2006	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.5	0.6	<3	<0.5	**10**	<0.5	--
	6/20/2006	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.6	0.7	<3	<0.5	**11**	<0.5	--
	8/16/2006	1,131.4	µg/L	<1	0.5	<0.5	<1	<0.5	<0.5	<0.5	0.7	0.8	<3	<0.5	**12**	<0.5	--
	9/19/2006	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	3	<0.5	--
	12/13/2006	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	3	<0.5	--
	2/21/2007	1,131.4	µg/L	<1	0.6	<0.5	<1	<0.5	<0.5	<0.5	0.8	0.7	<3	<0.5	**12**	<0.5	--
	3/20/2007	1,131.4	µg/L	<1	0.5	<0.5	<1	<0.5	<0.5	<0.5	0.9	0.7	<3	<0.5	**10**	<0.5	--
	4/16/2007	1,131.4	µg/L	<1	0.6	<0.5	<1	<0.5	<0.5	<0.5	1	1	<3	<0.5	**13**	<0.5	--
	5/22/2007	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	1.3	0.8	<3	<0.5	**11**	<0.5	--
	6/12/2007	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.8	0.7	<3	<0.5	**9.4**	<0.5	--
	7/18/2007	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.8	0.6	<3	<0.5	**8.8**	<0.5	--
	9/18/2007	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	1.9	<0.5	--
	10/24/2007	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.7	0.5	<3	<0.5	**8.6**	<0.5	--
	11/16/2007	1,131.4	µg/L	<1	0.9	<0.5	<1	<0.5	<0.5	<0.5	1.1	1	<3	<0.5	**13**	<0.5	--
	1/22/2008	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	2.5	<0.5	--
	3/12/2008	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<1	<0.5	<3	<0.5	1.5	<1	--
	4/17/2008	1,131.4	µg/L	<1	1.2	<0.5	<1	<0.5	<0.5	<0.5	1.3	1.3	<3	<0.5	**22**	<0.5	--
	5/20/2008	1,131.4	µg/L	<1	0.5	<0.5	<1	<0.5	<0.5	<0.5	0.6	<0.5	<3	<0.5	**10**	<0.5	--
	6/16/2008	1,131.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<0.5	1.3	<0.5	--
	8/13/2008	1,131.4	µg/L	<1	2.1	<0.5	<1	<0.5	<0.5	<0.5	1.6	2.5	<2	<0.5	**53**	<0.5	--
	9/15/2008	1,131.4	µg/L	<1	3.1	<0.5	<1	<0.5	<0.5	<0.5	1.8	2.8	<2	<0.5	**69**	<0.5	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Benzene	Bromoform	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-dichloroethene	Trichloroethene	Vinyl Chloride	Comments
PW																	
	10/16/2008	1,131.4	µg/L	<1	2.9	<0.5	<1	<0.5	<0.5	<0.5	2.1	2.7	<2	<0.5	**83**	<0.5	--
	11/14/2008	1,131.4	µg/L	<1	2.5	<0.5	<1	<0.5	<0.5	<0.5	2	1.9	<2	<0.5	**70**	<0.5	--
	12/12/2008	1,131.4	µg/L	<1	2.7	<0.5	<1	<0.5	<0.5	<0.5	2.1	2.8	<2	<0.5	**76**	<0.5	--
	1/13/2009	1,131.4	µg/L	<1	3.5	<0.5	<1	<0.5	<0.5	<0.5	2.6	4.3	<2	<0.5	**110**	<0.5	--
	2/12/2009	1,131.4	µg/L	<1	2.7	<0.5	<1	<0.5	<0.5	<0.5	2.5	4.4	<2	<0.5	**85**	<0.5	--
	3/12/2009	1,131.4	µg/L	<1	2.7	<0.5	<1	<0.5	<0.5	<0.5	2.3	4.8	<2	<0.5	**86**	<0.5	--
	4/10/2009	1,131.4	µg/L	<1	3.4	<0.5	<1	<0.5	<0.5	<0.5	2.6	4.4	<2	<0.5	**100**	<0.5	--
	5/12/2009	1,131.4	µg/L	<1	2.3	<0.5	<1	<0.5	<0.5	<0.5	2.3	3.9	<2	<0.5	**76**	<0.5	--
	7/16/2009	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	2.1	<0.5	--
	8/14/2009	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	0.7	<2	<0.5	**6.3**	<0.5	--
	9/17/2009	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	3.8	<0.5	--
	10/15/2009	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	3.1	<0.5	--
	11/12/2009	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	3.9	<0.5	--
	12/11/2009	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	1.3	<0.5	<2	<0.5	**8**	<0.5	--
	1/13/2010	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	1.5	<0.5	<2	<0.5	**9.3**	<0.5	--
	2/17/2010	1,152.4	µg/L	<1	<0.5	<0.5	<1	<0.5	<0.5	<0.5	2.1	<0.5	<2	<0.5	**9.5**	<0.5	--
	3/10/2010	1,152.4	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	2.6	<0.5	<2	<0.5	**12**	<0.5	--
	4/16/2010	1,152.4	µg/L	<0.5	0.6	<0.5	<1	<0.5	<0.5	<0.5	2.7	1.9	<2	<0.5	**42**	<0.5	--
	6/16/2010	1,152.4	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.9	<0.5	<2	<0.5	**5.2**	<0.5	--
	9/10/2010	1,152.4	µg/L	<0.5	0.8	<0.5	<1	<0.5	<0.5	<0.5	2.3	2.2	<2	<0.5	**38.3**	<0.5	--
	11/19/2010	1,152.4	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	1.6	1.3	<2	<0.5	**21.2**	<0.5	--
	11/24/2010	1,152.4	µg/L	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	2.1	1.4	<2	<0.5	**24.2**	<0.5	--
	3/8/2011	1,152.4	µg/L	<0.5	1.2	<0.5	<1	<0.5	<0.5	<0.5	2.9	1.9	<2	<0.5	**30.5**	<0.5	--
	5/26/2011	1,152.4	µg/L	<0.5	1.3	<0.5	<1	<0.5	<0.5	<0.5	4	2.3	<2	<0.5	**39.6**	<0.5	--
	8/19/2011	1,152.4	µg/L	<0.5	2.7	<0.5	<1	<0.5	<0.5	<0.5	6.3	3.6	<2	<0.5	**58.5**	<0.5	--
	11/22/2011	1,152.4	µg/L	3.8	**15.8**	0.5	<1	<0.5	0.5	4.1	**164**	**23.7**	<2	0.6	**464**	**10.3**	--
	12/12/2011	1,152.4	µg/L	<0.5	2.7	<0.5	<1	<0.5	<0.5	<0.5	19.5	2.8	<2	<0.5	**54.5**	<0.5	--
	2/21/2012	1,152.4	µg/L	<0.5	1.6	<0.5	<1	<0.5	<0.5	<0.5	5.5	1.7	<2	<0.5	**31.3**	<0.5	--
	5/10/2012	1,152.4	µg/L	<0.5	1.6	<20	<1	<5	<0.5	<4	5.3	1.9	<2	<0.5	**27.3**	<1	--
	8/22/2012	1,152.4	µg/L	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	**21.8**	<2	--
AWQS:				**N/A**	**7**	**5**	**80**	**N/A**	**100**	**80**	**70**	**5**	**1,000**	**100**	**5**	**2**	

Notes: AWQS - Aquifer Water Quality Standard
Grey text indicates result was less than the reporting limit
Bold text indicates a result detected above the AWQS
µg/L - microgams per liter
ft amsl - feet above mean sea level
- = data not applicable or available

APPENDIX F

GROUNDWATER ANALYTICAL RESULTS
SUMMARY OF INORGANIC DATA

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Alkalinity, Total (CaCO3)	Calcium	Chloride	Fluoride	Iron	Magnesium	Nitrate (As N)	Nitrate-Nitrite	Nitrite	Potassium	Sodium	Sulfate	Total Dissolved Solids	Comments
MW-01																	
	6/14/1993	1,200.6	mg/L	-	-	13	0.5	-	-	-	-	-	-	-	20	-	
	6/22/1993	1,200.6	mg/L	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	
	1/12/2006	1,155.6	mg/L	-	45	-	-	1.1	27	-	-	-	3.2	46	-	-	
	1/18/2006	1,155.6	mg/L	250	-	-	<0.5	-	-	3.2	-	-	-	-	18	320	
	7/13/2006	1,155.6	mg/L	240	43	-	<0.5	1.2	26	-	3.7	<0	2.6	43	19	310	
MW-02																	
	6/14/1993	1,181.0	mg/L	-	-	20	0.4	-	-	-	-	-	-	-	20	-	
	6/22/1993	1,181.0	mg/L	-	-	-	-	1.2	-	-	-	-	-	-	-	-	
	1/12/2006	1,152.0	mg/L	-	43	-	-	6.6	28	-	-	-	3.2	39	-	-	
	1/18/2006	1,152.0	mg/L	250	-	-	<0.5	-	-	<0.5	-	-	-	-	15	290	
	7/13/2006	1,152.0	mg/L	240	42	-	<0.5	1.7	29	-	2.1	<0	2.7	38	18	320	
	7/18/2007	1,152.0	mg/L	220	43	-	<0.5	1.4	30	-	3.3	<0	2.7	38	20	320	
	1/22/2008	1,152.0	mg/L	240	41	-	<0.5	9.8	28	-	2.9	<0	3.6	40	14	310	
	7/18/2008	1,152.0	mg/L	250	44	-	<0.5	18	31	-	2.9	<0	3.8	41	13	240	
	1/13/2009	1,152.0	mg/L	230	40	15	<0.5	1.1	29	-	4.4	<0	2.9	38	16	320	
	7/16/2009	1,142.0	mg/L	210	33	15	<0.5	2.3	28	-	2.7	<0	2.3	36	11	260	
	1/13/2010	1,142.0	mg/L	220	27	15	0.4	1.2	27	-	3.3	<0	2.3	36	12	290	
	6/16/2010	1,142.0	mg/L	210	29	-	-	0.2	28	-	3.7	<0	3.7	42	-	290	
	3/8/2011	1,142.0	mg/L	234	32.2	17	<0.5	0.7	29.7	-	-	<0	2.5	38.7	15	311	
	2/21/2012	1,142.0	mg/L	238	36.5	17.3	<0.5	0.4	28.6	9.5	-	<0	2.6	36.9	16.2	336	
	5/10/2012	1,142.0	mg/L	239	38.7	16.6	<0.5	<0.2	33.3	10	-	-	2.3	38.5	16.2	335	
MW-03																	
	1/22/2008	1,089.6	mg/L	260	21	-	<0.5	2	15	-	0.8	<0	3.4	75	8.3	340	
	1/13/2009	1,089.6	mg/L	260	28	18	0.5	1.6	20	-	0.7	<0	4.7	74	6.6	320	
	7/16/2009	1,142.6	mg/L	250	25	17	0.5	2.5	18	-	0.2	<0	4.2	64	4.6	280	
	1/13/2010	1,142.6	mg/L	230	23	17	0.5	0.3	22	-	0.3	<0	3.7	50	6.5	280	
	6/16/2010	1,142.6	mg/L	250	26	-	-	0.9	28	-	<0.1	<0	2.7	38	-	300	
	3/8/2011	1,142.6	mg/L	242	35.5	18.8	<0.5	<0.1	29.7	-	1.9	<0	2.9	37.8	14.5	299	
	2/16/2012	1,142.6	mg/L	249	34	18.7	0.5	<0.2	26.6	1.2	-	<0	2.7	34.8	14.9	306	
	5/10/2012	1,142.6	mg/L	248	35.6	17.2	<0.5	<0.2	31.4	1.2	-	-	2.5	35.9	14.9	360	
MW-04																	
	3/8/2011	1,132.0	mg/L	250	31.9	18.4	<0.5	0.3	25	-	-	<0	2.8	54.5	16.2	305	
	2/16/2012	1,132.0	mg/L	251	35.5	18.8	0.5	1.5	26.1	1.3	-	<0	2.5	32.4	14.2	282	
	5/8/2012	1,132.0	mg/L	249	35.6	17.1	<0.5	0.9	26.8	1.4	-	-	2.6	32	14.1	299	
AWQS:				**N/A**	**N/A**	**N/A**	**4,000**	**1,000**	**N/A**	**10,000**	**10,000**	**1,000**	**N/A**	**N/A**	**N/A**	**N/A**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Alkalinity, Total (CaCO3)	Calcium	Chloride	Fluoride	Iron	Magnesium	Nitrate (As N)	Nitrate-Nitrite	Nitrite	Potassium	Sodium	Sulfate	Total Dissolved Solids	Comments
MW-05																	
	3/8/2011	1,144.2	mg/L	246	31.9	18.5	<0.5	0.8	24.2	-	2.4	<0	3.7	51.7	21.8	318	
	2/15/2012	1,144.2	mg/L	247	36.1	16.5	0.5	0.6	26.2	1.9	-	<0	4	39.3	18.3	290	
	5/9/2012	1,144.2	mg/L	247	35.4	15.2	<0.5	0.5	25.5	1.6	-	-	3.4	37.7	17.6	331	
MW-06																	
	2/15/2012	1,141.3	mg/L	254	34.9	17.6	<0.5	1.1	27.4	1.7	-	<0	3.3	38.5	14.9	260	
	5/9/2012	1,141.3	mg/L	251	34.6	15.9	<0.5	1.3	27	1.5	-	-	2.5	35.4	14.2	335	
MW-07																	
	5/8/2012	1,142.2	mg/L	256	32.9	17.4	<0.5	0.4	25.6	1.3	-	-	2.5	41.2	15.1	307	
MW-08																	
	5/8/2012	1,153.7	mg/L	238	44.8	22.5	<0.5	0.3	18.2	0.9	-	-	2	41.6	22.9	331	
PW																	
	10/23/1987	1,131.4	mg/L	-	-	-	-	0.3	-	-	-	-	-	-	-	-	
	5/25/1988	1,131.4	mg/L	-	49	16	0.4	<0.1	22	-	-	-	-	33	22	-	
	3/19/1990	1,131.4	mg/L	-	-	16	0.4	<0.1	-	-	-	-	-	-	25	-	
	2/25/1991	1,131.4	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	
	8/14/1991	1,131.4	mg/L	-	-	16	0.5	<0.1	-	-	-	-	-	-	27	-	
	11/20/1991	1,131.4	mg/L	-	-	16	0.3	<0.5	-	-	-	-	-	-	26	-	
	7/22/1992	1,131.4	mg/L	-	-	17	0.4	<0.1	-	-	-	-	-	-	21	-	
	1/12/2006	1,131.4	mg/L	-	50	-	-	<0.1	24	-	-	-	2.4	37	-	-	
	1/18/2006	1,131.4	mg/L	250	-	-	<0.5	-	-	<0.5	-	-	-	-	12	310	
	7/13/2006	1,131.4	mg/L	240	47	-	<0.5	<0.1	27	-	1.7	<0	2.1	38	19	320	
	7/18/2007	1,131.4	mg/L	240	47	-	<0.5	0.1	29	-	1.4	<0	2.3	36	18	320	
	1/22/2008	1,131.4	mg/L	240	36	-	<0.5	2.4	29	-	1.2	<0	2.3	34	9.3	280	
	7/18/2008	1,131.4	mg/L	250	49	-	<0.5	<0.1	27	-	1.4	<0	2.6	38	19	260	
	1/13/2009	1,131.4	mg/L	250	48	22	<0.5	<0.1	26	-	1.4	<0	2.3	37	19	340	
	7/16/2009	1,152.4	mg/L	250	41	21	<0.5	0.2	33	-	1.1	<0	2.1	33	11	320	
	1/13/2010	1,152.4	mg/L	240	36	20	0.5	0.3	32	-	1.1	<0	2	31	11	320	
	6/16/2010	1,152.4	mg/L	280	42	-	-	<0.1	33	-	<0.1	<0	2.3	35	-	330	
	3/8/2011	1,152.4	mg/L	246	42.2	22.3	<0.5	<0.1	32.1	-	1.5	<0	2.2	35.4	17.3	324	
	2/21/2012	1,152.4	mg/L	252	36.3	20.9	<0.5	0.6	25.4	1.4	-	<0	2.1	30.6	17.5	276	
	5/10/2012	1,152.4	mg/L	251	39.7	20	<0.5	<0.2	31.1	1.4	-	-	1.8	34	17.4	301	
AWQS:				**N/A**	**N/A**	**N/A**	**4,000**	**1,000**	**N/A**	**10,000**	**10,000**	**1,000**	**N/A**	**N/A**	**N/A**	**N/A**	

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Alkalinity, Total (CaCO3)	Calcium	Chloride	Fluoride	Iron	Magnesium	Nitrate (As N)	Nitrate-Nitrite	Nitrite	Potassium	Sodium	Sulfate	Total Dissolved Solids	Comments
AWQS:				**N/A**	**N/A**	**N/A**	**4,000**	**1,000**	**N/A**	**10,000**	**10,000**	**1,000**	**N/A**	**N/A**	**N/A**	**N/A**	

Notes: AWQS - Aquifer Water Quality Standard
Grey text indicates a non-detected compound
Bold text indicates a detected compound above the AWQS
mg/L - milligams per liter
ft amsl - feet ablove mean sea level
- = data not applicable or available

APPENDIX G

SOIL VAPOR ANALYTICAL RESULTS
SUMMARY OF CHLORINATED SOLVENT AND RELATED COMPOUND DATA

Appendix G. Soil Vapor Results - Summary of Chlorinated Solvent and Related Compound Data

Cave Creek Landfill, Maricopa County

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Allyl chloride	Carbon tetrachloride	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	1,4-Dioxane	Hexachlorobutadiene	Methylene chloride	1,1,2,2-Tetrachloroethane	Tetrachloroethene	trans-1,3-Dichloropropene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride	Comments
Ambient																										
	6/16/2010	-	µg/m³	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	Ambient Sample; One Day Preliminary SVE Test
	1/5/2012	-	µg/m³	<1.6	<3.1	<1.3	<2.4	<2.1	<2	<2	<2	<2	<2	<2.3	<2.3	<7.2	<10.7	<1.7	<3.4	5.4	<2.3	<2.7	<2.7	<2.7	<1.3	- -
	3/9/2012	-	µg/m³	<1.6	<3.1	<1.3	<2.4	<2.1	<2	<2	<2	<2	<2	<2.3	<2.3	<7.2	<10.7	<1.7	<3.4	<3.4	<2.3	<2.7	<2.7	<2.7	<1.3	- -
GW-08																										
	12/3/2009	1,870.0	µg/m³	-	<170	170	<130	<220	710	<110	520	25,000	320	<120	<120	<380	<1,100	<92	<180	470	<120	<140	<140	1,300	1,600	- -
GW-13																										
	12/3/2009	1,883.7	µg/m³	-	<230	700	<180	<300	570	<150	420	8,100	150	<170	<170	<530	<1,600	470	<250	2,200	<170	<200	<200	1,900	650	- -
GW-19																										
	12/3/2009	1,844.5	µg/m³	-	<75	47	<58	<98	72	<48	140	2,200	<47	<55	<54	<170	<510	78	<82	1,400	<54	<65	<65	1,500	36	- -
GW-22																										
	12/3/2009	1,857.7	µg/m³	-	<140	<60	<110	<190	<93	<93	120	5,400	<91	<100	<100	<330	<980	<80	<160	710	<100	<120	<120	1,000	300	- -
GW-25																										
	12/3/2009	1,854.9	µg/m³	-	<150	82	<120	<200	<96	<96	160	4,000	<94	<110	<110	<340	<1,000	97	<160	1,600	<110	<130	<130	1,200	190	- -
GW-29																										
	12/3/2009	1,851.9	µg/m³	-	<140	120	<110	<190	<93	<93	120	1,600	<91	<100	<100	<330	<980	<80	<160	970	<100	<120	<120	1,000	270	- -
MW-02																										
	5/19/2009	1,226.0	µg/m³	-	<8	<3.3	<6.2	<10	<5.1	<5.1	<5	5.7	<5	<5.8	<5.7	<18	<54	<4.4	<8.7	<8.6	<5.7	<6.9	<6.9	110	<3.2	- -
NDP-01-D																										
	11/15/2004	1,757.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	560	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	520	<5,000	- -
	12/8/2004	1,757.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	1,400	<500	<500	<500	-	-	<5,000	<1,000	1,300	<500	<500	<500	1,600	5,700	- -
	6/9/2005	1,757.0	µg/m³	-	<500	<5,000	-	<5,000	-	<500	-	-	<500	<500	<500	-	-	<5,000	<1,000	-	<500	<500	<500	-	-	- -
	6/10/2005	1,757.0	µg/m³	-	-	-	<500	-	510	-	<1,000	1,600	-	-	-	-	-	-	<1,000	9,600	-	-	-	15,000	<1,000	- -
	1/17/2008	1,757.0	µg/m³	-	-	-	<500	-	<500	-	1,000	1,600	-	-	-	-	-	-	<1,000	1,700	-	-	-	19,000	<1,000	- -
	12/1/2009	1,757.0	µg/m³	-	<500	<210	760	<650	<320	<320	3,400	1,300	<310	<360	<360	<1,100	<3,400	<270	<540	6,300	<360	<430	<430	95,000	500	- -
	11/8/2011	1,757.0	µg/m³	<782.5	<1,570	<660	<1,220	<1,040	<1,010	<1,010	2,030	2,500	<990	<1,160	<1,140	<3,600	<5,340	<867.5	<1,720	8,140	<1,140	<1,370	<1,370	86,000	742.4	- -
NDP-01-S																										
	11/15/2004	1,807.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	930	<500	<500	<500	870	<5,000	- -
	12/8/2004	1,807.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	1,500	<500	<500	<500	1,500	<5,000	- -
	6/9/2005	1,807.0	µg/m³	-	<500	<5,000	-	<5,000	-	<500	-	-	<500	<500	<500	-	-	<5,000	<1,000	-	<500	<500	<500	-	-	- -
	6/10/2005	1,807.0	µg/m³	-	-	-	<500	-	<500	-	<1,000	1,100	-	-	-	-	-	-	<1,000	8,000	-	-	-	8,300	<1,000	- -
	1/17/2008	1,807.0	µg/m³	-	-	-	<500	-	<500	-	1,600	1,800	-	-	-	-	-	-	<1,000	2,000	-	-	-	26,000	<1,000	- -
	12/1/2009	1,807.0	µg/m³	-	<380	<160	440	<500	<240	<240	2,500	2,900	<240	<280	<270	<870	<2,600	<210	<420	5,300	<270	<330	<330	60,000	1,000	- -
	11/8/2011	1,807.0	µg/m³	<156.5	<314.5	<132	434.3	<207	<202.5	<202.5	992.5	3,450	<198	<231	<227	<720	<1,070	<173.5	<343.5	4,480	<227	<273	<273	45,100	1,230	- -
NDP-02-D																										
	11/15/2004	1,756.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	1,400	<500	<500	<500	890	<5,000	- -
	12/8/2004	1,756.0	µg/m³	-	<500	<5,000	<500	<5,000	1,100	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	3,800	<500	<500	<500	1,600	<5,000	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Allyl chloride	Carbon tetrachloride	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	1,4-Dioxane	Hexachlorobutadiene	Methylene chloride	1,1,2,2-Tetrachloroethane	Tetrachloroethene	trans-1,3-Dichloropropene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride	Comments
NDP-02-D																										
	6/9/2005	1,756.0	µg/m³	-	<500	<5,000	-	<5,000	-	<500	-	-	<500	<500	<500	-	-	<5,000	<1,000	-	<500	<500	<500	-	-	- -
	6/10/2005	1,756.0	µg/m³	-	-	-	<500	-	910	-	<1,000	<500	-	-	-	-	-	-	<1,000	6,400	-	-	-	3,400	<5,000	- -
	1/17/2008	1,756.0	µg/m³	-	-	-	<500	-	<500	-	<1,000	<500	-	-	-	-	-	-	<1,000	1,800	-	-	-	4,700	<5,000	- -
	12/1/2009	1,756.0	µg/m³	-	<740	<310	750	<970	<480	<480	1,500	<460	<460	<540	<530	<1,700	<5,000	<410	<810	4,300	<530	<640	<640	19,000	<300	- -
NDP-02-S																										
	11/15/2004	1,806.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,806.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	1,400	<500	<500	<500	880	<5,000	- -
	6/9/2005	1,806.0	µg/m³	-	<500	<5,000	-	<5,000	-	<500	-	-	<500	<500	<500	-	-	<5,000	<1,000	-	<500	<500	<500	4,700	-	- -
	6/10/2005	1,806.0	µg/m³	-	-	-	<500	-	<500	-	<1,000	<500	-	-	-	-	-	-	<1,000	5,200	-	-	-	470	<5,000	- -
	1/17/2008	1,806.0	µg/m³	-	-	-	790	-	<500	-	1,200	<500	-	-	-	-	-	-	<1,000	3,500	-	-	-	11,000	<5,000	- -
	12/1/2009	1,806.0	µg/m³	-	<510	<200	440	<640	<320	<320	980	<310	<310	<370	<350	<1,100	<3,400	<270	<530	4,000	<350	<440	<440	14,000	<200	- -
ODP-01-D																										
	11/18/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/1/2009	1,758.0	µg/m³	-	<970	<410	<750	<1,300	800	<620	380,000	<610	<610	<710	<700	<2,200	<6,600	2,600	<1,000	14,000	<700	<840	<840	21,000	1,000	- -
ODP-01-S																										
	11/18/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	1,500	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	3,300	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/1/2009	1,808.0	µg/m³	-	<260	<110	<200	<340	<170	<170	43,000	220	<160	<190	<190	<600	<1,800	380	<280	5,300	<190	<230	<230	3,600	380	- -
ODP-02-D																										
	11/18/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/1/2009	1,758.0	µg/m³	-	<30	23	30	<39	38	<19	5,800	720	42	<22	<21	<68	<200	250	<32	3,400	<21	<26	<26	4,100	2,200	- -
ODP-02-S																										
	11/18/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/1/2009	1,808.0	µg/m³	-	<20	35	<15	<26	25	<13	2,400	320	19	<15	<14	<46	<130	98	<22	2,100	<14	<17	<17	1,900	780	- -
ODP-03-D																										
	11/18/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	11,000	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	640	<500	<500	<500	<500	<5,000	- -
	1/17/2008	1,758.0	µg/m³	-	-	-	<500	-	<500	-	<1,000	<500	-	-	-	-	-	-	<1,000	<500	-	-	-	<500	<5,000	- -
	12/1/2009	1,758.0	µg/m³	-	<22	<9.1	41	<28	17	<14	2,600	130	<14	<16	<16	<50	<150	64	<24	1,800	<16	<19	<19	4,900	73	- -
	11/8/2011	1,758.0	µg/m³	<78.3	<157.3	<66	<122	<103.5	<101.3	<101.3	361.3	<99	<99	<115.5	<113.5	<360	<533.5	<86.8	<171.8	413.6	<113.5	<136.5	<136.5	3,280	<64	- -
ODP-03-S																										
	11/18/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	13,000	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	1,900	<500	<500	<500	<500	<5,000	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Allyl chloride	Carbon tetrachloride	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	1,4-Dioxane	Hexachlorobutadiene	Methylene chloride	1,1,2,2-Tetrachloroethane	Tetrachloroethene	trans-1,3-Dichloropropene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride	Comments
ODP-03-S																										
	1/17/2008	1,808.0	µg/m³	-	-	-	<500	-	<500	-	<1,000	<500	-	-	-	-	-	-	<1,000	<500	-	-	-	<500	<5,000	- -
	12/1/2009	1,808.0	µg/m³	-	<7.3	<4.2	<5.7	<9.6	<4.7	<4.7	<4.6	<4.6	<4.6	<5.4	<5.3	<23	<50	<4	<8	<7.9	<5.3	<6.4	<8.6	<6.3	<3	- -
	11/8/2011	1,808.0	µg/m³	<7.8	<15.7	<6.6	<12.2	<10.4	<10.1	<10.1	<9.9	29.7	<9.9	<11.6	<11.4	<36	<53.4	<8.7	<17.2	183.1	<11.4	<13.7	<13.7	590.7	15.6	- -
ODP-04-D																										
	11/18/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	740	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,758.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	1/17/2008	1,758.0	µg/m³	-	-	-	<500	-	<500	-	<1,000	<500	-	-	-	-	-	-	<1,000	<500	-	-	-	<500	<5,000	- -
	12/1/2009	1,758.0	µg/m³	-	<110	<46	<85	<140	<70	<70	28,000	260	<69	<80	<79	<250	<740	580	<120	2,600	<79	<95	<95	16,000	410	- -
ODP-04-S																										
	11/18/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	1,000	870	<500	<500	<500	<500	<5,000	- -
	12/8/2004	1,808.0	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	1/17/2008	1,808.0	µg/m³	-	-	-	<500	-	6,200	-	<1,000	<500	-	-	-	-	-	-	<1,000	<500	-	-	-	2,100	<5,000	- -
	12/1/2009	1,808.0	µg/m³	-	<21	50	<16	<28	34	<13	1,600	92	<13	<15	<15	<48	<140	56	<23	1,200	<15	<18	<18	2,800	77	- -
P-02-D																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/2/2009	-	µg/m³	-	<16	<6.5	29	<20	<10	<10	470	60	<9.8	<11	<11	<36	<100	14	<17	1,500	<11	<13	<13	3,500	<6.3	- -
P-02-S																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/2/2009	-	µg/m³	-	<7.5	<3.1	13	<9.8	<4.8	<4.8	180	28	<4.7	<5.5	<5.4	<17	<51	6	<8.2	690	<5.4	<6.5	<6.5	1,600	<3	- -
	11/8/2011	-	µg/m³	<3.1	<6.3	<2.6	<4.9	<4.1	<4.1	<4.1	<4	<4	<4	<4.6	<4.5	<14.4	<21.3	<3.5	<6.9	<6.8	<4.5	<5.5	<5.5	33.3	<2.6	- -
P-03																										
	3/9/2012	-	µg/m³	<1.6	<3.1	<1.3	<2.4	<2.1	<2	<2	<2	<2	<2	<2.3	<2.3	<7.2	<10.7	<1.7	<3.4	<3.4	<2.3	<2.7	<2.7	<2.7	<1.3	- -
P-05																										
	11/18/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	830	<500	<1,000	660	<500	<500	<500	-	-	<5,000	<1,000	1,600	<500	<500	<500	<500	<5,000	- -
P-06																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	1/5/2012	-	µg/m³	<1.6	<3.1	<1.3	<2.4	<2.1	<2	<2	<2	<2	<2	<2.3	<2.3	<7.2	<10.7	<1.7	<3.4	5.4	<2.3	<2.7	<2.7	<2.7	<1.3	- -
P-07																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	1/5/2012	-	µg/m³	<1.6	<3.1	<1.3	<2.4	<2.1	<2	<2	<2	<2	<2	<2.3	<2.3	<7.2	<10.7	<1.7	<3.4	12.2	<2.3	<2.7	<2.7	<2.7	<1.3	- -
P-08																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	1/5/2012	-	µg/m³	<1.6	<3.1	<1.3	7.3	<2.1	<2	<2	<2	<2	<2	<2.3	<2.3	<7.2	<10.7	<1.7	<3.4	30.5	<2.3	<2.7	<2.7	<2.7	<1.3	- -
P-09																										
	3/9/2012	-	µg/m³	<313	<629	<264	<488	<414	<405	<405	1,349.8	<396	<396	<462	<454	<1,440	<2,130	<347	<687	1,830	<454	<546	<546	59,100	<256	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Allyl chloride	Carbon tetrachloride	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	1,4-Dioxane	Hexachlorobutadiene	Methylene chloride	1,1,2,2-Tetrachloroethane	Tetrachloroethene	trans-1,3-Dichloropropene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride	Comments
P-10																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	1,700	<5,000	- -
	1/5/2012	-	µg/m³	<1.6	<3.1	<1.3	<2.4	<2.1	<2	<2	14.3	<2	<2	<2.3	<2.3	<7.2	<10.7	<1.7	<3.4	34.6	<2.3	<2.7	<2.7	590.7	<1.3	- -
P-11																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	1,200	<5,000	- -
P-12																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
P-13-D																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
P-13-S																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	7,600	<5,000	- -
P-17-D																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
P-17-S																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
P-18-D																										
	11/15/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/2/2009	-	µg/m³	-	<15	<6.1	31	<19	<9.4	<9.4	400	46	<9.2	<11	<10	<34	<99	12	<16	1,200	<10	<13	<13	2,400	<6	- -
P-18-S																										
	11/15/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
	12/2/2009	-	µg/m³	-	<30	<13	26	<40	<20	<20	180	31	<19	<22	<22	<70	<210	<17	<33	1,200	<22	<26	<26	1,700	<12	- -
P-19-D																										
	11/15/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
P-19-S																										
	11/15/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
P-22																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	8,300	<5,000	- -
P-23																										
	11/16/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	<500	<5,000	- -
P-25																										
	11/15/2004	-	µg/m³	-	<500	<5,000	<500	<5,000	<500	<500	<1,000	<500	<500	<500	<500	-	-	<5,000	<1,000	<500	<500	<500	<500	1,900	<5,000	- -
PW																										
	5/21/2009	1,201.4	µg/m³	-	<780	<320	<600	<1,000	<500	<500	5,600	9,800	<490	<570	<560	<1,800	<5,300	<430	<850	12,000	<560	<670	<670	180,000	<320	- -
	6/16/2010	1,201.4	µg/m³	<620	<620	<620	<620	<620	<620	<620	2,700	15,000	<620	<620	<620	<620	<620	<620	<620	6,300	<620	<620	<620	100,000	<620	One Day Preliminary SVE Test
	6/16/2010	1,201.4	µg/m³	<850	<850	<850	<850	<850	<850	<850	2,800	12,000	<850	<850	<850	<850	<850	<850	<850	7,100	<850	<850	<850	130,000	<850	One Day Preliminary SVE Test
	6/16/2010	1,201.4	µg/m³	<630	<630	<630	<630	<630	<630	<630	2,700	11,000	<630	<630	<630	<630	<630	<630	<630	7,500	<630	<630	<630	120,000	<630	One Day Preliminary SVE Test
	11/8/2011	1,201.4	µg/m³	<1,570	<3,150	<1,320	<2,440	<2,070	<2,030	<2,030	<1,990	7,130	<1,980	<2,310	<2,270	<7,200	<10,700	<1,740	<3,440	7,460	<2,270	<2,730	<2,730	140,000	<1,280	- -

Appendix G. Soil Vapor Results - Summary of Chlorinated Solvent and Related Compound Data

Cave Creek Landfill, Maricopa County

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Allyl chloride	Carbon tetrachloride	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	1,4-Dioxane	Hexachlorobutadiene	Methylene chloride	1,1,2,2-Tetrachloroethane	Tetrachloroethene	trans-1,3-Dichloropropene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride	Comments
PW																										
	11/23/2011	1,201.4	µg/m³	<1,570	<3,150	<1,320	<2,440	<2,070	<2,030	<2,030	24,200	285,000	<1,980	<2,310	<2,270	<7,200	<10,700	3,820	<3,440	37,300	<2,270	<2,730	<2,730	752,000	13,300	Extended SVE Pilot Test
TSSV-01-D																										
	2/23/2010	1,332.0	µg/m³	-	<780	<330	660	<1,000	860	<500	4,300	250,000	<490	<570	<560	<1,800	<5,300	18,000	<850	8,000	<560	<680	<680	77,000	18,000	- -
	6/16/2010	1,332.0	µg/m³	<220	<220	<220	330	<220	340	<220	2,700	90,000	<220	<220	<220	<220	<220	4,100	<220	3,200	<220	<220	<220	32,000	3,400	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<1,200	<1,200	<1,200	<1,200	<1,200	1,400	<1,200	24,000	230,000	<1,200	<1,200	<1,200	<1,200	<1,200	15,000	<1,200	19,000	<1,200	<1,200	<1,200	200,000	12,000	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<1,700	<1,700	<1,700	<1,700	<1,700	2,100	<1,700	37,000	340,000	<1,700	<1,700	<1,700	<1,700	<1,700	24,000	<1,700	30,000	<1,700	<1,700	<1,700	310,000	18,000	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<1,500	<1,500	<1,500	<1,500	<1,500	1,900	<1,500	34,000	310,000	<1,500	<1,500	<1,500	<1,500	<1,500	22,000	<1,500	26,000	<1,500	<1,500	<1,500	270,000	16,000	One Day Preliminary SVE Test
	11/8/2011	1,332.0	µg/m³	<1,570	<3,150	<1,320	<2,440	<2,070	<2,030	<2,030	2,940	111,000	<1,980	<2,310	<2,270	<7,200	<10,700	6,590	<3,440	5,360	<2,270	<2,730	<2,730	47,000	7,170	- -
	2/20/2012	1,332.0	µg/m³	<1,570	<3,150	<1,320	2,930	<2,070	3,440	2,030	79,400	1,350,000	<1,980	<2,310	<2,270	<7,200	<10,700	41,600	<3,440	67,100	<2,270	<2,730	<2,730	1,340,000	33,300	Extended SVE Pilot Test
	2/29/2012	1,332.0	µg/m³	<15,700	<31,500	<13,200	<24,400	<20,700	<20,300	<20,300	262,000	1,230,000	<19,800	<23,100	<22,700	<72,000	<107,000	111,000	<34,400	237,000	<22,700	<27,300	<27,300	2,630,000	58,900	Extended SVE Pilot Test
TSSV-01-M																										
	2/23/2010	1,531.0	µg/m³	-	<430	<180	2,200	<560	<280	<280	1,300	1,600	<270	<310	<310	<980	<2,900	<240	<470	6,000	<310	<370	<370	200,000	250	- -
	6/16/2010	1,531.0	µg/m³	<620	<620	<620	1,300	<620	<620	<620	<620	1,200	<620	<620	<620	<620	<620	<620	<620	3,900	<620	<620	<620	110,000	<620	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<580	<580	<580	1,400	<580	<580	<580	640	1,900	<580	<580	<580	<580	<580	<580	<580	4,400	<580	<580	<580	120,000	<580	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<940	<940	<940	1,900	<940	<940	<940	<940	2,900	<940	<940	<940	<940	<940	<940	<940	6,300	<940	<940	<940	170,000	<940	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<930	<930	<930	1,400	<930	<930	<930	<930	1,900	<930	<930	<930	<930	<930	<930	<930	4,200	<930	<930	<930	120,000	<930	One Day Preliminary SVE Test
	11/8/2011	1,531.0	µg/m³	<3,130	<6,290	<2,640	<4,880	<4,140	<4,050	<4,050	<3,970	<3,960	<3,960	<4,620	<4,540	<14,400	<21,300	<3,470	<6,870	10,800	<4,540	<5,460	<5,460	279,000	<2,560	- -
	1/16/2012	1,531.0	µg/m³	<6,260	<12,600	<5,280	<9,760	<8,280	<8,100	<8,100	<7,940	<7,920	<7,920	<9,240	<9,080	<28,800	<42,700	<6,940	<13,700	18,306	<9,080	<10,900	<10,900	446,000	<5,120	Extended SVE Pilot Test
	1/20/2012	1,531.0	µg/m³	<6,260	<12,600	<5,280	<9,760	<8,280	<8,100	<8,100	<7,940	15,400	<7,920	<9,240	<9,080	<28,800	<42,700	<6,940	<13,700	21,700	<9,080	<10,900	<10,900	510,000	<5,120	Extended SVE Pilot Test
	1/31/2012	1,531.0	µg/m³	<6,260	<12,600	<5,280	<9,760	<8,280	<8,100	<8,100	<7,940	43,600	<7,920	<9,240	<9,080	<28,800	<42,700	<6,940	<13,700	36,600	<9,080	<10,900	<10,900	698,000	<5,120	Extended SVE Pilot Test
	2/20/2012	1,531.0	µg/m³	<3,130	<6,290	<2,640	<4,880	<4,140	<4,050	<4,050	5,560	47,500	<3,960	<4,620	<4,540	<14,400	<21,300	<3,470	<6,870	27,800	<4,540	<5,460	<5,460	752,000	5,630	Extended SVE Pilot Test
TSSV-01-S																										
	2/23/2010	1,731.0	µg/m³	-	<200	<83	200	<260	<130	<130	1,900	170	<120	<140	<140	<450	<1,300	<110	<220	3,800	<140	<170	<170	130,000	250	- -
	6/16/2010	1,731.0	µg/m³	<270	<270	<270	480	<270	<270	<270	290	<270	<270	<270	<270	<270	<270	<270	<270	1,200	<270	<270	<270	36,000	<270	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	1,200	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	5,400	<1,000	<1,000	<1,000	160,000	<1,000	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<740	<740	<740	<740	<740	<740	<740	1,100	<740	<740	<740	<740	<740	<740	<740	<740	4,900	<740	<740	<740	140,000	<740	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<1,200	<1,200	<1,200	<1,200	<1,200	<1,200	<1,200	1,700	<1,200	<1,200	<1,200	<1,200	<1,200	<1,200	<1,200	<1,200	7,900	<1,200	<1,200	<1,200	230,000	<1,200	One Day Preliminary SVE Test
	11/8/2011	1,731.0	µg/m³	<3,130	<6,290	<2,640	<4,880	<4,140	<4,050	<4,050	4,760	<3,960	<3,960	<4,620	<4,540	<14,400	<21,300	<3,470	<6,870	17,600	<4,540	<5,460	<5,460	435,000	<2,560	- -
	11/16/2011	1,731.0	µg/m³	<3,130	<6,290	<2,640	<4,880	<4,140	<4,050	<4,050	4,760	<3,960	<3,960	<4,620	<4,540	<14,400	<21,300	<3,470	<6,870	11,500	<4,540	<5,460	<5,460	456,000	<2,560	Extended SVE Pilot Test
	11/23/2011	1,731.0	µg/m³	<3,130	<6,290	<2,640	<4,880	<4,140	<4,050	<4,050	5,560	<3,960	<3,960	<4,620	<4,540	<14,400	<21,300	<3,470	<6,870	21,000	<4,540	<5,460	<5,460	806,000	<2,560	Extended SVE Pilot Test
	12/13/2011	1,731.0	µg/m³	<6,260	<12,600	<5,280	<9,760	<8,280	<8,100	<8,100	8,340	<7,920	<7,920	<9,240	<9,080	<28,800	<42,700	<6,940	<13,700	27,100	<9,080	<10,900	<10,900	913,000	<5,120	Extended SVE Pilot Test

Notes: Grey text indicates a non-detected compound
µg/m³ - micrograms per cubic meter
ft amsl - feet above mean sea level
- = data not applicable or available

APPENDIX H

SOIL VAPOR ANALYTICAL RESULTS
SUMMARY OF AROMATIC COMPOUND AND FUEL RELATED DATA

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Benzene	Benzyl chloride	Chlorobenzene	Cumene	Cyclohexane	Ethyl Benzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	4-Ethyltoluene	Heptane	Hexane	Methyl tert-butyl ether	o-Xylene	Propene (Propylene)	Propylbenzene	Toluene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2,2,4-Trimethylpentane	m,p-Xylene	Styrene	Comments
Ambient																											
	6/16/2010	-	µg/m³	<1.9	<1.9	<1.9	<1.9	<3.9	<1.9	<1.9	<1.9	<1.9	<1.9	-	-	<1.9	<1.9	<1.9	-	<1.9	<1.9	2.2	<1.9	-	<3.9	<1.9	Ambient Sample; One Day Preliminary SVE Test
	1/5/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<2.5	<2.1	<1.8	<3.6	<2.2	<.9	-	<1.9	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	- -
	3/9/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<4.9	<2.1	<1.8	<7.2	<2.2	<.9	-	<1.9	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	- -
GW-08																											
	12/3/2009	1,886.0	µg/m³	1,600	-	210	<130	3,600	3,900	<160	<160	<160	<130	7,500	4,100	480	1,300	-	<130	18,000	<790	180	<130	2,200	5,700	<110	- -
GW-13																											
	12/3/2009	1,891.0	µg/m³	1,600	-	<170	<180	8,400	4,200	<220	<220	<220	<180	11,000	5,500	820	1,300	-	<180	46,000	<1,100	<180	<180	4,800	6,500	<160	- -
GW-19																											
	12/3/2009	1,867.0	µg/m³	310	-	230	<58	560	3,800	<72	<72	<72	190	1,200	300	78	1,600	-	<58	20,000	<350	220	78	360	7,200	<51	- -
GW-22																											
	12/3/2009	1,868.0	µg/m³	530	-	220	<110	460	4,300	<140	<140	<140	320	1,200	490	110	1,800	-	130	12,000	<680	340	140	330	7,100	<98	- -
GW-25																											
	12/3/2009	1,867.0	µg/m³	590	-	240	<120	1,400	5,400	<140	<140	<140	390	3,000	1,300	160	2,300	-	<120	19,000	<710	420	160	1,300	9,400	<100	- -
GW-29																											
	12/3/2009	1,866.0	µg/m³	370	-	240	<110	530	5,100	<140	<140	<140	490	2,000	1,300	<82	2,400	-	<110	9,700	<680	530	180	560	8,800	<98	- -
MW-02																											
	5/19/2009	1,226.0	µg/m³	6.1	-	<5.8	32	<4.4	16	<7.6	<7.6	<7.6	<6.2	7.7	8	<4.6	31	-	6.3	50	<38	<6.2	<6.2	<5.9	65	14	- -
NDP-01-D																											
	11/15/2004	1,772.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,772.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	6/9/2005	1,772.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	-	-	-	-	-	<1,500	-	- -
	6/10/2005	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,200	-	-	-	-	-	-	- -
	1/17/2008	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,700	-	-	-	-	-	-	- -
	12/1/2009	1,772.0	µg/m³	<250	-	1,000	<390	330	<340	<470	<480	<480	<390	<320	<280	<280	<340	-	<390	<300	<2,300	<390	<390	<370	<340	<340	- -
	11/8/2011	1,772.0	µg/m³	<797.5	<5,180	<1,150	-	<860	<1,090	<1,500	<1,500	<1,500	<1,230	<1,030	<880	<1,810	<1,090	<430	-	<942.5	<7,420	<1,230	<1,230	<1,170	<2,170	<1,070	- -
NDP-01-S																											
	11/15/2004	1,822.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,822.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	6/9/2005	1,822.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	-	-	-	-	-	<1,500	-	- -
	6/10/2005	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,100	-	-	-	-	-	-	- -
	1/17/2008	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,600	-	-	-	-	-	-	- -
	12/1/2009	1,822.0	µg/m³	<190	-	840	<300	400	<260	<360	<360	<360	<300	<250	320	<220	<260	-	<300	<230	<1,800	<300	<300	<280	<260	<260	- -
	11/8/2011	1,822.0	µg/m³	<159.5	<1,040	<230	-	378.4	<217	<300.5	<300.5	<300.5	<246	<205	563.2	<361	<217	<86	-	<188.5	<1,480	<246	<246	<233	<434	<213	- -
NDP-02-D																											
	11/15/2004	1,772.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,772.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Benzene	Benzyl chloride	Chlorobenzene	Cumene	Cyclohexane	Ethyl Benzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	4-Ethyltoluene	Heptane	Hexane	Methyl tert-butyl ether	o-Xylene	Propene (Propylene)	Propylbenzene	Toluene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2,2,4-Trimethylpentane	m,p-Xylene	Styrene	Comments
NDP-02-D																											
	6/9/2005	1,772.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	-	-	-	-	-	<1,500	-	- -
	6/10/2005	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	1/17/2008	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	12/1/2009	1,772.0	µg/m³	<380	-	600	<580	<400	<510	<710	<710	<710	<580	<480	<410	<420	<510	-	<580	<440	<3,500	<580	<580	<550	<510	<500	- -
NDP-02-S																											
	11/15/2004	1,822.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,822.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	6/9/2005	1,822.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	-	-	-	-	-	<1,500	-	- -
	6/10/2005	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	1/17/2008	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	12/1/2009	1,822.0	µg/m³	<260	-	380	<400	280	<350	<480	<480	<480	<400	<330	<280	<290	<350	-	<400	700	<2,400	<400	<400	<380	<350	<340	- -
ODP-01-D																											
	11/18/2004	1,773.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,773.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/1/2009	1,773.0	µg/m³	<490	-	<710	<760	960	<670	<920	<920	<920	<760	<630	<540	<560	<670	-	<760	<580	<4,600	<760	<760	16,000	<670	<660	- -
ODP-01-S																											
	11/18/2004	1,823.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,823.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/1/2009	1,823.0	µg/m³	<130	-	560	<200	210	<180	<250	<250	<250	<200	360	460	<150	<180	-	<200	<160	<1,200	<200	<200	440	<180	<180	- -
ODP-02-D																											
	11/18/2004	1,767.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,767.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/1/2009	1,767.0	µg/m³	270	-	4,100	23	63	<20	<28	<28	<28	<23	140	170	<17	45	-	<23	120	<140	<23	<23	62	43	<20	- -
ODP-02-S																											
	11/18/2004	1,817.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,817.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/1/2009	1,817.0	µg/m³	110	-	3,700	36	43	<14	<19	<19	<19	<16	95	140	<11	39	-	<16	120	<94	<16	<16	47	41	<13	- -
ODP-03-D																											
	11/18/2004	1,762.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,762.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	1/17/2008	1,762.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	12/1/2009	1,762.0	µg/m³	55	-	2,500	30	35	<15	<21	<21	<21	<17	37	48	<12	38	-	<17	67	<100	<17	<17	<16	42	<15	- -
	11/8/2011	1,762.0	µg/m³	<79.8	<518	156.4	-	<86	<108.5	<150.3	<150.3	282.5	<123	<102.5	<88	<180.5	<108.5	<43	-	<94.3	<742	<123	<123	<116.5	<217	<106.5	- -
ODP-03-S																											
	11/18/2004	1,812.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,812.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Benzene	Benzyl chloride	Chlorobenzene	Cumene	Cyclohexane	Ethyl Benzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	4-Ethyltoluene	Heptane	Hexane	Methyl tert-butyl ether	o-Xylene	Propene (Propylene)	Propylbenzene	Toluene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2,2,4-Trimethylpentane	m,p-Xylene	Styrene	Comments
ODP-03-S																											
	1/17/2008	1,812.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	12/1/2009	1,812.0	µg/m³	41	-	1,300	19	22	8.1	<9.5	<9.5	<9.5	<7.8	31	38	<5.7	23	-	<7.8	44	<47	<7.8	<7.8	10	29	<6.7	- -
	11/8/2011	1,812.0	µg/m³	30.9	<51.8	50.6	-	14.4	<10.9	66.1	<15	282.5	<12.3	<10.3	25.3	<18.1	<10.9	<4.3	-	10.6	<74.2	<12.3	<12.3	<11.7	<21.7	<10.7	- -
ODP-04-D																											
	11/18/2004	1,767.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,767.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	1/17/2008	1,767.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	12/1/2009	1,767.0	µg/m³	100	-	1,000	<86	180	<76	<100	<100	<100	<86	360	220	<63	<76	-	<86	<66	<520	<86	<86	170	<76	<74	- -
ODP-04-S																											
	11/18/2004	1,817.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/8/2004	1,817.0	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	1/17/2008	1,817.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1,000	-	-	-	-	-	-	- -
	12/1/2009	1,817.0	µg/m³	68	-	1,000	36	69	<14	<20	<20	<20	<16	110	78	<12	24	-	<16	39	<99	<16	<16	170	37	<14	- -
P-02-D																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/2/2009	-	µg/m³	9.5	-	630	28	8.6	44	<15	<15	15	17	<10	<8.7	<8.9	46	-	<12	80	<73	18	<12	<12	94	11	- -
P-02-S																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/2/2009	-	µg/m³	7.1	-	280	12	<4.1	20	<7.2	<7.2	<7.2	7.8	<4.9	<4.2	<4.3	21	-	<5.8	49	<35	8.4	<5.8	<5.6	45	<5.1	- -
	11/8/2011	-	µg/m³	<3.2	<20.7	<4.6	-	<3.4	<4.3	<6	<6	<6	<4.9	<4.1	<3.5	<7.2	<4.3	4	-	<3.8	<29.7	<4.9	<4.9	<4.7	<8.7	<4.3	- -
P-03																											
	3/9/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<4.9	<2.1	<1.8	<7.2	<2.2	<.9	-	3.4	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	- -
P-05																											
	11/18/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-06																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	1/5/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<2.5	<2.1	<1.8	<3.6	<2.2	<.9	-	<1.9	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	- -
P-07																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	1/5/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<2.5	<2.1	<1.8	<3.6	<2.2	<.9	-	2.3	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	- -
P-08																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	1/5/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<2.5	<2.1	<1.8	<3.6	<2.2	<.9	-	3.8	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	- -
P-09																											
	3/9/2012	-	µg/m³	4,150	<2,070	<460	-	<344	<434	<601	<601	<601	<984	<410	<352	<1,440	<434	<172	-	603.2	<2,970	<492	<492	<466	<868	<426	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Benzene	Benzyl chloride	Chlorobenzene	Cumene	Cyclohexane	Ethyl Benzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	4-Ethyltoluene	Heptane	Hexane	Methyl tert-butyl ether	o-Xylene	Propene (Propylene)	Propylbenzene	Toluene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2,2,4-Trimethylpentane	m,p-Xylene	Styrene	Comments
P-10																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	1/5/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<2.5	<2.1	2.1	<3.6	<2.2	<.9	-	7.2	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	Duplicate Sample
	1/5/2012	-	µg/m³	<1.6	<10.4	<2.3	-	<1.7	<2.2	<3	<3	<3	<2.5	<2.1	2.5	<3.6	<2.2	<.9	-	8.3	<14.8	<2.5	<2.5	<2.3	<4.3	<2.1	- -
P-11																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-12																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-13-D																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-13-S																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-17-D																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-17-S																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-18-D																											
	11/15/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/2/2009	-	µg/m³	<7.4	-	350	15	<8	22	<14	<14	<14	<11	<9.5	<8.2	<8.4	22	-	<11	47	<69	<11	<11	<11	46	<9.9	- -
P-18-S																											
	11/15/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
	12/2/2009	-	µg/m³	<15	-	310	<24	<17	21	<29	<29	<29	<24	<20	<17	<17	23	-	<24	38	<140	<24	<24	<23	45	<21	- -
P-19-D																											
	11/15/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-19-S																											
	11/15/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-22																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-23																											
	11/16/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
P-25																											
	11/15/2004	-	µg/m³	-	-	<500	-	-	<1,000	<500	<500	<500	-	-	-	-	-	-	-	<1,000	-	-	-	-	<1,500	-	- -
PW																											
	5/21/2009	1,201.4	µg/m³	<390	-	<570	<610	<420	<540	<740	<740	<740	<610	<510	<440	<440	<540	-	<610	<460	<3,700	<610	<610	<580	<540	<530	- -
	6/16/2010	1,201.4	µg/m³	<620	<620	1,500	<620	<1,200	<620	<620	<620	<620	<620	-	-	<620	<620	<620	-	<620	<620	<620	<620	-	<1,200	<620	One Day Preliminary SVE Test
	6/16/2010	1,201.4	µg/m³	<850	<850	1,100	<850	<1,700	<850	<850	<850	<850	<850	-	-	<850	<850	<850	-	<850	<850	<850	<850	-	<1,700	<850	One Day Preliminary SVE Test
	6/16/2010	1,201.4	µg/m³	<630	<630	<630	<630	<1,300	<630	<630	<630	<630	<630	-	-	<630	<630	<630	-	<630	<630	<630	<630	-	<1,300	<630	One Day Preliminary SVE Test

Appendix H. Soil Vapor Analytical Results - Summary of Aromatic and Fuel Related Compound Data

Cave Creek Landfill, Maricopa County

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Benzene	Benzyl chloride	Chlorobenzene	Cumene	Cyclohexane	Ethyl Benzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	4-Ethyltoluene	Heptane	Hexane	Methyl tert-butyl ether	o-Xylene	Propene (Propylene)	Propylbenzene	Toluene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2,2,4-Trimethylpentane	m,p-Xylene	Styrene	Comments
PW																											
	11/8/2011	1,201.4	µg/m³	<1,600	<10,400	<2,300	-	<1,720	<2,170	<3,010	<3,010	<3,010	<2,460	<2,050	<1,760	<3,610	<2,170	<860	-	<1,890	<14,800	<2,460	<2,460	<2,330	<4,340	<2,130	- -
	11/23/2011	1,201.4	µg/m³	<1,600	<10,400	8,280	-	<1,720	<2,170	<3,010	<3,010	<3,010	<2,460	<2,050	<1,760	<3,610	<2,170	<860	-	<1,890	<14,800	<2,460	<2,460	<2,330	<4,340	<2,130	Extended SVE Pilot Test
TSSV-01-D																											
	2/23/2010	1,332.0	µg/m³	1,500	-	30,000	<610	<430	<540	<740	<740	<740	<610	<510	<440	<450	<540	-	<610	730	<3,700	<610	<610	<580	630	<530	- -
	6/16/2010	1,332.0	µg/m³	450	<220	18,000	<220	<440	<220	2,600	<220	280	<220	-	-	<220	<220	<220	-	<220	<220	<220	<220	-	<440	<220	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<1,200	<1,200	21,000	<1,200	<2,300	<1,200	1,900	<1,200	<1,200	<1,200	-	-	<1,200	<1,200	<1,200	-	<1,200	<1,200	<1,200	<1,200	-	<2,300	<1,200	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<1,700	<1,700	31,000	<1,700	<3,500	<1,700	3,700	<1,700	<1,700	<1,700	-	-	<1,700	<1,700	<1,700	-	<1,700	<1,700	<1,700	<1,700	-	<3,500	<1,700	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<1,500	<1,500	25,000	<1,500	<3,100	<1,500	2,400	<1,500	<1,500	<1,500	-	-	<1,500	<1,500	<1,500	-	<1,500	<1,500	<1,500	<1,500	-	<3,100	<1,500	One Day Preliminary SVE Test
	11/8/2011	1,332.0	µg/m³	<1,600	<10,400	42,300	-	<1,720	<2,170	6,010	<3,010	<3,010	<2,460	<2,050	<1,760	<3,610	<2,170	<860	-	<1,890	<14,800	<2,460	<2,460	<2,330	<4,340	<2,130	- -
	2/20/2012	1,332.0	µg/m³	<1,600	<10,400	87,400	-	<1,720	<2,170	14,400	<3,010	<3,010	<2,460	<2,050	<1,760	<3,610	<2,170	<860	-	<1,890	<14,840	<2,460	<2,460	<2,330	<4,340	<2,130	Extended SVE Pilot Test
	2/29/2012	1,332.0	µg/m³	<16,000	<104,000	120,000	-	<17,200	<21,700	<30,100	<30,100	<30,100	<49,200	<20,500	<17,600	<72,200	<21,700	<8,600	-	<18,900	<148,000	<24,600	<24,600	<23,300	<43,400	<21,300	Extended SVE Pilot Test
TSSV-01-M																											
	2/23/2010	1,531.0	µg/m³	<220	-	700	<330	<230	<300	<410	<410	<410	<330	<280	<240	<240	<300	-	<330	<260	<2,000	<330	<330	<320	<300	<290	- -
	6/16/2010	1,531.0	µg/m³	<620	<620	1,000	<620	<1,200	<620	<620	<620	<620	<620	-	-	<620	<620	<620	-	<620	<620	<620	<620	-	<1,200	<620	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<580	<580	1,600	<580	<1,200	<580	<580	<580	<580	<580	-	-	<580	<580	<580	-	<580	<580	<580	<580	-	<1,200	<580	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<940	<940	2,500	<940	<1,900	<940	<940	<940	<940	<940	-	-	<940	<940	<940	-	<940	<940	<940	<940	-	<1,900	<940	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<930	<930	1,500	<930	<1,900	<930	<930	<930	<930	<930	-	-	<930	<930	<930	-	<930	<930	<930	<930	-	<1,900	<930	One Day Preliminary SVE Test
	11/8/2011	1,531.0	µg/m³	<3,190	<20,700	5,060	-	<3,440	<4,340	<6,010	<6,010	<6,010	<4,920	<4,100	<3,520	<7,220	<4,340	<1,720	-	<3,770	<29,700	<4,920	<4,920	<4,660	<8,680	<4,260	- -
	1/16/2012	1,531.0	µg/m³	<6,380	<41,400	12,400	-	<6,880	<8,680	<12,000	<12,000	<12,000	<9,840	<8,200	<7,040	<14,400	<8,680	<3,440	-	<7,540	<59,400	<9,840	<9,840	<9,320	<17,400	<8,520	Extended SVE Pilot Test
	1/20/2012	1,531.0	µg/m³	<6,380	<41,400	25,800	-	<6,880	<8,680	<12,000	<12,000	<12,000	<9,840	<8,200	<7,040	<14,400	<8,680	<3,440	-	<7,540	56,400	<9,840	<9,840	<9,320	<17,400	<8,520	Extended SVE Pilot Test
	1/31/2012	1,531.0	µg/m³	<6,380	<41,400	55,200	-	<6,880	<8,680	42,100	<12,000	<12,000	<9,840	<8,200	<7,040	<14,400	<8,680	<3,440	-	<7,540	<59,400	<9,840	<9,840	<9,320	<17,400	<8,520	Extended SVE Pilot Test
	2/20/2012	1,531.0	µg/m³	<3,190	<20,700	46,000	-	<3,440	<4,340	26,400	<6,010	<6,010	<4,920	<4,100	<3,520	<7,220	<4,340	<1,720	-	<3,770	<29,700	<4,920	<4,920	<4,660	<8,680	<4,260	Extended SVE Pilot Test
TSSV-01-S																											
	2/23/2010	1,731.0	µg/m³	<100	-	<140	<150	<110	<140	<190	<190	<190	<150	<130	<110	<110	<140	-	<150	<120	<930	<150	<150	<150	<140	<130	- -
	6/16/2010	1,731.0	µg/m³	<270	<270	<270	<270	<530	<270	<270	<270	<270	<270	-	-	<270	<270	<270	-	<270	<270	<270	<270	-	<530	<270	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<1,000	<1,000	<1,000	<1,000	<2,000	<1,000	<1,000	<1,000	<1,000	<1,000	-	-	<1,000	<1,000	<1,000	-	<1,000	<1,000	<1,000	<1,000	-	<2,000	<1,000	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<740	<740	<740	<740	<1,500	<740	<740	<740	<740	<740	-	-	<740	<740	<740	-	<740	<740	<740	<740	-	<1,500	<740	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<1,200	<1,200	<1,200	<1,200	<2,300	<1,200	<1,200	<1,200	<1,200	<1,200	-	-	<1,200	<1,200	<1,200	-	<1,200	<1,200	<1,200	<1,200	-	<2,300	<1,200	One Day Preliminary SVE Test
	11/8/2011	1,731.0	µg/m³	<3,190	<20,700	<4,600	-	<3,440	<4,340	<6,010	<6,010	<6,010	<4,920	<4,100	<3,520	<7,220	<4,340	<1,720	-	<3,770	<29,700	<4,920	<4,920	<4,660	<8,680	<4,260	- -
	11/16/2011	1,731.0	µg/m³	<3,190	<20,700	<4,600	-	<3,440	<4,340	<6,010	<6,010	<6,010	<4,920	<4,100	<3,520	<7,220	<4,340	<1,720	-	<3,770	<29,700	<4,920	<4,920	<4,660	<8,680	<4,260	Extended SVE Pilot Test
	11/23/2011	1,731.0	µg/m³	<3,190	<20,700	<4,600	-	<3,440	<4,340	<6,010	<6,010	<6,010	<4,920	<4,100	<3,520	<7,220	<4,340	<1,720	-	<3,770	<29,700	<4,920	<4,920	<4,660	<8,680	<4,260	Extended SVE Pilot Test
	12/13/2011	1,731.0	µg/m³	<6,380	<41,400	<9,200	-	<6,880	<8,680	<12,000	<12,000	<12,000	<9,840	<8,200	<7,040	<14,400	<8,680	<3,440	-	<7,540	<59,400	<9,840	<9,840	<9,320	<17,400	<8,520	Extended SVE Pilot Test

Notes: Grey text indicates a non-detected compound
µg/m³ - micrograms per cubic meter
ft amsl - feet above mean sea level
- = data not applicable or available

APPENDIX I

SOIL VAPOR ANALYTICAL RESULTS
SUMMARY OF FREON AND OTHER VOC DATA

Appendix I. Soil Vapor Analytical Results - Summary of Freon and Other VOC Data

Cave Creek Landfill, Maricopa County

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Acetone	Bromodichloromethane	Bromoethene(Vinyl Bromide)	Bromoform	Bromomethane	1,3-Butadiene	2-Butanone (MEK)	Carbon disulfide	Dibromochloromethane	1,2-Dibromoethane (EDB)	Ethanol	Ethyl Acetate	Freon 11	Freon 12	Freon 113	Freon 114	2-Hexanone	4-Methyl-2-pentanone (MIK)	2-Propanol (IPA)	Tetrahydrofuran	Vinyl acetate	Comments
Ambient																									
	6/16/2010	-	µg/m³	86	<1.9	-	<1.9	<1.9	<1.9	<19	<19	<1.9	<1.9	<19	<3.9	<1.9	2.1	-	-	<1.9	<1.9	<3.9	16	<19	Ambient Sample; One Day Preliminary SVE Test
	1/5/2012	-	µg/m³	<11.9	<3.4	<2.2	<5.2	<1.9	<1.1	<5.9	<1.6	<4.3	<3.8	-	<1.8	<2.8	<5	<3.8	<3.5	<4.1	<8.2	<4.9	<5.9	<1.8	- -
	3/9/2012	-	µg/m³	13.6	<3.4	<2.2	<5.2	<1.9	<1.1	<5.9	<1.6	<4.3	<3.8	-	<1.8	<2.8	<5	<3.8	<3.5	<8.2	<8.2	<4.9	<5.9	<1.8	- -
GW-08																									
	12/3/2009	1,886.0	µg/m³	240	<180	-	<270	<100	<59	<78	<82	<220	<200	<200	-	150	12,000	240	1,700	<430	<110	<260	4,500	-	- -
GW-13																									
	12/3/2009	1,891.0	µg/m³	13,000	<240	-	<380	<140	<81	17,000	<110	<310	<280	<280	-	350	7,400	<280	890	<600	1,500	1,000	7,700	-	- -
GW-19																									
	12/3/2009	1,867.0	µg/m³	12,000	<80	-	<120	<46	<26	15,000	<37	<100	<91	7,800	-	<67	320	94	<83	<190	900	11,000	5,800	-	- -
GW-22																									
	12/3/2009	1,868.0	µg/m³	3,000	<150	-	<240	<89	<51	3,800	<71	<200	<180	18,000	-	<130	430	<180	270	<380	320	16,000	2,200	-	- -
GW-25																									
	12/3/2009	1,867.0	µg/m³	6,600	<160	-	<250	<92	<53	9,100	<74	<200	<180	22,000	-	150	2,000	<180	360	<390	930	16,000	5,400	-	- -
GW-29																									
	12/3/2009	1,866.0	µg/m³	1,800	<150	-	<240	<89	<51	1,300	<71	<200	<180	23,000	-	4,000	2,400	<180	520	<380	<94	12,000	2,200	-	- -
MW-02																									
	5/19/2009	1,226.0	µg/m³	230	<8.5	-	<13	<4.9	<2.8	92	8.2	<11	<9.7	14	-	17	310	53	19	<21	44	23	53	-	- -
NDP-01-D																									
	11/15/2004	1,772.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,772.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	6/9/2005	1,772.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	6/10/2005	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/17/2008	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,772.0	µg/m³	<750	<530	-	<820	<310	<170	<230	<250	<670	<610	<600	-	1,300	4,200	41,000	<550	<1,300	<320	<780	<230	-	- -
	11/8/2011	1,772.0	µg/m³	<5,950	<1,680	<1,090	<2,590	<970	<552.5	<2,950	<777.5	<2,130	<1,920	-	<900	<1,410	4,950	49,800	<1,750	<2,050	<2,050	<2,450	<2,950	<880	- -
NDP-01-S																									
	11/15/2004	1,822.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,822.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	6/9/2005	1,822.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	6/10/2005	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/17/2008	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,822.0	µg/m³	<570	<400	-	<620	<230	<130	<180	<190	<520	<460	<460	-	1,300	4,200	35,000	560	<990	<250	<590	<180	-	- -
	11/8/2011	1,822.0	µg/m³	<1,190	<335	<218.5	<517	<194	<110.5	<590	<155.5	<426	<384	-	<180	730.6	4,650	19,200	482.3	<410	<410	<490	<590	<176	- -
NDP-02-D																									
	11/15/2004	1,772.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,772.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Acetone	Bromodichloromethane	Bromoethene(Vinyl Bromide)	Bromoform	Bromomethane	1,3-Butadiene	2-Butanone (MEK)	Carbon disulfide	Dibromochloromethane	1,2-Dibromoethane (EDB)	Ethanol	Ethyl Acetate	Freon 11	Freon 12	Freon 113	Freon 114	2-Hexanone	4-Methyl-2-pentanone (MIK)	2-Propanol (IPA)	Tetrahydrofuran	Vinyl acetate	Comments
NDP-02-D																									
	6/9/2005	1,772.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	6/10/2005	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/17/2008	1,772.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,772.0	µg/m³	<1,100	<790	-	<1,200	<460	<260	<350	<360	<1,000	<900	<880	-	2,900	9,000	170,000	<820	<1,900	<480	<1,200	<350	-	- -
NDP-02-S																									
	11/15/2004	1,822.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,822.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	6/9/2005	1,822.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	6/10/2005	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/17/2008	1,822.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,822.0	µg/m³	3,400	<540	-	<830	<310	<180	<240	<250	<680	<620	<610	-	2,000	6,900	120,000	<560	<1,300	<330	<790	<240	-	- -
ODP-01-D																									
	11/18/2004	1,773.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,773.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,773.0	µg/m³	<1,500	<1,000	-	<1,600	<600	<340	<450	<480	<1,300	<1,200	<1,200	-	2,100	32,000	120,000	1,800	<2,500	<630	<1,500	<450	-	- -
ODP-01-S																									
	11/18/2004	1,823.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,823.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,823.0	µg/m³	<400	<280	-	<430	<160	<92	<120	<130	<350	<320	<310	-	310	8,800	9,600	2,200	<680	<170	<410	190	-	- -
ODP-02-D																									
	11/18/2004	1,767.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,767.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,767.0	µg/m³	<45	<31	-	<48	<18	<10	<14	<15	<40	<36	<35	-	620	720	1,300	360	<77	<19	<46	23	-	- -
ODP-02-S																									
	11/18/2004	1,817.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,817.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,817.0	µg/m³	<30	<21	-	<33	<12	<7	<9.3	<9.8	<27	<24	<24	-	560	420	290	200	<52	<13	<31	94	-	- -
ODP-03-D																									
	11/18/2004	1,762.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,762.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/17/2008	1,762.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,762.0	µg/m³	<33	<23	-	<36	<13	<7.6	<10	<11	<29	<26	<26	-	320	540	2,500	360	<57	<14	<34	23	-	- -
	11/8/2011	1,762.0	µg/m³	<595	<167.5	<109.3	<258.5	<97	<55.3	<295	<77.8	<213	<192	-	<90	207.9	440.6	1,380	258.6	<205	<205	<245	<295	<88	- -
ODP-03-S																									
	11/18/2004	1,812.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,812.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -

Appendix I. Soil Vapor Analytical Results - Summary of Freon and Other VOC Data

Cave Creek Landfill, Maricopa County

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Acetone	Bromodichloromethane	Bromoethene(Vinyl Bromide)	Bromoform	Bromomethane	1,3-Butadiene	2-Butanone (MEK)	Carbon disulfide	Dibromochloromethane	1,2-Dibromoethane (EDB)	Ethanol	Ethyl Acetate	Freon 11	Freon 12	Freon 113	Freon 114	2-Hexanone	4-Methyl-2-pentanone (MIK)	2-Propanol (IPA)	Tetrahydrofuran	Vinyl acetate	Comments
ODP-03-S																									
	1/17/2008	1,812.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,812.0	µg/m³	33	<10	-	<16	<6.1	<3.5	8.8	<4.9	<13	<12	18	-	160	980	240	240	<26	<6.5	<16	31	-	- -
	11/8/2011	1,812.0	µg/m³	<59.5	<16.8	<10.9	<25.9	<9.7	<5.5	<29.5	<7.8	<21.3	<19.2	-	<9	168.6	207.9	<19.2	517.3	<20.5	<20.5	<24.5	<29.5	<8.8	- -
ODP-04-D																									
	11/18/2004	1,767.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,767.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/17/2008	1,767.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,767.0	µg/m³	<160	<120	-	<180	<68	<38	<51	<54	<150	<130	<130	-	180	2,700	13,000	1,200	<280	<71	<170	<51	-	- -
ODP-04-S																									
	11/18/2004	1,817.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/8/2004	1,817.0	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/17/2008	1,817.0	µg/m³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/1/2009	1,817.0	µg/m³	69	<22	-	<34	<13	<7.4	22	<10	<28	<26	<25	-	46	570	540	500	<55	<14	<33	58	-	- -
P-02-D																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/2/2009	-	µg/m³	420	<16	-	<26	<9.6	<5.5	390	<7.7	<21	<19	19	-	220	430	670	32	<40	<10	69	1,100	-	- -
P-02-S																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/2/2009	-	µg/m³	120	<8	-	<12	<4.6	<2.6	120	4.7	<10	<9.1	<9	-	31	190	180	21	<19	<4.9	16	350	-	- -
	11/8/2011	-	µg/m³	30.9	<6.7	<4.4	<10.3	<3.9	<2.2	<11.8	<3.1	<8.5	<7.7	-	<3.6	<5.6	<9.9	<7.7	<7	<8.2	<8.2	<9.8	<11.8	<3.5	- -
P-03																									
	3/9/2012	-	µg/m³	16.7	<3.4	<2.2	<5.2	<1.9	<1.1	24.2	<1.6	<4.3	<3.8	-	<1.8	<2.8	7.4	<3.8	<3.5	<8.2	<8.2	<4.9	<5.9	<1.8	- -
P-05																									
	11/18/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-06																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/5/2012	-	µg/m³	<11.9	<3.4	<2.2	<5.2	<1.9	<1.1	<5.9	<1.6	<4.3	<3.8	-	<1.8	<2.8	5.9	<3.8	<3.5	<4.1	<8.2	<4.9	<5.9	<1.8	- -
P-07																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/5/2012	-	µg/m³	<11.9	<3.4	<2.2	<5.2	<1.9	<1.1	41.3	<1.6	<4.3	<3.8	-	<1.8	5.1	15.3	229.8	<3.5	<4.1	<8.2	<4.9	<5.9	<1.8	- -
P-08																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/5/2012	-	µg/m³	61.9	<3.4	<2.2	<5.2	<1.9	<1.1	27.4	<1.6	<4.3	<3.8	-	<1.8	<2.8	<5	<3.8	<3.5	<4.1	<8.2	<4.9	<5.9	<1.8	- -
P-09																									
	3/9/2012	-	µg/m³	<2,380	<670	<437	<1,030	<388	<221	<1,180	<311	<852	<768	-	<360	<562	<990	15,300	<699	<1,640	<1,640	<980	<1,180	<352	- -

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Acetone	Bromodichloromethane	Bromoethene(Vinyl Bromide)	Bromoform	Bromomethane	1,3-Butadiene	2-Butanone (MEK)	Carbon disulfide	Dibromochloromethane	1,2-Dibromoethane (EDB)	Ethanol	Ethyl Acetate	Freon 11	Freon 12	Freon 113	Freon 114	2-Hexanone	4-Methyl-2-pentanone (MIK)	2-Propanol (IPA)	Tetrahydrofuran	Vinyl acetate	Comments
P-10																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	1/5/2012	-	µg/m³	16.2	<3.4	<2.2	<5.2	<1.9	<1.1	62	<1.6	<4.3	<3.8	-	<1.8	<2.8	5.9	71.2	<3.5	<4.1	<8.2	<4.9	<5.9	<1.8	Duplicate Sample
	1/5/2012	-	µg/m³	23.3	<3.4	<2.2	<5.2	<1.9	<1.1	76.7	<1.6	<4.3	<3.8	-	<1.8	<2.8	7.9	130.2	<3.5	<4.1	<8.2	<4.9	<5.9	<1.8	- -
P-11																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-12																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-13-D																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-13-S																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-17-D																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-17-S																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-18-D																									
	11/15/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/2/2009	-	µg/m³	1,700	<16	-	<24	<9	<5.2	590	<7.2	<20	<18	<18	-	3,000	4,500	1,300	270	<38	<9.5	110	2,000	-	- -
P-18-S																									
	11/15/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	5,100	-	-	-	-	-	-	-	-	-	-	-	-	- -
	12/2/2009	-	µg/m³	530	<32	-	<50	<19	<11	470	<15	<41	<37	<36	-	3,800	5,600	600	340	<79	<20	72	1,500	-	- -
P-19-D																									
	11/15/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-19-S																									
	11/15/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-22																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-23																									
	11/16/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
P-25																									
	11/15/2004	-	µg/m³	-	<500	-	<1,000	<5,000	-	-	-	<500	-	-	-	-	-	-	-	-	-	-	-	-	- -
PW																									
	5/21/2009	1,201.4	µg/m³	<1,200	<830	-	<1,300	<480	<270	<360	<380	<1,000	<950	<930	-	<690	1,800	45,000	<860	<2,000	<500	<1,200	<360	-	- -
	6/16/2010	1,201.4	µg/m³	<6,200	<620	-	<620	<620	<620	<6,200	<6,200	<620	<620	<6,200	<1,200	<620	770	-	-	<620	<620	<1,200	<620	<6,200	One Day Preliminary SVE Test
	6/16/2010	1,201.4	µg/m³	<8,500	<850	-	<850	<850	<850	<8,500	<8,500	<850	<850	<8,500	<1,700	<850	1,000	-	-	<850	<850	<1,700	<850	<8,500	One Day Preliminary SVE Test
	6/16/2010	1,201.4	µg/m³	<6,300	<630	-	<630	<630	<630	<6,300	<6,300	<630	<630	<6,300	<1,300	<630	930	-	-	<630	<630	<1,300	<630	<6,300	One Day Preliminary SVE Test

Appendix I. Soil Vapor Analytical Results - Summary of Freon and Other VOC Data

Cave Creek Landfill, Maricopa County

Well Name	Sample Date	Sample Elevation (ft amsl)	Units	Acetone	Bromodichloromethane	Bromoethene(Vinyl Bromide)	Bromoform	Bromomethane	1,3-Butadiene	2-Butanone (MEK)	Carbon disulfide	Dibromochloromethane	1,2-Dibromoethane (EDB)	Ethanol	Ethyl Acetate	Freon 11	Freon 12	Freon 113	Freon 114	2-Hexanone	4-Methyl-2-pentanone (MIK)	2-Propanol (IPA)	Tetrahydrofuran	Vinyl acetate	Comments
PW																									
	11/8/2011	1,201.4	µg/m³	<11,900	<3,350	<2,190	<5,170	<1,940	<1,110	<5,900	<1,560	<4,260	<3,840	-	<1,800	<2,810	<4,950	72,000	<3,500	<4,100	<4,100	<4,900	<5,900	<1,760	- -
	11/23/2011	1,201.4	µg/m³	<11,900	<3,350	<2,190	<5,170	<1,940	<1,110	<5,900	<1,560	<4,260	<3,840	-	<1,800	<2,810	<4,950	107,000	<3,500	<4,100	<4,100	<4,900	<5,900	<1,760	Extended SVE Pilot Test
TSSV-01-D																									
	2/23/2010	1,332.0	µg/m³	<1,200	<830	-	<1,300	<480	<270	<360	<390	<1,000	<950	<930	-	<700	730	12,000	<870	<2,000	<510	<1,200	<360	-	- -
	6/16/2010	1,332.0	µg/m³	20,000	<220	-	<220	<220	<220	31,000	<2,200	<220	<220	<2,200	<440	<220	<220	-	-	<220	<220	<440	96,000	<2,200	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<12,000	<1,200	-	<1,200	<1,200	<1,200	<12,000	<12,000	<1,200	<1,200	<12,000	<2,300	<1,200	<1,200	-	-	<1,200	<1,200	<2,300	4,700	<12,000	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<17,000	<1,700	-	<1,700	<1,700	<1,700	<17,000	<17,000	<1,700	<1,700	<17,000	<3,500	<1,700	<1,700	-	-	<1,700	<1,700	<3,500	1,900	<17,000	One Day Preliminary SVE Test
	6/16/2010	1,332.0	µg/m³	<15,000	<1,500	-	<1,500	<1,500	<1,500	<15,000	<15,000	<1,500	<1,500	<15,000	<3,100	<1,500	<1,500	-	-	<1,500	<1,500	<3,100	<1,500	<15,000	One Day Preliminary SVE Test
	11/8/2011	1,332.0	µg/m³	<11,900	<3,350	<2,190	<5,170	<1,940	<1,110	<5,900	<1,560	<4,260	<3,840	-	<1,800	<2,810	<4,950	5,360	<3,500	<4,100	<4,100	<4,900	<5,900	<1,760	- -
	2/20/2012	1,332.0	µg/m³	<11,900	<3,350	<2,190	<5,170	<1,940	<1,110	<5,900	<1,560	<4,260	<3,840	-	<1,800	<2,810	<4,950	41,400	<3,500	<4,100	<4,100	<4,900	<5,900	<1,760	Extended SVE Pilot Test
	2/29/2012	1,332.0	µg/m³	<119,000	<33,500	<21,900	<51,700	<19,400	<11,100	<59,000	<15,600	<42,600	<38,400	-	<18,000	<28,100	<49,500	245,000	<35,000	<82,000	<82,000	<49,000	<59,000	<17,600	Extended SVE Pilot Test
TSSV-01-M																									
	2/23/2010	1,531.0	µg/m³	<650	<460	-	<700	<260	<150	<200	<210	<580	<520	<510	-	760	2,800	100,000	<480	<1,100	<280	<670	<200	-	- -
	6/16/2010	1,531.0	µg/m³	8,600	<620	-	<620	<620	<620	14,000	<6,200	<620	<620	<6,200	<1,200	<620	1,000	-	-	<620	<620	<1,200	38,000	<6,200	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<5,800	<580	-	<580	<580	<580	<5,800	<5,800	<580	<580	<5,800	<1,200	<580	1,200	-	-	<580	<580	<1,200	4,800	<5,800	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<9,400	<940	-	<940	<940	<940	<9,400	<9,400	<940	<940	<9,400	<1,900	<940	1,600	-	-	<940	<940	<1,900	1,600	<9,400	One Day Preliminary SVE Test
	6/16/2010	1,531.0	µg/m³	<9,300	<930	-	<930	<930	<930	<9,300	<9,300	<930	<930	<9,300	<1,900	<930	1,300	-	-	<930	<930	<1,900	<930	<9,300	One Day Preliminary SVE Test
	11/8/2011	1,531.0	µg/m³	<23,800	<6,700	<4,370	<10,300	<3,880	<2,210	<11,800	<3,110	<8,520	<7,680	-	<3,600	<5,620	<9,900	123,000	<6,990	<8,200	<8,200	<9,800	<11,800	<3,520	- -
	1/16/2012	1,531.0	µg/m³	<47,600	<13,400	<8,740	<20,700	<7,760	<4,420	<23,600	<6,220	<17,000	<15,400	-	<7,200	<11,200	<19,800	153,000	<14,000	<16,400	<16,400	<19,600	<23,600	<7,040	Extended SVE Pilot Test
	1/20/2012	1,531.0	µg/m³	<47,600	<13,400	<8,740	<20,700	<7,760	<4,420	<23,600	<6,220	<17,000	<15,400	-	<7,200	<11,200	<19,800	169,000	<14,000	<16,400	<16,400	<19,600	<23,600	<7,040	Extended SVE Pilot Test
	1/31/2012	1,531.0	µg/m³	<47,600	<13,400	<8,740	<20,700	<7,760	<4,420	<23,600	<6,220	<17,000	<15,400	-	<7,200	<11,200	23,300	199,000	<14,000	<16,400	<16,400	<19,600	<23,600	<7,040	Extended SVE Pilot Test
	2/20/2012	1,531.0	µg/m³	<23,800	<6,700	<4,370	<10,300	<3,880	<2,210	<11,800	<3,110	<8,520	<7,680	-	<3,600	<5,620	<9,900	161,000	<6,990	<8,200	<8,200	<9,800	<11,800	<3,520	Extended SVE Pilot Test
TSSV-01-S																									
	2/23/2010	1,731.0	µg/m³	<300	<210	-	<320	<120	<70	<93	<98	<270	<240	<240	-	790	3,100	140,000	<220	<520	<130	<310	<93	-	- -
	6/16/2010	1,731.0	µg/m³	11,000	<270	-	<270	<270	<270	17,000	<2,700	<270	<270	<2,700	<530	<270	350	-	-	<270	<270	<530	44,000	<2,700	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<10,000	<1,000	-	<1,000	<1,000	<1,000	<10,000	<10,000	<1,000	<1,000	<10,000	<2,000	<1,000	1,800	-	-	<1,000	<1,000	<2,000	2,200	<10,000	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<7,400	<740	-	<740	<740	<740	<7,400	<7,400	<740	<740	<7,400	<1,500	<740	1,600	-	-	<740	<740	<1,500	<740	<7,400	One Day Preliminary SVE Test
	6/16/2010	1,731.0	µg/m³	<12,000	<1,200	-	<1,200	<1,200	<1,200	<12,000	<12,000	<1,200	<1,200	<12,000	<2,300	<1,200	2,500	-	-	<1,200	<1,200	<2,300	<1,200	<12,000	One Day Preliminary SVE Test
	11/8/2011	1,731.0	µg/m³	<23,800	<6,700	<4,370	<10,300	<3,880	<2,210	<11,800	<3,110	<8,520	<7,680	-	<3,600	<5,620	<9,900	337,000	<6,990	<8,200	<8,200	<9,800	<11,800	<3,520	- -
	11/16/2011	1,731.0	µg/m³	<23,800	<6,700	<4,370	<10,300	<3,880	<2,210	<11,800	<3,110	<8,520	<7,680	-	<3,600	<5,620	<9,900	391,000	<6,990	<8,200	<8,200	<9,800	<11,800	<3,520	Extended SVE Pilot Test
	11/23/2011	1,731.0	µg/m³	<23,800	<6,700	<4,370	<10,300	<3,880	<2,210	<11,800	<3,110	<8,520	<7,680	-	<3,600	<5,620	<9,900	360,000	<6,990	<8,200	<8,200	<9,800	<11,800	<3,520	Extended SVE Pilot Test
	12/13/2011	1,731.0	µg/m³	<47,600	<13,400	<8,740	<20,700	<7,760	<4,420	<23,600	<6,220	<17,000	<15,400	-	<7,200	<11,200	<19,800	421,000	<14,000	<16,400	<16,400	<19,600	<23,600	<7,040	Extended SVE Pilot Test

Notes: Grey text indicates a non-detected compound
µg/m³ - micrograms per cubic meter
ft amsl - feet above mean sea level
- = data not applicable or available

APPENDIX J

ONE-DAY SVE PILOT TEST
OPERATIONAL AND ROI DATA

		SVE System/Extraction Well(s):					TSSV1-S		TSSV1-L		TSSV1-D		Monitoring Point Wells Vacuum ("H_2O)										
	Date & Time	Well I.D.	Sample Y/N	PID ppm	Vac ("H_2O)	Approx. Flow Rate (acfm)	Vac ("H_2O)	Approx. Flow Rate (acfm)	Vac ("H_2O)	Approx. Flow Rate (acfm)	Vac ("H_2O)	Approx. Flow Rate (acfm)	PW	P-25	P-10	P-13	P-13X S	P-13X D	ODP-3 S	ODP-3 D	TSSV1-S	TSSV1-L	TSSV1-D
	6/16/10 20:00	**Maximum TSSV1[(1)] vacuum and flow rates**					42	156	56	62	56	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Vac	6/16/10 11:00	**TSSV1-S,L,D[(1)]**	Y	---	30	174	N/A	117	N/A	55	N/A	0	---	---	---	---	---	---	---	---	---	---	---
	6/16/10 11:20	**TSSV1-S,L,D[(1)]**	N	---	30	172	N/A	117	N/A	55	N/A	0	---	---	---	---	---	---	---	---	---	---	---
1/3 Max Vacuum	6/16/10 11:22	**TSSV1-S,L,D[(1)]**	N	---	10	115	N/A	68	N/A	48	N/A	0	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A
	6/16/10 11:50	**TSSV1-S,L,D[(1)]**	N	---	10	75	N/A	55	N/A	20	N/A	0	---	<0.00	0.00	0.00	0.01	0.03	<0.00	0.07	N/A	N/A	N/A
	6/16/10 12:20	**TSSV1-S,L,D[(1)]**	N	---	10	75	N/A	55	N/A	20	N/A	0	---	<0.00	0.00	0.00	<0.00	<0.00	<0.00	<0.00	N/A	N/A	N/A
	6/16/10 12:50	**TSSV1-S,L,D[(1)]**	Y	115.5 133.4 185.0	10	75	N/A	55	N/A	20	N/A	0	---	<0.00	0.00	0.00	<0.00	<0.00	<0.00	<0.00	N/A	N/A	N/A
2/3 Max Vacuum	6/16/10 13:20	**TSSV1-S,L,D[(1)]**	N	---	20	115	N/A	92	N/A	23	N/A	0	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A
	6/16/10 13:50	**TSSV1-S,L,D[(1)]**	N	---	20	115	N/A	92	N/A	23	N/A	0	---	<0.00	0.00	<0.00	<0.00	<0.00	<0.00	<0.00	N/A	N/A	N/A
	6/16/10 14:20	**TSSV1-S,L,D[(1)]**	Y	114.5 125.4 152.9	20	115	N/A	92	N/A	23	N/A	0	---	<0.00	<0.00	<0.00	<0.00	<0.00	<0.00	<0.00	N/A	N/A	N/A
	6/16/10 14:50	**TSSV1-S,L,D[(1)]**	N	---	20	115	N/A	92	N/A	23	N/A	0	0.40	<0.00	<0.00	<0.00	<0.00	<0.00	<0.00	<0.00	N/A	N/A	N/A
3/3 Max Vacuum	6/16/10 15:20	**TSSV1-S,L,D[(1)]**	N	---	30	179	N/A	120	N/A	39	N/A	20	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A
	6/16/10 15:30	**TSSV1-S,L,D[(1)]**	N	---	30	180	N/A	120	N/A	39	N/A	20	0.50	<0.00	0.00	<0.00	<0.00	<0.00	<0.00	<0.00	N/A	N/A	N/A
	6/16/10 16:00	**TSSV1-S,L,D[(1)]**	N	121.4 124.7 139.4	30	180	N/A	120	N/A	39	N/A	20	0.57	<0.00	0.00	<0.00	<0.00	<0.00	<0.00	<0.00	N/A	N/A	N/A
	6/16/10 16:30	**TSSV1-S,L,D[(1)]**	N	---	32	180	N/A	120	N/A	43	N/A	20	0.60	<0.00	0.00	<0.00	<0.00	<0.00	<0.00	<0.00	<0.00	<0.00	<0.00
Max Vac	6/16/10 17:30	**PW**	N	---	26	187	N/A	N/A	N/A	N/A	N/A	N/A	---	---	---	---	---	---	---	---	---	---	---
1/3 Max Vacuum	6/16/10 18:00	**PW**	Y	54	8.6	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.10
	6/16/10 18:30	**PW**	N	---	8.6	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.00	0.00	0.00	0.00	0.00	<0.00	<0.00	0.20	0.20	0.10
2/3 Vac	6/16/10 19:00	**PW**	Y	81	17	123	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.00	0.00	0.00	<0.00	<0.00	<0.00	<0.00	0.05	0.06	0.00
Max Vacuum	6/16/10 19:30	**PW**	N	---	26	190	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.00	0.00	0.00	<0.00	<0.00	<0.00	<0.00	0.05	0.06	0.00
	6/16/10 20:00	**PW**	Y	94	26	190	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.00	0.00	0.00	<0.00	<0.00	<0.00	<0.00	0.05	0.08	0.00
	6/16/10 20:30	**PW**	N	---	26	190	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.00	0.00	0.00	<0.00	<0.00	<0.00	<0.00	0.05	0.07	0.00

Notes:

[(1)] - TSSV1 nested wells S, L and D manifolded into single conveyance line.

"---" - No reading

acfm - Actual cubic feet per minute

" H_2O - Inches of water column

I.D. - Identification

Max - Maximum

N/A - Not applicable

PID - Photoionization detector

SVE - Soil vapor extraction

Vac - Vacuum

APPENDIX K

EXTENDED SVE PILOT TEST
OPERATIONAL AND ROI DATA

		PW Well Monitoring								
Date [MM/DD/YY]	Operator [Initials]	Time [24-h]	Wellhead Flow Rate [scfm]	Wellhead Vacuum [in-H_2O]	Wellhead PID Reading [ppmV]	Wellhead CO Reading [%]	Wellhead CH_4 Reading [% LEL]	Wellhead H_2S Reading [%]	Wellhead O_2 Reading [%]	Comments
11/16/2011	LH	14:00	--	80	58.0	--	--	--	--	Startup w/SVE from PW and TSSV-1-S
11/17/2011	LH	6:30	--	85	37.0	--	--	--	--	---
11/18/2011	LH/RK	9:20	--	85	117.0	--	7	--	5.9	---
11/21/2011	RK	9:30	--	--	130.0	--	--	--	--	---
11/23/2011	RK	9:30	230	--	142.0	--	--	--	--	Sampled at 10:00
11/28/2011	LH	8:00	--	--	122.6	--	--	--	--	Rented PID (previous measurements are w/this PID)
11/28/2011	LH	8:00	220	65	176.8	8.8	4	--	8.2	County PID (subsequent measurements are w/ this PID); shutdown after monitoring
12/1/2011	--	--	--	--	--	--	--	--	--	Carbon changeout
12/5/2011	LH	8:30	205	65	82.6	0.1	1	--	9.6	Restart w/ SVE from PW and TSSV-1-S; closed PW to SVE after monitoring
12/6/2011	LH	8:00	--	--	--	--	--	--	--	Closed to SVE
12/8/2011	LH	8:00	--	--	--	--	--	--	--	Closed to SVE
12/9/2011	LH	7:30	--	--	--	--	--	--	--	Closed to SVE
12/12/2011	LH	13:00	--	--	--	--	--	--	--	Closed to SVE
12/13/2011	LH	9:00	0	0.09P	--	--	--	--	--	Closed to SVE
12/15/2011	SW	8:30	--	--	--	--	--	--	--	Closed to SVE
12/15/2011	LH	12:30	0	0.15	--	--	--	--	--	Closed to SVE
12/15/2011	LH	14:55	0	0.15	--	--	--	--	--	Closed to SVE
1/16/2012	LH/RK	16:00	--	--	--	--	--	--	--	Closed to SVE
1/17/2012	RK	12:00	--	--	--	--	--	--	--	Closed to SVE
1/17/2012	RK	14:00	--	--	--	--	--	--	--	Closed to SVE
1/18/2012	RK	11:00	--	--	--	--	--	--	--	Closed to SVE
1/19/2012	SW	9:00	--	--	--	--	--	--	--	Closed to SVE
1/20/2012	LH	8:00	--	--	--	--	--	--	--	Closed to SVE
1/20/2012	LH/RK	12:00	--	--	--	--	--	--	--	Closed to SVE
1/20/2012	LH/RK	13:45	--	--	--	--	--	--	--	Closed to SVE
1/21/2012	SW	9:00	--	--	--	--	--	--	--	Closed to SVE
1/22/2012	SW	10:00	--	--	--	--	--	--	--	Closed to SVE
1/23/2012	SW	8:14	--	--	--	--	--	--	--	Closed to SVE
1/24/2012	LH	12:30	--	--	--	--	--	--	--	Closed to SVE
1/26/2012	SW	8:13	--	--	--	--	--	--	--	Closed to SVE
1/27/2012	LH	15:30	--	--	--	--	--	--	--	Closed to SVE
1/30/2012	RK	12:01	--	--	--	--	--	--	--	Closed to SVE
1/31/2012	LH	12:00	--	--	--	--	--	--	--	Closed to SVE
2/3/2012	LH	9:00	--	--	--	--	--	--	--	Closed to SVE
2/7/2012	LH	10:00	--	--	--	--	--	--	--	Closed to SVE
2/16/2012	RK	11:50	--	--	--	--	--	--	--	Closed to SVE
2/20/2012	RK/LH	11:15	--	--	--	--	--	--	--	Vacuum at PW when TSSV-1-S, -M, and -D operated at 100 in-H2O ranged from 1.30 to 1.49 in-H2O
2/20/2012	RK/LH	13:20	--	--	--	--	--	--	--	Closed to SVE
2/21/2012	RK	14:30	--	--	--	--	--	--	--	Closed to SVE
2/29/2012	RK	11:00	--	--	--	--	--	--	--	Vacuum at PW when TSSV-1-D operated at 100 in-H2O was 1.24 in-H2O

Notes:

Blue text identifies anomolous data

		TSSV Well Monitoring									
Date [MM/DD/YY]	Operator [Initials]	Time [24-h]	Operating Screened Interval [ft bgs]	Wellhead Flow Rate [ft^3 / min]	Wellhead Vacuum [in-H_2O]	Wellhead PID Reading [ppmV]	Wellhead CO Reading [%]	Wellhead CH_4 Reading [% LEL]	Wellhead H_2S Reading [%]	Wellhead O_2 Reading [%]	Comments
11/16/2011	LH	14:00	150-200	--	80	139.0	4.7	0	--	10.5	Startup w/SVE from PW and TSSV-1-S; sampled at 18:05
11/17/2011	LH	6:30	150-200	--	85	210.4	4.2	0	--	9.3	---
11/18/2011	LH/RK	8:53	150-200	--	79	128.0	4.9	0	--	10.3	---
11/21/2011	RK	9:30	150-200	--	--	145.0	--	--	--	--	---
11/23/2011	RK	9:30	150-200	--	--	140.0	--	--	--	--	Sampled at 10:10
11/28/2011	LH	8:00	150-200	--	--	149.7	--	--	--	--	Rented PID (previous measurements are w/this PID)
11/28/2011	LH	8:00	150-200	--	79	255.1	7.9	0.3	--	7.6	County PID (subsequent measurements are w/ this PID); shutdown after monitoring
12/1/2011	--	---	---	--	--	--	--	--	--	--	Carbon changeout
12/5/2011	LH	8:30	150-200	--	98	88.7	5.9	1	--	9.7	Restart w/ SVE from PW and TSSV-1-S; closed PW afterwards
12/6/2011	LH	8:00	150-200	220	100	94.1	6.5	0	--	9.0	Modifications made to piping to enable flow measurement
12/8/2011	LH	8:00	150-200	237	100	206.0	6.7	0	--	9.2	---
12/9/2011	LH	7:30	150-200	226	98	245.0	0	0	0	8.2	County 4-Gas Meter (subsequent measurements are w/ this meter)
12/12/2011	LH	13:00	150-200	242	98	195.1	0	0	0	8.3	---
12/13/2011	LH	9:00	150-200	190	97	205.8	0	0	0	8.2	Sampled at 13:40
12/15/2011	SW	8:30	150-200	175	--	206.0	5	0	0	8.7	---
12/15/2011	LH	12:30	150-200	160	95	225.8	13	0	0	8.4	---
12/15/2011	LH	14:55	150-200	172	100	238.7	14	0	0	8.3	Partially closed dilution valve; shutdown after monitoring
1/16/2012	LH/RK	16:00	350-400	80.5	100	108.8	2	0	0	10.9	Restart w/ SVE from TSSV-1-M
1/17/2012	RK	12:00	350-400	92.0	100	147.8	3	0	0	9.5	Sampling equipment contamination resulting in elevated PID readings
1/17/2012	RK	14:00	350-400	--	--	130.6	--	--	--	--	Reading after replacing contaminated equipment
1/18/2012	RK	11:00	350-400	87.0	100	149.6	2	0	0	10.2	---
1/19/2012	SW	9:00	350-400	**126.0**	100	**101.0**	**1**	**0**	**0**	**20.7**	Shutdown after monitoring
1/20/2012	LH	8:00	---	--	--	--	--	--	--	--	Carbon changeout
1/20/2012	LH/RK	12:04	350-400	--	--	156.9	--	--	--	--	Restart w/ SVE from TSSV-1-M
1/20/2012	LH/RK	13:45	350-400	88.5	100	129.2	3	0	0	11.1	Sampled Influent/TSSV-1-M at 14:21
1/21/2012	SW	9:00	350-400	--	--	140.2	2	0	0	13.1	---
1/22/2012	SW	10:02	350-400	--	--	159.4	2	0	0	8.1	---
1/23/2012	SW	8:14	350-400	--	100	143.9	8	0	0	6.5	---
1/24/2012	LH	12:30	350-400	89.6	100	142.8	7	0	0	9.0	---
1/26/2012	SW	8:13	350-400	--	100	**70.3**	**0**	**0**	**0**	**15.6**	---
1/27/2012	LH	15:30	350-400	90.2	100	163.9	8	0	0	8.7	---
1/30/2012	RK	12:01	350-400	95.5	100	169.5	2	0	0	9.2	---
1/31/2012	LH	12:00	350-400	89.7	100	183.4	**6**	0	0	9.0	Sampled Influent/TSSV-1-M at approx. 12:00
2/3/2012	LH	9:00	350-400	96.7	100	165.0	7	0	0	6.0	---
2/7/2012	LH	10:00	350-400	91.3	100	176.5	6	0	0	6.8	Vacuum monitored at TSSV-1-S was 0.08 in-H2O; vacuum monitored at TSSV-1-D was 0.23 in-H2O
2/16/2012	RK	11:46	350-400	90.5	100	166.2	8	5	0	4.1	---
2/20/2012	RK/LH	11:14	350-400	96.5	100	169.6	4	5	0	5.0	Sampled at 11:11; vacuum measured at TSSV-1-S was 1.4 in-H2O; vacuum monitored at TSSV-1-D was over 2 in-H2O
2/20/2012	RK/LH	13:20	549-599	46.7	100	160.1	13	36	0	2.5	Switched to extraction from TSSV-1-D; sampled at 13:28; vacuum measured at TSSV-1-S was 1.9 in-H2O; vacuum at TSSV-1-M was 1.9 in-H2O
2/21/2012	RK	14:31	549-599	60.0	100	161.2	5	13	0	17.7	---
2/29/2012	RK	11:01	549-599	60.5	95	176.4	0	45	0	3.1	Vacuum measured at TSSV-1-S was 0.67 in-H2O; vacuum measured at TSSV-1-M was 1.46 in-H2O; sampled Influent/TSSV-1-D at 13:38; shutdown after sampling

Notes:

Blue text identifies anomolous data

		Influent Monitoring									
Date [MM/DD/YY]	Operator [Initials]	Time [24-h]	Flow Rate [scfm]	Vacuum [in-H_2O]	Temper-ature [deg F]	PID Reading [ppmV]	Wellhead CO Reading [%]	Wellhead CH_4 Reading [% LEL]	Wellhead H_2S Reading [%]	Wellhead O_2 Reading [%]	Comments
11/16/2011	LH	14:00	---	80	--	88.0	7.0	4	--	10.0	Startup w/SVE from PW and TSSV-1-S; sampled at 18:00
11/17/2011	LH	6:30	---	85	--	130.0	6.5	0	--	10.5	---
11/18/2011	LH/RK	8:49	---	85	--	99.1	7.0	4	--	8.8	---
11/21/2011	RK	9:30	---	80	--	109.0	--	--	--	--	---
11/23/2011	RK	9:30	---	---	--	140.0	--	--	--	--	---
11/28/2011	LH	8:00	---	---	--	145.7	--	--	--	--	Rented PID (previous measurements are w/this PID)
11/28/2011	LH	8:00	---	79	--	198.9	9.0	8	--	8.2	County PID (subsequent measurements are w/ this PID); shutdown after monitoring
12/1/2011	--	---	---	---	---	---	---	---	---	---	Carbon changeout
12/5/2011	LH	8:30	---	100	--	88.7	4.9	0	--	12.1	Restart w/ SVE from PW and TSSV-1-S; closed PW to SVE after monitoring
12/6/2011	LH	8:00	---	100	--	93.2	6.5	0	--	9.8	Modifications made to piping to enable flow measurement
12/8/2011	LH	8:00	---	100	--	127.6	3.0	0	--	15.1	Dilution air valve open 10%
12/9/2011	LH	7:30	298	100	--	120.2	0	0	0	13.6	County 4-Gas Meter (subsequent measurements are w/ this meter); sampled at 10:25
12/12/2011	LH	13:00	285	100	67.0	109.8	0	0	0	13.8	Raining; humidity suspected of impacting PID readings
12/13/2011	LH	9:00	290	100	67.4	120.6	0	0	0	13.0	Sampled at 13:35
12/15/2011	SW	8:30	230	85	--	106.0	5	0	0	13.8	---
12/15/2011	LH	12:30	255	95	72.8	127.8	5	0	0	13.7	---
12/15/2011	LH	14:55	260	100	71.7	168.7	5	0	0	12.2	Shutdown after monitoring
1/16/2012	LH/RK	16:00	82.5	100	73.0	122.5	4	0	0	11.0	Restart w/ SVE from TSSV-1-M; sampled at 16:00
1/17/2012	RK	12:00	99.5	100	77.0	149.6	1	0	0	8.2	Sampling equipment contamination resulting in elevated PID readings
1/17/2012	RK	14:00	--	--	--	129.1	--	--	--	--	Reading after replacing contaminated equipment
1/18/2012	RK	11:00	94.0	100	72.4	150.9	1	0	0	8.5	---
1/19/2012	SW	9:00	--	100	--	109.2	1	0	0	20.7	Shutdown after monitoring
1/20/2012	LH	8:00	--	--	--	--	--	--	--	--	Carbon changeout
1/20/2012	LH/RK	12:30	--	--	--	134.6	--	--	--	--	Restart w/ SVE from TSSV-1-M
1/20/2012	LH/RK	13:45	97.0	100	78.4	149.1	2	0	0	7.8	Sampled Influent/TSSV-1-M at 14:21
1/21/2012	SW	9:06	--	--	--	145.0	2	0	0	8.2	---
1/22/2012	SW	10:06	--	100	--	175.1	2	0	0	10.3	---
1/23/2012	SW	8:21	--	100	--	165.6	9	0	0	6.1	---
1/24/2012	LH	12:40	92.7	100	76.9	148.7	9	0	0	8.4	---
1/26/2012	SW	8:25	--	--	--	157.8	2	0	0	9.6	---
1/27/2012	LH	15:45	90.8	100	79.2	151.8	9	0	0	9.2	---
1/30/2012	RK	12:06	94.5	100	82.1	157.6	6	0	0	6.6	---
1/31/2012	LH	12:13	90.2	100	80.7	173.9	8	0	0	8.7	Sampled Influent/TSSV-1-M at approx. 12:00
2/3/2012	LH	9:30	95.8	100	75.7	163.0	4	0	0	10.8	---
2/7/2012	LH	10:10	92.7	100	77.8	156.5	5	0	0	9.7	---
2/16/2012	RK	11:40	91.0	100	76.5	153.7	1	5	0	4.9	---
2/20/2012	RK/LH	11:20	99.5	100	74.1	165.3	3	5	0	4.9	---
2/20/2012	RK/LH	13:27	47.5	100	74.6	158.7	12	37	0	2.6	---
2/21/2012	RK	14:42	65.0	100	86.2	150.1	13	41	0	2.8	---
2/29/2012	RK	11:05	64.5	95	75.0	178.1	4	43	0	2.1	Sampled Influent/TSSV-1-D at 13:38; shutdown after sampling

Notes:

Blue text identifies anomolous data

		Carbon/Hydrosil System Monitoring								
Date [MM/DD/YY]	Operator [Initials]	Time [24-h]	Carbon Run Time [days]	PID Influent Reading [ppmV]	PID Reading After Lead Unit [ppmV]	PID Reading After Lag Unit [ppmV]	PID Reading After Hydrosil Unit (System Effluent) [ppmV]	Control Efficiency of Lead Unit [%]	Control Efficiency of System [%]	Comments
11/16/2011	LH	14:00	0	88.0	2.3	1.0	1.0	97.4%	98.9%	Startup w/SVE from PW and TSSV-1-S
11/17/2011	LH	6:30	1	130.0	2.7	1.0	1.5	97.9%	98.8%	---
11/18/2011	LH/RK	8:49	2	99.1	6.3	2.3	0.0	93.6%	100.0%	---
11/21/2011	RK	9:30	5	109.0	12.0	1.8	0.3	89.0%	99.7%	---
11/23/2011	RK	9:30	7	140.0	1.4	2.2	1.3	99.0%	99.1%	---
11/28/2011	LH	8:00	12	145.7	120.8	32.5	22.3	17.1%	84.7%	Rented PID (previous measurements are w/this PID)
11/28/2011	LH	8:00	12	198.9	139.8	45.6	35.8	29.7%	82.0%	County PID (subsequent measurements are w/ this PID); shutdown after monitoring
12/1/2011	--	---	0	---	---	---	---	---	---	Carbon changeout
12/5/2011	LH	8:30	0	88.7	0.7	0.2	0.2	99.2%	99.8%	Restart w/ SVE from PW and TSSV-1-S; closed PW to SVE after monitoring
12/6/2011	LH	8:00	1	93.2	0.8	0.4	0.3	99.1%	99.7%	---
12/8/2011	LH	8:00	3	127.6	2.0	2.7	3.5	98.4%	97.3%	---
12/9/2011	LH	7:30	4	120.2	2.8	2.4	3.7	97.7%	96.9%	---
12/12/2011	LH	13:00	7	109.8	12.4	4.2	2.3	88.7%	97.9%	Raining; humidity suspected of impacting PID readings
12/13/2011	LH	9:00	8	120.6	7.5	1.7	2.3	93.8%	98.1%	---
12/15/2011	SW	8:30	10	106.0	5.3	5.9	12.1	95.0%	88.6%	---
12/15/2011	LH	12:30	10	127.8	7.6	5.2	3.8	94.1%	97.0%	---
12/15/2011	LH	14:55	10	168.7	7.8	5.3	4.3	95.4%	97.5%	Shutdown after monitoring
1/16/2012	LH/RK	16:00	11	122.5	13.8	7.9	2.7	88.7%	97.8%	Restart w/ SVE from TSSV-1-M; sampling equipment contamination resulting in elevated PID readings
1/17/2012	RK	12:00	13	149.6	23.0	14.1	9.2	84.6%	93.9%	Sampling equipment contamination resulting in elevated PID readings
1/17/2012	RK	14:00	15	129.1	9.5	2.9	0.8	92.6%	99.4%	Reading after replacing contaminated equipment
1/18/2012	RK	11:00	18	150.9	8.5	2.9	0.9	94.4%	99.4%	---
1/19/2012	SW	9:00	22	109.2	11.2	3.9	8.2	89.7%	92.5%	Shutdown after monitoring
1/20/2012	LH	8:00	0	---	---	---	---	---	---	Carbon changeout; extra vessel onsite
1/20/2012	LH/RK	12:30	0	134.6	0.5	0.3	0.6	99.6%	99.6%	Restart w/ SVE from TSSV-1-M; began operations with three carbon vessels in series
1/20/2012	LH/RK	13:45	0	149.1	0.9	0.7	0.5	99.4%	99.7%	---
1/21/2012	SW	9:06	1	145.0	7.8	2.3	1.5	94.6%	99.0%	---
1/22/2012	SW	10:06	2	175.1	8.0	2.8	1.4	95.4%	99.2%	---
1/23/2012	SW	8:21	3	165.6	6.3	2.6	1.7	96.2%	99.0%	---
1/24/2012	LH	12:55	4	148.7	5.9	2.4 / 2.3	1.5	96.0%	99.0%	Secondary measurements were collected after third carbon vessel
1/26/2012	SW	8:25	6	157.8	9.2	4.2 / 3.3	2.8	94.2%	98.2%	Secondary measurements were collected after third carbon vessel
1/27/2012	LH	15:50	7	151.8	8.7	6.2	1.5	94.3%	99.0%	Disconnected third vessel; continued operation with first two vessels
1/30/2012	RK	12:06	10	157.6	1.8	0.5	0.4	98.9%	99.7%	---
1/31/2012	LH	12:25	11	173.9	10.2	6.8	3.7	94.1%	97.9%	---
2/3/2012	LH	9:30	14	163.0	1.4	2.0	3.0	99.1%	98.2%	---
2/7/2012	LH	10:10	18	156.5	3.7	6.5	6.2	97.6%	96.0%	---
2/16/2012	RK	11:40	27	153.7	11.6	2.6	0.5	92.5%	99.7%	---
2/20/2012	RK/LH	11:20	31	165.3	35.7	10.5	5.0	78.4%	97.0%	After collecting data, disconnected lead vessel and made lag new lead; connected former third vessel as new lag
2/20/2012	RK/LH	13:27	31	158.7	11.2	1.7	0.3	92.9%	99.8%	---
2/21/2012	RK	14:42	32	150.1	31.0	11.0	1.9	79.3%	98.7%	---
2/29/2012	RK	11:05	40	178.1	47.0	7.5	0.5	73.6%	99.7%	Shutdown after sampling

Notes:

Blue text identifies anomolous data

		Effluent and Blower Monitoring								
Date [MM/DD/YY]	Operator [Initials]	Time [24-h]	Vacuum (pre-blower) [in-H_2O]	Discharge Temper-ature [deg F]	Discharge Flow Rate [acfm]	Blower Hour Meter Reading [hrs]	Elapsed Blower Hours [hrs]	Blower Amperage [amps]	Phase Converter Amperage [amps]	Comments
11/16/2011	LH	14:00	80	160	500	4176.1	0	49.3	72.1	Startup w/SVE from PW and TSSV-1-S
11/17/2011	LH	6:30	85	160	500	4192.7	16.6	49.5	73.2	---
11/18/2011	LH/RK	8:30	85	160	500	4217.5	41.4	50.2	74.8	---
11/21/2011	RK	9:30	85	160	500	--	--	--	--	---
11/23/2011	RK	9:30	--	--	--	--	--	--	--	---
11/28/2011	LH	8:00	--	--	--	--	--	--	--	---
11/28/2011	LH	8:00	79	160	500	4457.5	281.4	50.3	74.6	Shutdown after monitoring
12/1/2011	--	--	--	--	--	--	--	--	--	Carbon changeout
12/5/2011	LH	8:30	100	200	500	4458.2	282.1	50.1	73.2	Restart w/ SVE from PW and TSSV-1-S; closed PW afterwards
12/6/2011	LH	8:00	100	195	500	4483.6	307.5	50.8	75.6	---
12/8/2011	LH	8:00	100	200	400	4531.5	355.4	53.5	79.7	---
12/9/2011	LH	7:30	100	198	400	4554.2	378.1	51.8	77.2	---
12/12/2011	LH	13:00	100	195	400	4630.2	454.1	51.6	76.7	---
12/13/2011	LH	9:00	100	195	400	4651.1	475.0	51.2	77.1	---
12/15/2011	SW	8:30	85	170	425	4696.9	520.8	--	--	---
12/15/2011	LH	12:30	95	200	400	4701.2	525.1	50.1	76.5	---
12/15/2011	LH	14:55	100	200	400	4703.5	527.4	53.2	78.5	Shutdown after monitoring
1/16/2012	LH/RK	12:00	100	250	---	4704.9	528.8	50.0	70.0	Restart w/ SVE from TSSV-1-M; discharge flow gage inoperable
1/17/2012	RK	12:00	100	250	--	4727.3	551.2	--	--	---
1/17/2012	RK	14:00	--	--	--	--	--	--	--	---
1/18/2012	RK	11:00	100	250	--	4750.4	574.3	--	--	---
1/19/2012	SW	9:00	--	--	--	4775.4	599.3	--	--	Shutdown after monitoring
1/20/2012	LH	8:00	--	--	--	--	--	--	--	Carbon changeout
1/20/2012	LH/RK	12:00	--	--	--	--	--	--	--	Restart w/ SVE from TSSV-1-M
1/20/2012	LH/RK	13:45	100	250	--	4777.8	601.7	--	--	---
1/21/2012	SW	9:00	--	--	--	--	--	--	--	---
1/22/2012	SW	10:23	100	--	--	4822.5	646.4	--	--	---
1/23/2012	SW	8:50	100	--	--	4845.0	668.9	--	--	---
1/24/2012	LH	13:10	100	250	--	4873.3	697.2	52.7	73.8	---
1/26/2012	SW	8:58	100	250	--	4917.1	741.0	--	--	---
1/27/2012	LH	15:55	100	250	--	4948.1	772.0	53.8	75.6	---
1/30/2012	RK	12:35	100	250	--	5016.7	840.6	--	--	---
1/31/2012	LH	12:55	100	250	--	5040.4	864.3	54.6	77.8	Greased blower; checked oil
2/3/2012	LH	10:25	100	250	--	5110.7	934.6	56.7	79.4	---
2/7/2012	LH	10:40	100	250	--	5206.9	1,030.8	56.4	77.2	---
2/16/2012	RK	12:20	100	250	--	5424.3	1,248.2	--	--	---
2/20/2012	RK/LH	11:15	100	250	--	5519.8	1,343.7	--	--	---
2/20/2012	RK/LH	13:20	100	--	--	--	--	--	--	---
2/21/2012	RK	14:30	100	275	--	5546.9	1,370.8	--	--	---
2/29/2012	RK	11:20	95	275	--	5735.4	1,559.3	--	--	Shutdown after sampling

Notes:

Blue text identifies anomolous data

		Recirculation and Condensate Monitoring							
Date [MM/DD/YY]	Operator [Initials]	Time [24-h]	Recirculation Valve Setting [%Open]	Calculated Dilution Flow Rate [scfm]	Dilution Valve Setting [%Open]	Knockout Tank Volume [gal]	Knockout Tank Vacuum [in-H_2O]	Condensate Storage Tank Volume [gal]	Comments
11/16/2011	LH	14:00	15	0	0	0	80	0	Startup w/SVE from PW and TSSV-1-S
11/17/2011	LH	6:30	15	0	0	0	80	0	---
11/18/2011	LH/RK	7:00	15	0	0	0	85	0	---
11/21/2011	RK	9:30	15	0	0	0	85	0	---
11/23/2011	RK	9:30	--	--	--	--	--	--	---
11/28/2011	LH	8:00	--	--	--	--	--	--	---
11/28/2011	LH	8:00	15	0	0	0	79	0	---
12/1/2011	--	--	--	--	--	--	--	--	Carbon changeout
12/5/2011	LH	8:30	15	0	0	0	100	0	Restart w/ SVE from PW and TSSV-1-S; closed PW afterwards
12/6/2011	LH	8:00	15	0	0	10	100	0	---
12/8/2011	LH	8:00	10	--	10	10	100	0	---
12/9/2011	LH	7:30	10	--	15	0	98	15	Pumped to knockout to storage
12/12/2011	LH	13:00	10	--	15	0	100	15	---
12/13/2011	LH	9:00	10	100	15	10	100	15	---
12/15/2011	SW	8:30	10	31	15	10	85	15	---
12/15/2011	LH	12:30	10	95	15	0	95	25	Pumped to knockout to storage
12/15/2011	LH	14:55	10	88	10	0	100	25	Partially closed dilution valve; shutdown after monitoring
1/16/2012	LH/RK	12:00	15	0	0	0	100	25	Restart w/ SVE from TSSV-1-M; recirculation valve opened to 15% open; no dilution
1/17/2012	RK	12:00	15	0	0	0	100	25	---
1/17/2012	RK	14:00	--	--	--	--	--	--	---
1/18/2012	RK	11:00	10	0	0	0	100	25	Closed recirculation valve setting to 10% open to maintain 100 in vacuum
1/19/2012	SW	9:00	--	--	--	--	--	--	Shutdown after monitoring
1/20/2012	LH	8:00	--	--	--	--	--	--	Carbon changeout
1/20/2012	LH/RK	12:00	--	--	--	--	--	--	Restart w/ SVE from TSSV-1-M; no dilution
1/20/2012	LH/RK	13:45	--	--	--	--	--	--	---
1/21/2012	SW	9:00	--	--	--	--	--	--	---
1/22/2012	SW	10:23	--	--	--	--	--	--	---
1/23/2012	SW	8:50	--	--	--	--	--	--	---
1/24/2012	LH	13:15	10	0	0	0	100	25	---
1/26/2012	SW	8:58	--	--	--	--	--	--	---
1/27/2012	LH	16:00	10	0	0	0	100	25	---
1/30/2012	RK	12:35	10	0	0	0	100	25	---
1/31/2012	LH	12:50	10	0	0	0	100	25	---
2/3/2012	LH	10:35	10	0	0	0	100	25	---
2/7/2012	LH	10:50	10	0	0	0	100	25	---
2/16/2012	RK	12:20	10	0	0	0	100	25	---
2/20/2012	RK/LH	11:15	10	0	0	0	100	25	---
2/20/2012	RK/LH	13:30	20	0	0	0	100	25	Opened recirculation valve to 20% open
2/21/2012	RK	14:30	20	0	0	0	100	25	---
2/29/2012	RK	11:20	10	0	0	0	100	25	Closed recirculation valve setting to 10% open to maintain 100 in vacuum; shutdown after sampling

Notes:

Blue text identifies anomolous data

Well Name	Date	Time	Induced Vacuum[(1)] [Inches H_2O]	Test well operating
NDP-1 D	11/18/2011	11:05	-0.25	TSSV1-S & PW
	11/21/2011	11:36	0.76	TSSV1-S & PW
	11/21/2011	13:10	0.52	TSSV1-S & PW
	11/21/2011	14:55	0.46	TSSV1-S & PW
	11/23/2011	11:18	-0.5	TSSV1-S & PW
	1/17/2012	13:00	0.43	TSSV1-M
	2/20/2012	12:49	0.15	TSSV1-D
	2/29/2012	11:55	0.31	TSSV1-D
NDP-1 S	11/18/2011	11:05	-0.185	TSSV1-S & PW
	11/21/2011	11:36	0.47	TSSV1-S & PW
	11/21/2011	13:03	0.28	TSSV1-S & PW
	11/21/2011	14:54	0.24	TSSV1-S & PW
	11/23/2011	11:12	-0.55	TSSV1-S & PW
	1/17/2012	13:01	0.22	TSSV1-M
	2/20/2012	12:49	0.15	TSSV1-D
	2/29/2012	11:55	0.14	TSSV1-D
ODP-1 D	11/18/2011	10:37	-0.18	TSSV1-S & PW
	11/21/2011	11:16	1.09	TSSV1-S & PW
	11/21/2011	13:37	0.79	TSSV1-S & PW
	11/21/2011	15:19	0.63	TSSV1-S & PW
	11/23/2011	11:30	0.01	TSSV1-S & PW
	1/17/2012	13:34	0.58	TSSV1-M
	2/20/2012	13:00	0.25	TSSV1-D
	2/29/2012	12:11	0.46	TSSV1-D
ODP-1 S	11/18/2011	10:37	-0.09	TSSV1-S & PW
	11/21/2011	11:14	0.64	TSSV1-S & PW
	11/21/2011	13:36	0.45	TSSV1-S & PW
	11/21/2011	15:18	0.34	TSSV1-S & PW
	11/23/2011	11:24	0.01	TSSV1-S & PW
	1/17/2012	13:33	0.28	TSSV1-M
	2/20/2012	13:00	0.5	TSSV1-D
	2/29/2012	12:11	0.23	TSSV1-D
ODP-2 D	11/18/2011	10:25	-0.12	TSSV1-S & PW
	11/21/2011	11:20	0.94	TSSV1-S & PW
	11/21/2011	13:32	0.69	TSSV1-S & PW
	11/21/2011	15:07	0.55	TSSV1-S & PW
	11/23/2011	12:00	-0.07	TSSV1-S & PW
	1/17/2012	13:28	0.44	TSSV1-M
	2/20/2012	12:58	0.29	TSSV1-D
	2/29/2012	12:07	0.38	TSSV1-D

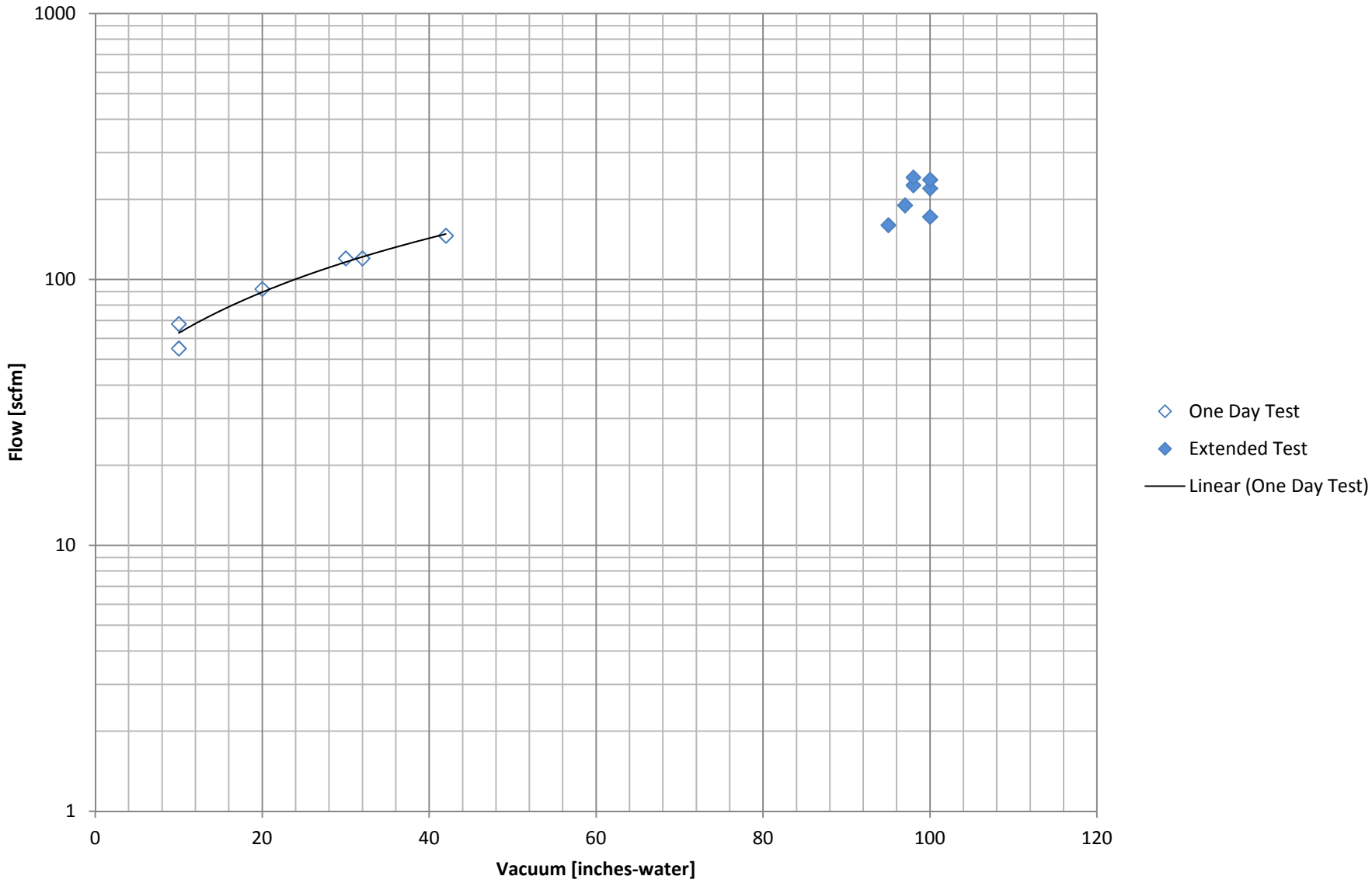
Well Name	Date	Time	Induced Vacuum[(1)] [Inches H_2O]	Test well operating
ODP-2 S	11/18/2011	10:25	-0.09	TSSV1-S & PW
	11/21/2011	11:19	0.55	TSSV1-S & PW
	11/21/2011	13:32	0.44	TSSV1-S & PW
	11/21/2011	15:06	0.33	TSSV1-S & PW
	11/23/2011	11:54	-0.02	TSSV1-S & PW
	1/17/2012	13:27	0.16	TSSV1-M
	2/20/2012	12:58	0.49	TSSV1-D
	2/29/2012	12:07	0.2	TSSV1-D
ODP-3 D	11/18/2011	10:14	2	TSSV1-S & PW
	11/21/2011	11:27	0.99	TSSV1-S & PW
	11/21/2011	13:24	0.78	TSSV1-S & PW
	11/21/2011	15:02	0.69	TSSV1-S & PW
	11/23/2011	11:42	-0.12	TSSV1-S & PW
	1/17/2012	13:22	0.53	TSSV1-M
	2/20/2012	12:52	0.3	TSSV1-D
	2/29/2012	12:03	0.47	TSSV1-D
ODP-3 S	11/18/2011	10:14	-0.03	TSSV1-S & PW
	11/21/2011	11:26	0.7	TSSV1-S & PW
	11/21/2011	13:23	0.5	TSSV1-S & PW
	11/21/2011	15:01	0.42	TSSV1-S & PW
	11/23/2011	11:36	-0.04	TSSV1-S & PW
	1/17/2012	13:21	0.31	TSSV1-M
	2/20/2012	12:52	0.49	TSSV1-D
	2/29/2012	12:03	0.26	TSSV1-D
P-25	11/18/2011	10:55	-0.05	TSSV1-S & PW
	11/21/2011	10:56	0.17	TSSV1-S & PW
	11/21/2011	13:15	0.11	TSSV1-S & PW
	11/21/2011	14:45	0.13	TSSV1-S & PW
	11/23/2011	11:06	0.01	TSSV1-S & PW
	1/17/2012	13:06	0.05	TSSV1-M
	2/20/2012	12:42	0.03	TSSV1-D
	2/29/2012	11:52	0.7	TSSV1-D
P-8	11/18/2011	10:20	0.01	TSSV1-S & PW
	11/21/2011	11:00	0.001	TSSV1-S & PW
	11/21/2011	13:18	0.001	TSSV1-S & PW
	11/21/2011	14:48	0.001	TSSV1-S & PW
	11/23/2011	11:00	0.001	TSSV1-S & PW
	1/17/2012	13:13	0.001	TSSV1-M
	2/20/2012	12:45	0.02	TSSV1-D
	2/29/2012	11:58	0.005	TSSV1-D

Well Name	Date	Time	Induced Vacuum[1] [Inches H_2O]	Test well operating
PW	12/13/2011	9:00	-0.09	TSSV1-S
	12/15/2011	12:30	0.15	TSSV1-S
	12/15/2011	14:55	0.15	TSSV1-S
	2/20/2012	11:15	1.3-1.49	TSSV1-D
	2/29/2012	11:00	1.24	TSSV1-D
TSSV1-S	2/7/2012	10:00	0.08	TSSV1-M
	2/20/2012	11:14	1.4	TSSV1-D
	2/20/2012	13:20	1.9	TSSV1-D
	2/29/2012	11:01	0.67	TSSV1-D
TSSV1-M	2/20/2012	13:20	1.9	TSSV1-D
	2/29/2012	11:01	1.46	TSSV1-D
TSSV1-D	2/7/2012	10:00	0.23	TSSV1-M
	2/20/2012	11:14	>2	TSSV1-M

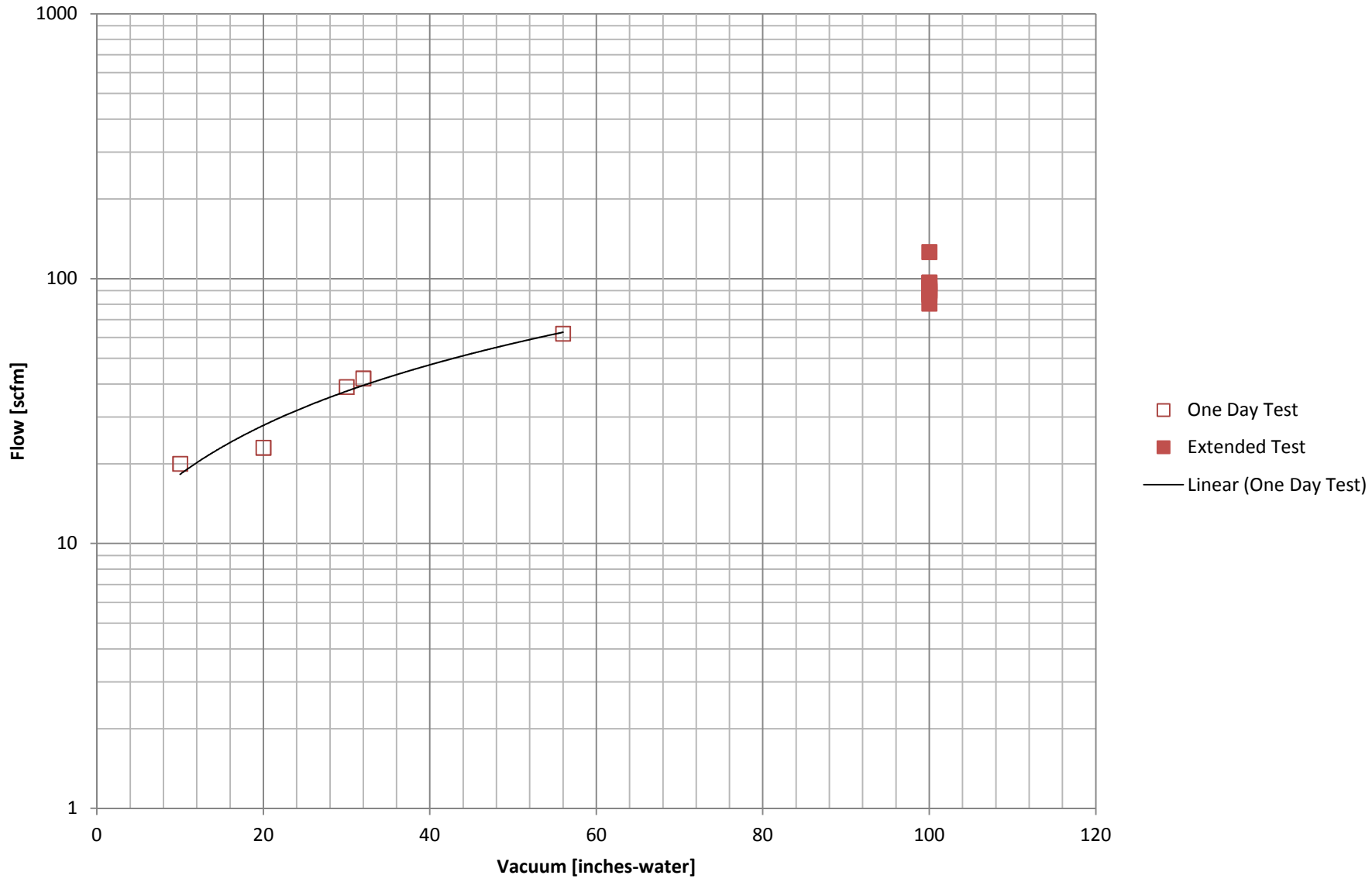
Notes:

[1] Negative values are pressure and positive values are vacuum

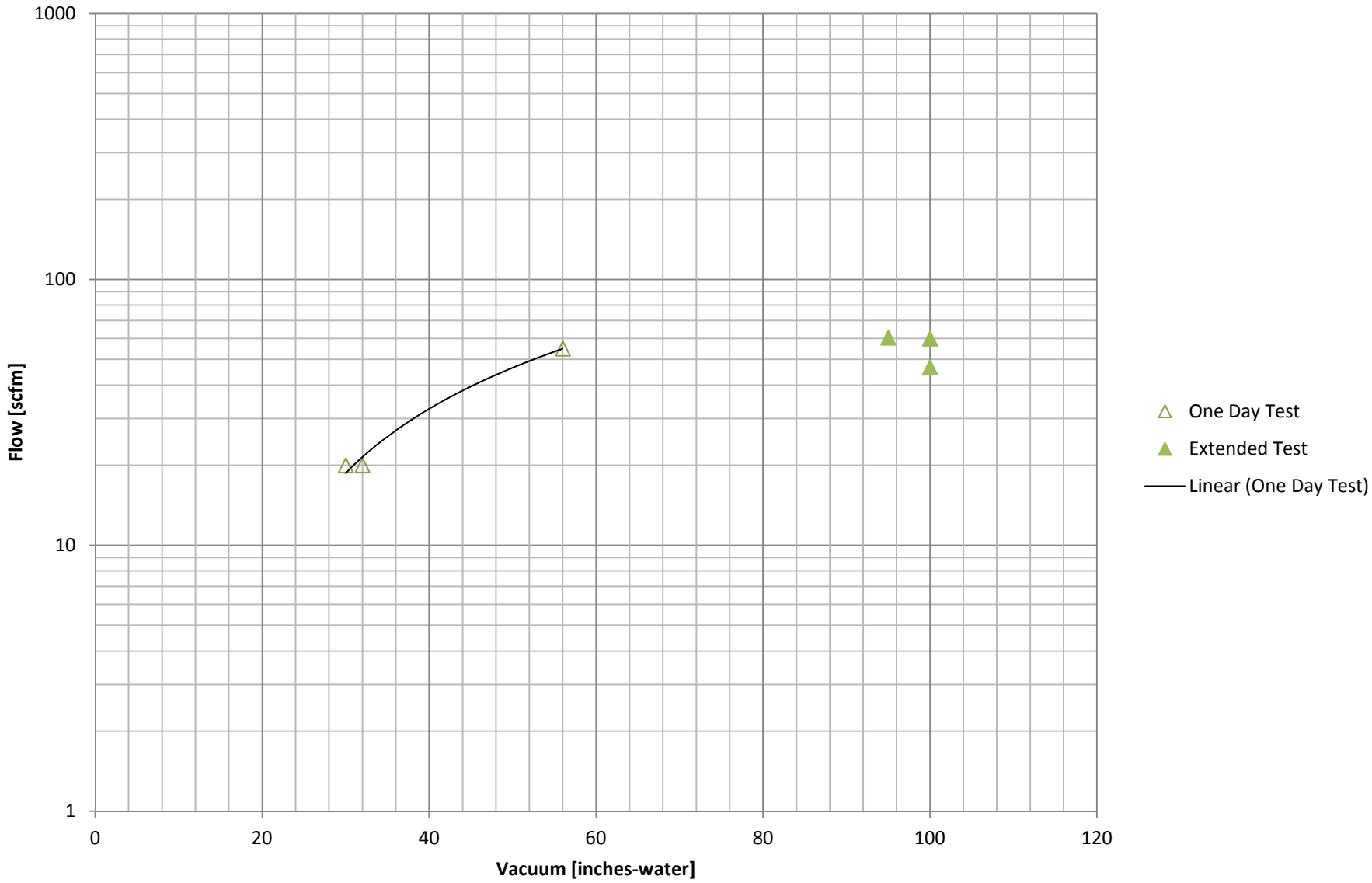
APPLIED VACUUM VERSUS OBSERVED FLOW - TSSV-1-S
One Day and Extended SVE Pilot Test Data



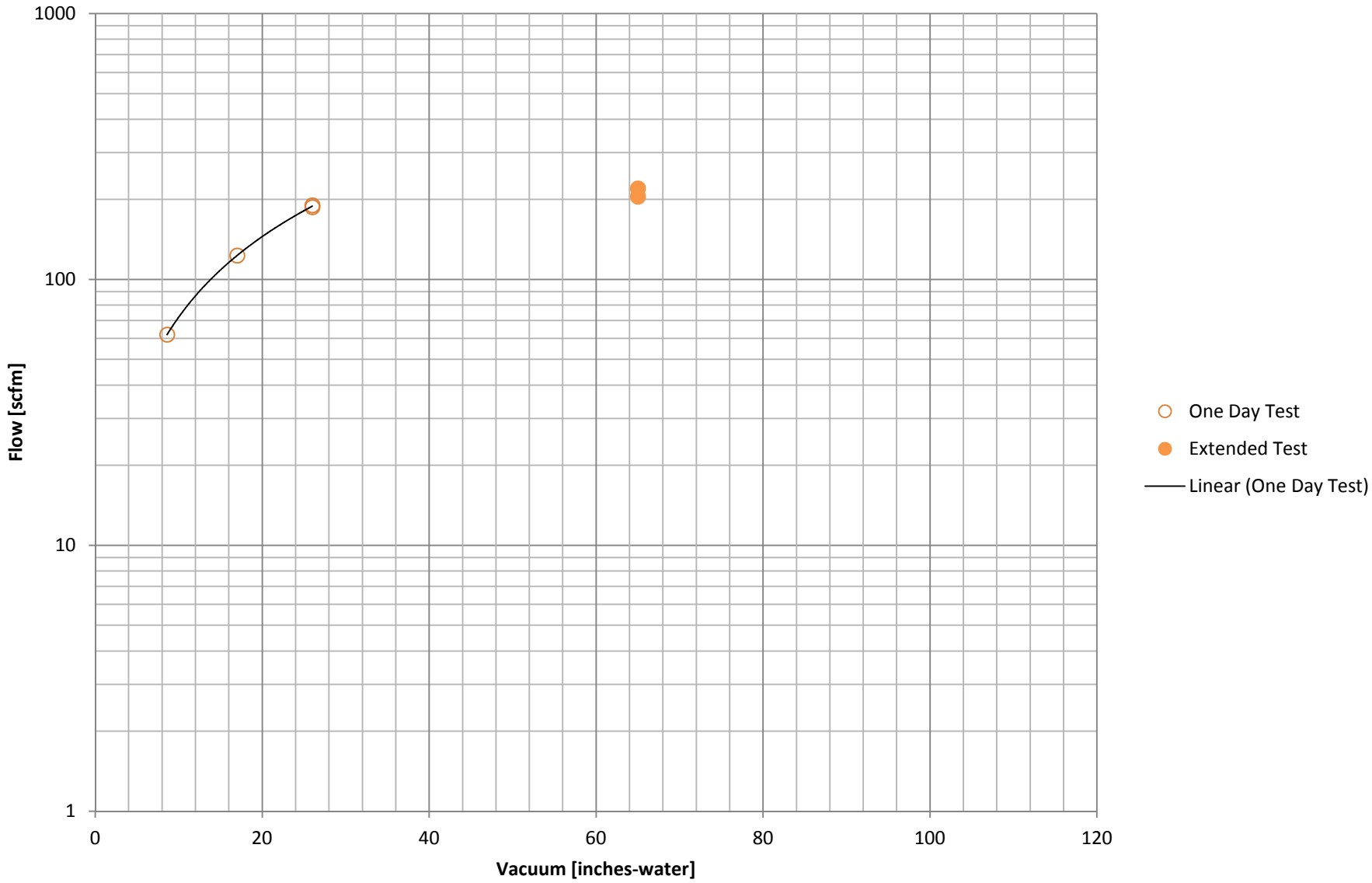
APPLIED VACUUM VERSUS OBSERVED FLOW - TSSV-1-M
One Day and Extended SVE Pilot Test Data

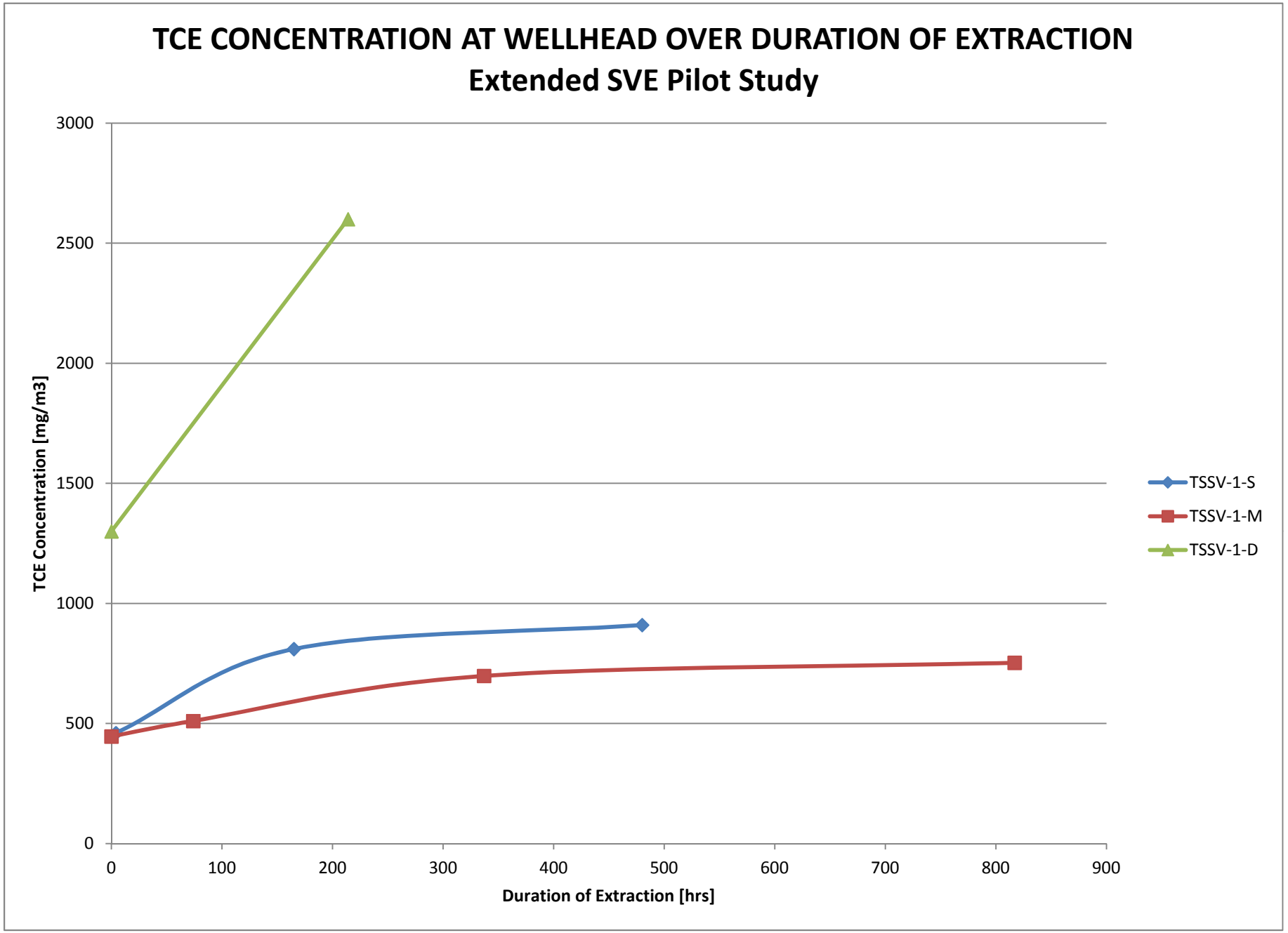


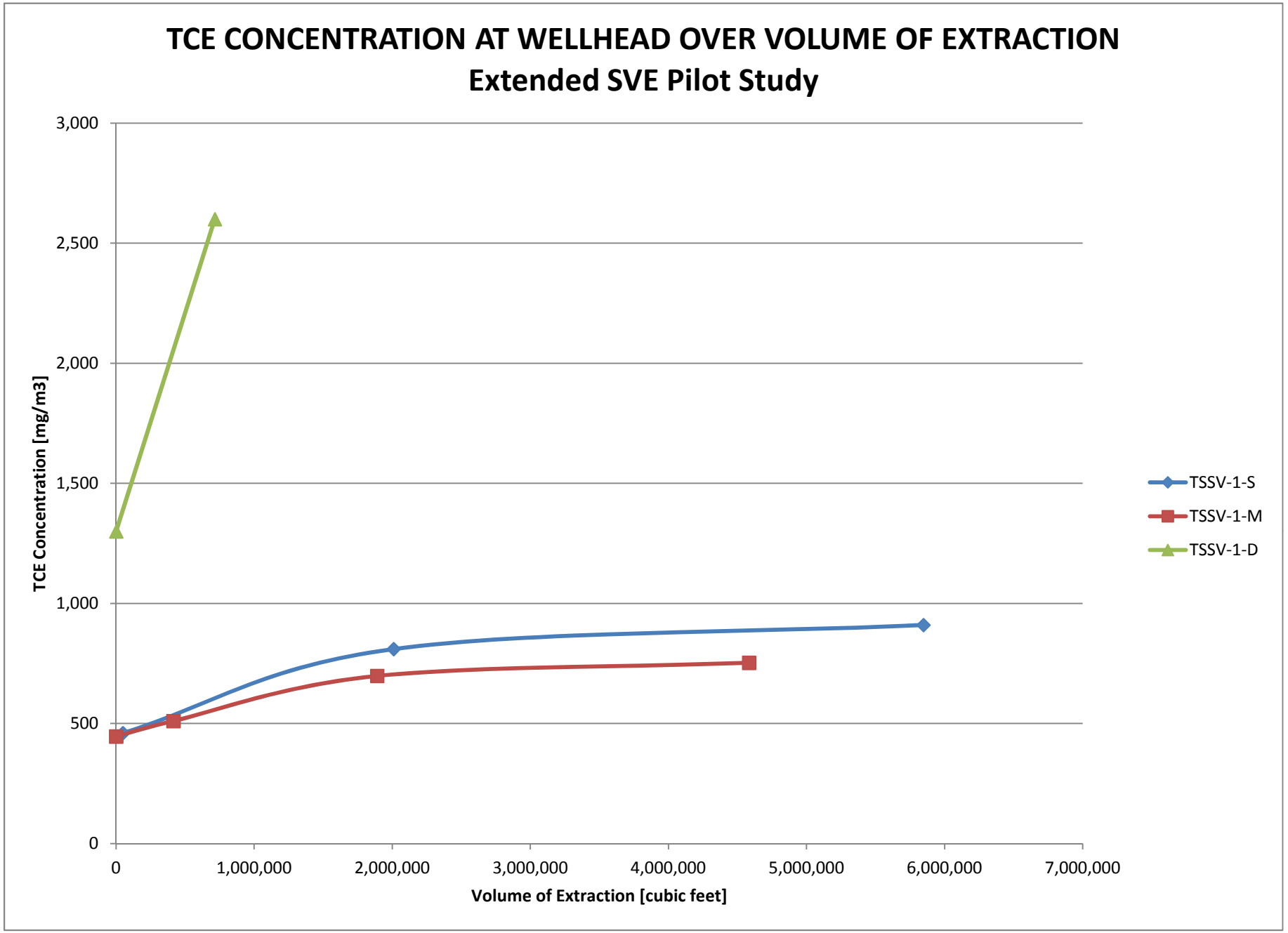
APPLIED VACUUM VERSUS OBSERVED FLOW - TSSV-1-D
One Day and Extended SVE Pilot Test Data



APPLIED VACUUM VERSUS OBSERVED FLOW - PW
One Day and Extended SVE Pilot Test Data

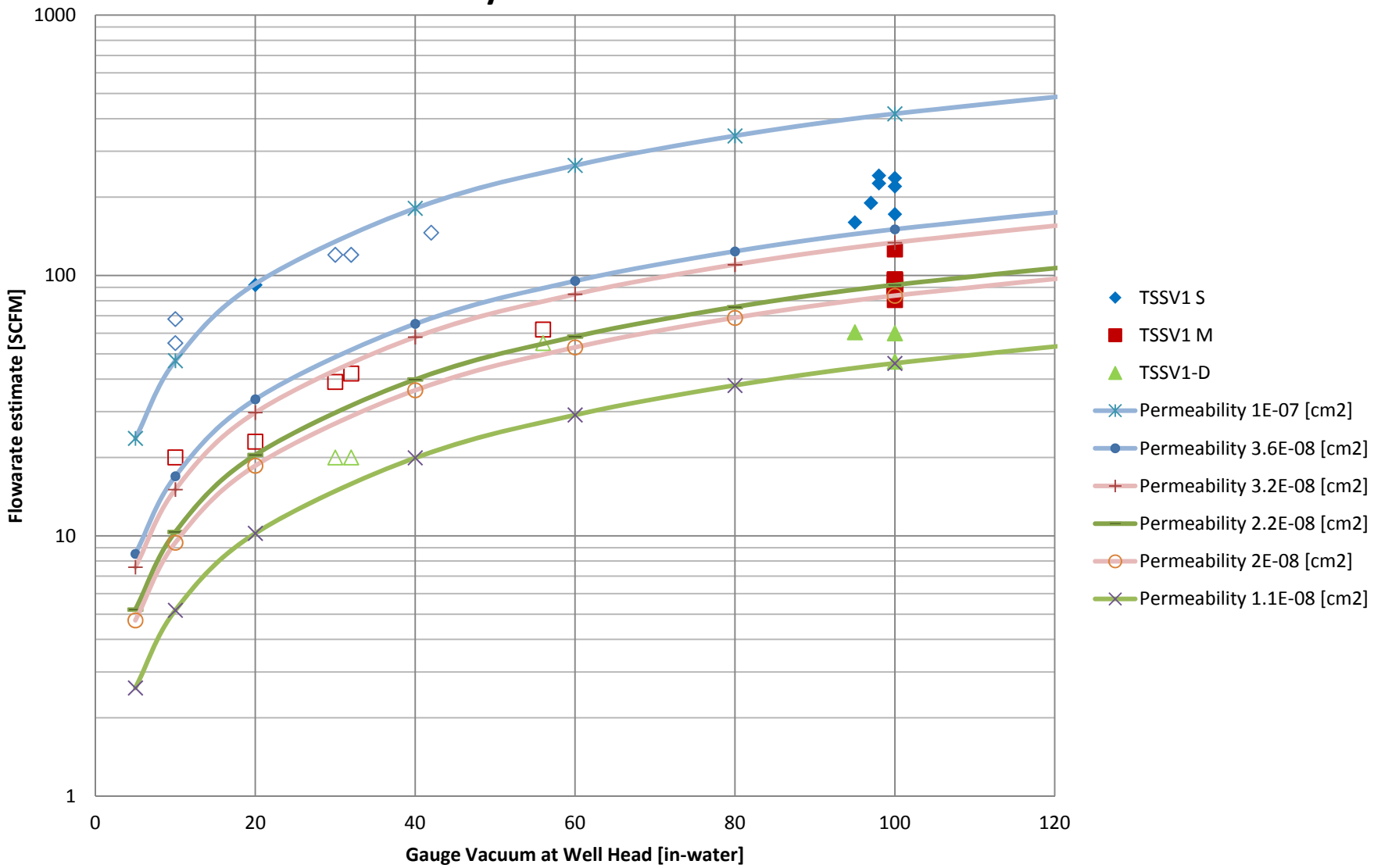



TCE CONCENTRATION AT WELLHEAD OVER DURATION OF EXTRACTION
Extended SVE Pilot Study
TCE Concentration [mg/m3]
3000
2500
2000
1500
1000
500
0
0
100
200
300
400
500
600
700
800
900
Duration of Extraction [hrs]
TSSV-1-S
TSSV-1-M
TSSV-1-D


TCE CONCENTRATION AT WELLHEAD OVER VOLUME OF EXTRACTION
Extended SVE Pilot Study
TCE Concentration [mg/m3]
3,000
2,500
2,000
1,500
1,000
500
0
0
1,000,000
2,000,000
3,000,000
4,000,000
5,000,000
6,000,000
7,000,000
Volume of Extraction [cubic feet]
TSSV-1-S
TSSV-1-M
TSSV-1-D

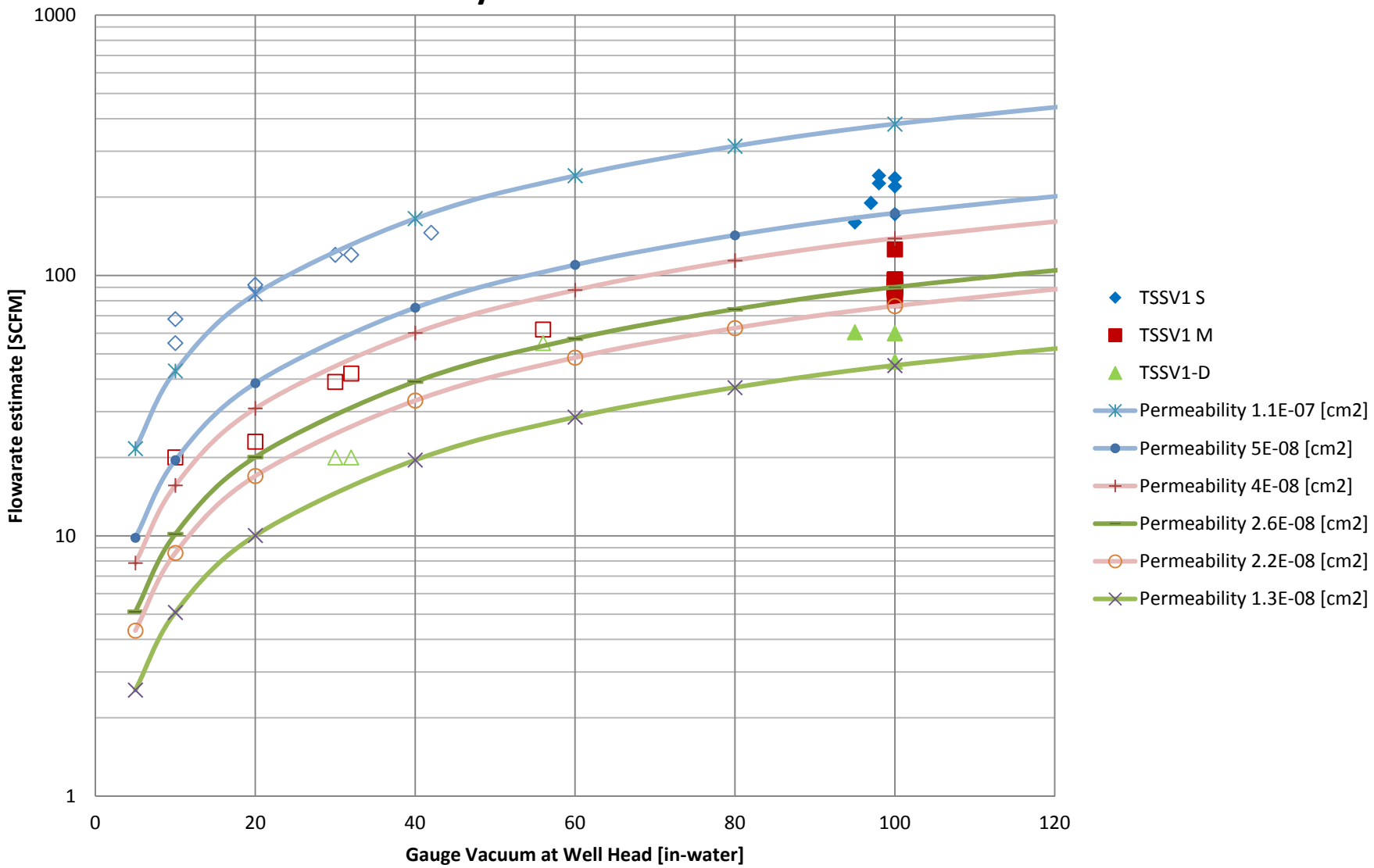
APPLIED VACUUM VERSUS OBSERVED FLOW - One Day and Extended SVE Pilot Test Data

Permeability Estimates for Assumed ROI=30 feet



APPLIED VACUUM VERSUS OBSERVED FLOW - One Day and Extended SVE Pilot Test Data

Permeability Estimates for Assumed ROI=100 feet



APPLIED VACUUM VERSUS OBSERVED FLOW - One Day and Extended SVE Pilot Test Data

Permeability Estimates for Assumed ROI=200 feet