

**FINAL
Remedial Investigation Report
South Mesa WQARF Registry Site
Mesa, Arizona
ADEQ Task Assignment EV11-0084**

Prepared for:

**Arizona Department of Environmental Quality
Waste Programs Division
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Prepared by:

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June 7, 2013

AMEC Project No. 14-2012-2022.04.01



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AMEC Project No. 1420122022.04.01

Arizona Department of Environmental Quality
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Attn: Mr. Kevin Snyder

**Re: Final Remedial Investigation Report
South Mesa WQARF Registry Site
ADEQ Task Assignment EV11-0084**

AMEC Environment and Infrastructure, Inc. (AMEC) is pleased to submit this *Final Remedial Investigation Report* for the South Mesa WQARF Registry Site (SMWRS) to the Arizona Department of Environmental Quality (ADEQ). This report has been prepared by AMEC for ADEQ per Task Assignment EV11-0084.

ADEQ initially contracted Law Engineering and Environmental Services, Inc (LAW) in March 2000 to perform the remedial investigation (RI) of the SMWRS. LAW was subsequently acquired by MACTEC Engineering and Consulting, Inc. in 2003 and MACTEC completed the RI and submitted the Draft RI Report to ADEQ for public comment on March 28, 2011. The Draft RI Report consisted of eight volumes and copies were made available in the ADEQ files and at the SMWRS repository at the Mesa Public Library. In May 2011, MACTEC was acquired by AMEC. Therefore, Volumes I and II of this Final RI Report are being submitted by AMEC. There have been no changes to Volumes III through VIII, which primarily contain copies of laboratory analytical reports for samples that were collected during the RI. Therefore, rather than re-copy and re-submit these documents as AMEC documents, they remain under MACTEC cover.

If you have any questions or comments regarding this work plan, please contact Mr. James Clarke at (602) 733-6055.

Respectfully submitted,

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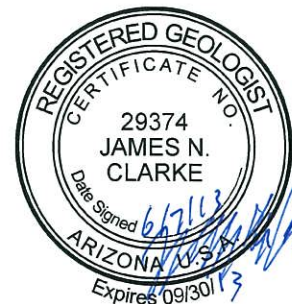
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EXECUTIVE SUMMARY

AMEC Environment & Infrastructure, Inc. (AMEC) completed this Remedial Investigation (RI) Report for the South Mesa Water Quality Assurance Revolving Fund (WQARF) Registry Site (SMWRS) in accordance with the Arizona Department of Environmental Quality (ADEQ) WQARF program rules.

Volatile organic chemicals (VOCs), particularly tetrachloroethene (PCE), were detected above Arizona Water Quality Standards (AWQSs) in groundwater samples collected from groundwater monitoring wells at the SMWRS.

- One contributor to the VOC groundwater contamination was identified as the former Applied Metalics Inc., (AMI) facility, located at 1545 North McQueen Road in Gilbert, Arizona (Figure 1). The AMI facility produced metal plated electronic components
- Sources of contamination at the former AMI facility included:
 - On-site PCE steam cleaner/degreaser; and,
 - An, on-site drywell used for disposal of process wastes.

Remedial Investigation Findings

The following summarizes the findings and conclusions of the tasks associated with the Remedial Investigation (RI) of the SMWRS:

Geophysical Survey

- A surface geophysical survey was performed to locate the septic tank and seepage pit on the former AMI facility. A 1,250-gallon concrete septic tank and associated seepage pit were identified.

Passive & Active Soil Vapor Surveys

- A passive soil vapor survey was performed to identify subsurface sources of PCE and to confirm previous operation of the soil vapor extraction (SVE) system.
 - PCE, trichloroethene (TCE), and cis-1, 2-dichloroethene (cis-1, 2-DCE) were detected at the highest concentrations in vapor samples collected in the area of the septic leach field and in a vapor plume that extended beneath the AMI building.
 - The lowest PCE concentrations were detected in vapor samples collected from areas of previous SVE system activities.
- Active soil gas samples were collected during the drilling of six borings (LB-1 through LB-6 as shown on Figure 6). PCE was the only VOC detected in the active soil gas samples.
 - The highest vapor-phase PCE concentrations were detected in boring LB-1 (<1.0 milligrams per cubic meter [mg/m^3] to $480 \text{ mg}/\text{m}^3$), in the southwest corner of the site, and in boring LB-6 ($1.5 \text{ mg}/\text{m}^3$ to $82 \text{ mg}/\text{m}^3$), located at the former process equipment area.

- Low concentrations of PCE were detected in active soil gas samples from boring LB-3 ($<1.0 \text{ mg/m}^3$ to 1.6 mg/m^3), confirming that the SVE system was effective in removing VOCs from soils located near the former drywell.

Soil Sampling

- Soil samples were collected during the drilling of boring LB-1 through LB-6 to confirm the results of the passive and active soil vapor surveys. The soil samples were analyzed for the presence of VOCs. PCE and other VOCs were not detected in the soil samples.
- Soil samples collected from borings LB-1 through LB-6 were also analyzed for metals and cyanide. Metals detected in soil samples collected at the AMI facility were in concentrations below Arizona's Residential Soil Remediation Levels (RSRLs) and Groundwater Protection Levels (GPLs). Metals were eliminated from consideration as Chemicals of Concern (COCs) and no further assessment or remedial actions were required for metals in soil.

Indoor Air Quality Assessment

- The presence of elevated PCE concentrations in the soil gas below the former AMI facility (1545 North McQueen Road) prompted the performance of a limited indoor air quality assessment.
- Indoor air quality samples were collected on June 27, 2002 and December 17, 2002. PCE and TCE were detected in the samples. PCE concentrations ranged from <3.39 micrograms per cubic meter ($\mu\text{g/m}^3$) to $1,220.4 \mu\text{g/m}^3$ and TCE concentrations ranged from $<2.69 \mu\text{g/m}^3$ to $21.48 \mu\text{g/m}^3$.
- Detected concentrations exceeded the *de minimus* CILCR and the *de maximus* RILCR. Because the 1545 North McQueen Road building was a commercial building, remedial actions were not required. However, ADEQ requested that soil vapor extraction be implemented.
- The soil vapor extraction (SVE) system (as part of an Early Response Action [ERA]) operated from 2004 until October 2007. More than 168 pounds of PCE were removed from the soil vapor below the AMI building.
- Based on results of vapor samples collected from SVE wells, the SVE system was shut down at the request of ADEQ in October 2007.
- In order to evaluate indoor VOC concentrations following system shut down, one follow-up confirmation indoor air quality sample was collected on November 21, 2007. The detected PCE concentration ($5.9 \mu\text{g/m}^3$) was below the *de minimis* CILCR of $1\text{E-}06$. TCE was not detected in the November 2007 sample. The results indicated that SVE was no longer required and the SVE system was removed from the site and the SVE wells were abandoned.
- It was determined that the detected PCE concentrations no longer posed an unacceptable threat to human health.

Early Response Action (ERA)

- Based on the indoor air quality assessment results, ADEQ requested that soil vapor extraction (SVE) be implemented as an ERA to mitigate vapor intrusion into the 1545 North McQueen Road (former AMI) building.
- The ERA SVE system operated from September 2004 until October 12, 2007.
- PCE ambient air concentrations were reduced from a high of 180 ppbv on December 17, 2002 to 0.85 ppbv on November 21, 2007.
- More than 168 pounds of PCE had been removed from soil vapor below the building (Table 14).
- The SVE system successfully reduced PCE and TCE concentrations in the vadose zone at the former AMI facility. The SVE system was shut down in October 2007 and was decommissioned in May 2008.

Groundwater Investigation

- The SMWRS well network currently consists of 30 wells:
 - 10 conventional groundwater monitoring wells (MW-1S through MW-AM-8S, [Table 1]);
 - 18 BARCAD multi-completion groundwater monitoring wells (MW-9-130 through MW-14-215, [Table 1]);
 - A former private production well, known as the Lewis Well, that has been converted to a monitoring well (MW-LW, [Table 1]); and an
 - Inactive Salt River Project (SRP) production well (SRP Well 28E-0N [Table 1]).
- Additionally, discreet groundwater analytical data collected during drilling of borings LB-1 through LB-3 and data collected by Salt River Project from SRP Wells 28.5E-1N and 29E-1N were also used to evaluate the nature and extent of the VOC impact at the SMWRS.

The findings and conclusions related to VOCs in groundwater are summarized below:

SMWRS Aquifer Characteristics

- There are two aquifers of concern at the SMWRS, the Upper Alluvial Unit (UAU), which is used for irrigation (and not drinking water) and the Middle Alluvial Unit (MAU), which is used both for irrigation and drinking water.
- AMEC subdivided the UAU into seven hydrologic units. Zones UAU1 through UAU4 are water-bearing zones that yield usable quantities of water and Zones AQ1-AQ3 are non-water bearing clay layers.

VOCs and Metals

- PCE and TCE are the only VOCs that have exceeded Arizona Aquifer Water Quality Standards (AWQSs). They are therefore listed as Chemicals of Potential Concern (COPCs), requiring further assessment.

- Cis-1,2-DCE has also been detected at concentrations below the AWQS. Cis-1,2 DCE is a breakdown byproduct of PCE and TCE and is therefore considered a chemical of interest (COI).
- Metals detected above the AWQSs in groundwater were arsenic, chromium, manganese, and nickel. Elevated concentrations of arsenic, chromium, and nickel were limited to the onsite well (MW-AM-8S).
- Groundwater samples collected from Zones UAU1 through UAU4 contained the highest detectable VOC concentrations.
- The VOC concentrations in Zones UAU1 through UAU4 are more extensive in size than the VOC plumes in clay layers AQ1 through AQ3.
- The highest PCE concentrations are found in Zones UAU2 and UAU3.
- The detected PCE concentrations range from less than 100 µg/L at the former AMI facility to approximately 10 µg/L at SRP Well 28.5E-1N.
- TCE was detected at low concentrations and may be a breakdown byproduct of PCE.
- Mesa Well No. 14 is the only known active production well in the immediate vicinity that obtains water from the Middle Alluvial Unit (MAU). Mesa Well No. 14 is a municipal drinking water supply well.
- The nature and extent of VOC impact in the MAU remains unknown.

VOC Natural Attenuation Investigation

- Analytical results indicated that natural attenuation of PCE and TCE via reductive dechlorination was not occurring on a regional basis and was not a significant factor in contaminant fate and transport.
- Groundwater samples collected during the July 2000, September 2000, December 2000, and March 2001 groundwater sampling events were analyzed for natural attenuation indicators. These indicators included dissolved ethene and ethane (biodegradation end products), dissolved hydrogen, dissolved oxygen, and oxidation-reduction potential (ORP).
- Selected samples collected during the September 2001 and December 2001 sampling events were also analyzed for iron and manganese, key indicators of successful VOC biodegradation.
- The presence of TCE and c-1,2-DCE (PCE breakdown by-products) in soil gas and groundwater samples indicated that natural attenuation of PCE and TCE was occurring on a localized scale in the soil and groundwater.
- Based on the observation of localized occurrences of reductive dechlorination of PCE to c-1,2-DCE, taking measures to enhance already occurring reductive dechlorination processes is a possible remedial option for groundwater at the SMWRS.

Water Levels

- Depth to groundwater within the boundaries of the SMWRS has been variable with time. Groundwater levels rose approximately 70 feet from the early 1980's to 2000. However, groundwater levels declined more than 15 feet between 2000 and 2004.
- Groundwater elevations have been rising within the SMWRS since 2004. As of December 2006 groundwater elevations were at all-time highs.

- Depth to groundwater currently ranged from approximately 104 feet below ground surface (bgs) to approximately 116 feet bgs in December 2006.
- Water levels were typically higher in the northern portions of the SMWRS.
- Groundwater in the SMWRS has historically flowed in a northeasterly direction. However, from December 2004 until November 2008, groundwater flowed in a southerly direction.
- Variations in groundwater flow direction are attributed to changes in local and regional groundwater pumping and recharge rates.

Revised Conceptual Site Model and Risk Scoping

The findings and conclusions related to the revised conceptual model and risk scoping are summarized as follows:

- Because PCE and TCE were present in the indoor air quality samples collected within the former AMI facility (1545 North McQueen Road), there was a complete pathway, i.e. PCE and TCE (contaminants) were able to move from the vadose zone soils (source) to people breathing the air inside the office building (receptors).
- Detected PCE and TCE concentrations did not exceed the commercial *de maximus* (maximum) standard of 1E-04 ILCR. However, the commercial *de minimus* (minimum) ILCR standard of 1E-06 was exceeded.
- An ERA soil vapor extraction (SVE) system was initiated to minimize indoor air exposure.
- The groundwater vertical pathway between the aquifers and clay layers is considered potentially complete because of the:
 - potential pumping of groundwater from SRP wells 28E-0N and 28.5E-1N and
 - the unknown impact to Mesa Well No. 14.
- The status of this pathway will be changed to incomplete if:
 - the SRP wells are not pumped and
 - sampling of Mesa Well No. 14 indicates the well is not impacted.
- Both the *de minimus* (minimum) risk level (1.0E-6) and the *de maximus* (maximum) risk level (1.0E-04) of the UAU2 and UAU3 groundwater vertical pathways were exceeded.

ACRONYMS AND ABBREVIATIONS

1,1-DCE	1,1-Dichloroethylene (<i>aka</i> 1,1-dichloroethene)
1,1,1-TCA	1,1,1-Trichloroethane
1,1-DCA	1,1-Dichloroethane
1,2-DCA	1,2-Dichloroethane
1,2-DCP	1,2-Dichloropropane
AAAQS	Arizona Ambient Air Quality Standard
A.A.C	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
af	Acre-foot or Acre-feet
AG	Agricultural Zoning
AMEC	AMEC Environment & Infrastructure, Inc.
AMI	Applied Metalics Inc.
AMSL	Above Mean Sea Level
AOC	Areas of Contamination
ARS	Arizona Revised Statutes
ASRAC	Arizona Superfund Response Action Contract
ASTM	American Society for Testing and Materials
atm	Pressure in atmospheres
atm-m ³ /mol	Henry's Law Constant, atmospheres per cubic meters per molecular weight
AWQS	Arizona Water Quality Standards
BDCME	Bromodichloromethane
bgs	Below ground surface
B.I.Z	Bonus Intensity Zone (City of Mesa Planning and Zoning term)
BOD	Biological Oxygen Demand
BRL	Below Reporting Limit
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
C-1	Neighborhood Commercial Zoning (Mesa), Light Commercial Zoning (Gilbert)
C-1,2-DCE	<i>cis</i> -1,2-Dichloroethene (<i>aka</i> , <i>cis</i> -1,2-dichloroethylene)
C-2	Limited Commercial Zoning (Mesa), General Commercial Zoning (Gilbert)
C-3	General commercial (zoning code)
ca	Listed Carcinogen
CAC	Chlorinated Aliphatic Compound
CAS	Chemical Abstracts Service
CEs	Chlorinated Ethenes
CFR	Code of Federal Regulations
CILCR	Commercial Incidental Lifetime Cancer Risk
COC	Chemical of Concern
COCs	Chemicals of Concern (may be capitalized as COCS)
COD	Chemical Oxygen Demand
COI	Compound of Interest
COIs	Compounds of Interest
Conc _x	Concentration of "x" Compound
COPC	Chemical of Potential Concern
COPCs	Chemicals of Potential Concern
CPRG	Commercial Preliminary Remediation Goal
Cr ⁺⁶	Hexavalent Chromium
CSM	Conceptual Site Model

DBCME	Dibromochloromethane
DBS	Diffusive Bag Sampler
DCE	Dichloroethylene (<i>aka</i> , dichloroethene)
DEUR	Declaration of Environmental Use Restriction
DH	Dissolved Hydrogen
DMA	Del Mar Analytical
DO	Dissolved Oxygen
EM	Electromagnetics
EPA	United States Environmental Protection Agency
ERA	Early Response Action
ERI	Environmental Response, Incorporated
Fe	Iron
Fe ⁺²	Ferrous Iron
Fe ⁺³	Ferric Iron
Freon-11	Trichlorofluoromethane
Freon-12	Dichlorodifluoromethane
FS	Feasibility Study
ft./day	feet per day
ft./ft.	feet per foot
g/cm ³	Grams per cubic centimeter
gpd/ft ²	Gallons per day per square foot
gpm	Gallons per minute
GC/MS	Gas chromatography/mass spectrometry
GPL	Groundwater Protection Level (Arizona)
GPR	Ground Penetrating Radar
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
HVOC	Halogenated Volatile Organic Compound
IAQ	Indoor Air Quality
IDW	Investigation Derived Waste
ILCR	Incremental Lifetime Cancer Risk
IRIS	Integrated Risk Information System
K _{oc}	Sediment/Water Coefficient
LAU	Lower Alluvial Unit
LAW	Law Engineering and Environmental Services, Inc.
L/day	Liter/day
LRL	Laboratory Reporting Limit
M-1	Limited Industrial Zoning (Mesa)
M-2	General Industrial Zoning (Mesa)
MACTEC	MACTEC Engineering & Consulting, Inc.
MCDHS	Maricopa County Department of Health Services
MAU	Middle Alluvial Unit
MCL	Maximum Contaminant Level
MEK	Methyl-Ethyl-Ketone
ml/g	Milliliters per Gram
µg/L	Microgram per Liter
mg/kg	Milligram per kilogram
mg/L	Milligram per Liter
Mn	Manganese

Mn ⁺²	Bivalent Manganese
Mn ⁺⁴	Tetravalent Manganese
MNA	Monitored Natural Attenuation
MW	Monitoring Well
N	Nitrogen
NAPL	Non-Aqueous Phase Liquid
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
ng	Nanograms
nM	Nanomolars
NIOSH	National Institute for Occupational Safety and Health
NO ₂	Nitrite
NO ₃	Nitrate
NRC	National Research Council
ND	Not Detected
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary Assessment
PAD	Planned Area Development (Mesa)
PAL	Precision Analytical Laboratory
PAMA	Phoenix Active Management Area
PCE	Tetrachloroethene (<i>aka</i> tetrachloroethylene)
PF	Public Facility (Mesa)
ppb	parts-per-billion
ppbv	parts-per-billion of vapor volume
ppm	parts-per-million
ppmv	parts-per-million of vapor volume
PQL	Practical Quantitation Limit
PRAP	Proposed Remedial Action Plan
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
QA/QC	Quality Assurance/Quality Control
R1-6	Single Residence Zoning (Mesa)
R1-7	Residential Zoning, 7,000 sq. ft. per dwelling unit (Gilbert)
R1-10	Residential Zoning, 10,000 sq. ft. per dwelling unit (Gilbert)
R1-43	Residential Zoning, rural residence, one-acre per dwelling unit (Gilbert)
R-2	Restricted Multiple Residential Zoning (Mesa)
R-2	Two-family Duplex Residential Zoning (Gilbert)
R-3	Limited Multiple Residential Zoning (Mesa)
R-4	General Multiple Residential Zoning (Mesa)
RAGS	Risk Assessment Guidance for Superfund
RAP	Remedial Action Plan
RBC	Risk-Based Concentration
RBCA	Risk-Based Corrective Action
RBSL	Risk-Based Screening Level
RI	Remedial Investigation
RILCR	Residential Incidental Lifetime Cancer Risk
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RPRG	Residential Preliminary Remediation Goal

RSRL	Residential Soil Remediation Level (Arizona)
scfm	Standard cubic feet per minute
SI	Site Investigation
SMCL	Secondary MCL
SMWRS	South Mesa WQARF Registry Site
SOC	Soluble or Dissolved Organic Carbon
SRL	Soil Remediation Level (Arizona)
SRP	Salt River Project
SVE	Soil Vapor Extraction
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene (<i>aka</i> trichloroethylene)
TDS	Total Dissolved Solids
TGI	Transwest Geochem, Inc.
THMs	Trihalomethanes
TOC	Total Organic Carbon
UAU	Upper Alluvial Unit
UCL	Upper Confidence Limit
UDS	Underground detection Service
UF	Uncertainty Factor
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter
URL	Universal Resource Location (Internet)
USEPA	United States Environmental Protection Agency, see also EPA
USGS	United States Geological Survey
VC	Vinyl Chloride
VES	Vapor Extraction System
VEW	Vapor Extraction Well
VOC	Volatile Organic Chemical
VW	Vapor Well
WBS	Work Breakdown Structure
WQARF	Water Quality Assurance Revolving Fund
WRA	Water Resource Associates
WTI	Western Technologies, Inc.

1.0 INTRODUCTION

In accordance with the Arizona Department of Environmental Quality (ADEQ) Water Quality Assurance Revolving Fund (WQARF) Remedy Selection Rules (adopted August 31, 2002), AMEC Environment & Infrastructure, Inc. (AMEC), formerly known as MACTEC Engineering and Consulting Inc. (MACTEC) and as Law Engineering and Environmental Services, Inc. (LAW), has completed this Remedial Investigation (RI) Report for the South Mesa WQARF Registry Site (SMWRS). AMEC has performed RI activities at the South Mesa WQARF Registry Site for ADEQ since 2000. Prior to 2000, ADEQ had performed RI and early response action (ERA) activities including monitoring well installation, groundwater monitoring, and operation of a soil vapor extraction (SVE) system. This RI report summarizes the results of previous investigations performed at the SMWRS by ADEQ, as well as the more current results and conclusions from additional investigative data obtained and/or collected by AMEC.

This RI Report has been prepared in accordance with the following guidance document:

- Arizona Administrative Code (A.A.C) R18-16-406 (August 31, 2001)

During completion of the RI, several reports were generated, including groundwater monitoring reports and source characterization reports. Copies of these documents are available at the ADEQ Records Center and the Mesa Public Library "Main Library" (repository).

1.1 Project Authorization

AMEC has been retained by ADEQ to perform the following activities for the SMWRS: a RI; an ERA; and, preparation of this RI Report, including a Remedial Objectives (RO) report. This RI report has been prepared in accordance with the scope of work and terms and conditions of the following: Arizona Superfund Response Action Contract (ASRAC) No. EV09-0100 between ADEQ and AMEC; and, ADEQ Task Assignment No. EV11-0084.

1.2 Water Quality Assurance Revolving Fund (WQARF) Process

The RI identifies and characterizes the soil and groundwater of a WQARF Site. The RI provides a detailed assessment of site conditions, including an evaluation of the extent and type of soil and groundwater contamination and an assessment of potential source areas. Information about land and water uses is collected to support the selection of ROs. The objective of the RI is to provide sufficient information to identify and characterize the site so an appropriate remedial action (cleanup method) can be developed in the Feasibility Study (FS) phase.

The Land and Water Use Study (Appendix A) presents a summary of current and future uses of land and water within and in the vicinity of the SMWRS, using information gathered from discussions with stakeholders including; property owners, water providers, municipalities, and well owners.

The RO Report has been prepared by ADEQ. The RO Report identifies remediation (cleanup) goals which will:

- protect against the loss or impairment of existing land or water uses,
- restore, replace or otherwise provide for each listed use;
- establish time frames when action is needed to protect or provide for the use; and
- identify the projected duration of the needed remedial actions.

The RO Report includes an evaluation and interpretation of information obtained from the Land and Water Use Study and reflects public input obtained during the comment period and public meeting. The Final RO report is included in Appendix B (Volume II).

A FS will be conducted after the Final RI Report is issued. The FS will identify proposed remedies that are capable of achieving the remedial objectives and will select a preferred remediation methodology. The preferred remedy will:

- Assure the protection of public health, welfare, and the environment;
- To the extent practicable, provide for the control, management, or cleanup of hazardous substances so as to allow for the maximum beneficial use of waters of the state;
- Be reasonable, necessary, cost-effective, and technically feasible; and
- Identify any well that either supplies water for municipal, domestic, industrial, irrigation, or agricultural uses or is part of a public water system, if the well would now or in the reasonably foreseeable future produce water that would not be fit for its current or reasonably foreseeable end use without treatment.

The FS will include the evaluation of a Reference Remedy, and at least two Alternative Remedies. The FS will identify remedial strategies and develop the remedial measures to be employed by each strategy. A remedial strategy may be plume remediation, physical containment, controlled migration, source control, monitoring, natural attenuation or no action. A comparative evaluation of the remedies including practicality, risk, costs, and benefit, as well as consistency with water provider plans, will be included in the FS.

Following completion of the FS Report, a Proposed Remedial Action Plan (PRAP) will be prepared incorporating the preferred remedy. The PRAP will describe how the proposed remedy will meet each of the remedial objectives identified in the Final RI Report and how accomplishment of the ROs are to be measured. The PRAP will also include an estimated cost of the proposed remedy.

After conclusion of all required public comment periods, ADEQ will issue a Record of Decision (ROD). The ROD will include a description of the remedy, a summary of comments received on the PRAP and a demonstration that the remedy meets the remedial objectives and will remain in place as long as necessary to ensure continued achievement of those objectives. The ROD will also include time frames for implementing and completing the remedy and the total estimated cost of the remedy.

1.3 SMWRS Site Description and History

The SMWRS is located within the boundaries of the former WQARF South Mesa Phase I Study Area and the former WQARF Phase II-A Hydrogeologic Study Area (see Figure 1). The original WQARF investigation was prompted by the 1983 discovery of volatile organic compound (VOC) contamination in two irrigation wells owned and operated by SRP (Wells 28E-0N and 28.5E-1N).

In 1987, ADEQ began to investigate the nature and extent of the contamination identified in the SRP wells. The VOCs historically detected in groundwater samples collected within the boundaries of the SMWRS were tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (c-1,2-DCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), 1,2-DCA, 1,2-dichloropropane (1,2-DCP) and toluene. However, PCE has been detected in the highest concentrations and is the most widespread VOC.

The boundaries of the SMWRS have been defined by data collected from the following wells:

- 10 conventional groundwater monitoring wells identified as MW-1S, MW-1D, MW-2D, MW-3S, MW-4S, MW-5S, MW-5D, MW-6D, MW-7D, and MW-AM-8S;
- 18 BARCAD multi-completion groundwater monitoring wells identified as MW-9-130, MW-9-170, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170, MW-11-200, MW-11-240, MW-12-159, MW-12-183, MW-12-217, MW-12-238, MW-14-130, MW-14-163, MW-14-186, and MW-14-215,
- A former private production well, known as the Lewis Well, that has been converted to a monitoring well, identified as MW-LW; and
- Two currently inactive Salt River Project (SRP) production wells, identified as SRP Wells 28E-0N and 28.5E-1N.

The boundaries of the SMWRS and the locations of the wells are shown on Figure 1. The SMWRS is generally bounded on the south and west by railroad tracks, on the east by Cooper/Stapley Road, and on the north by Broadway Road. Table 1 provides well construction information for the SMWRS monitoring well network.

Based on the Phase I and II Investigations and the Preliminary Assessment/Site Investigation (PA/SI) work conducted by ADEQ, a potential source of the VOC impact was identified as a drywell located at the former AMI (AMI) facility at 1545 North McQueen Road, Gilbert, located south of the intersection of McQueen Road and Baseline Road (Figure 1).

1.4 Former AMI Site Description and History

The former AMI facility was located at 1545 North McQueen Road in Gilbert, Arizona. A Site Plan for the former AMI facility is shown on Figure 2. As shown on Figure 2, the property is occupied by an approximate 2,000 square foot building that has a concrete floor slab. The remainder of the property is paved with asphalt and concrete.

AMI leased the property from 1979 to 1990 and operated a facility that produced metal plated electronic parts. Parts were plated with tin, copper, chromium, nickel and zinc. The plating process used acids (chromic, nitric, sulfuric and hydrochloric) and cyanide (copper plating

process). Acids (nitric, sulfuric, hydrochloric, acetic and phosphoric) and chlorinated solvents were also used to clean/degrease parts prior to plating. AMI used a chemical called *Perclene*, which contained 99 percent PCE (Water Resources Associates [WRA], 1991).

Wastewater from the facility was discharged to an on-site drywell (Earth Technologies, Incorporated [Earth Tech], 1995). Based on the Phase I and II Investigations and the PA/SI work conducted by ADEQ, the drywell was identified as the primary source of the VOC impact. Other suspected sources for the PCE and metals impact included: tanks, process equipment and drums which were stored inside and outside the building.

1.5 SMWRS History

Based on available and reviewed information, a chronology of events for the SMWRS is provided below:

YEAR	EVENT
1919	SRP Well 28E-0N drilled.
1940	SRP Well 28E-0N deepened to current depth. Water in 1945 reported at 56 feet below ground surface (bgs).
1951	SRP Well 28.5E-1N drilled. Water is reported at 140 feet bgs.
1979-1990	AMI operated a metal plating facility at 1545 North McQueen Road. An injection well was used to dispose of wastes.
1983	ADWR reported first groundwater in South Mesa area was greater than 200 feet deep.
1983	SRP conducted region-wide sampling of their production well system. PCE was detected in SRP Wells 28E-0N and 28.5E-1N. Water was reported at 274.2 feet bgs in SRP Well 28E-0N. SRP subsequently took Well 28E-0N off-line.
1987-1988	Kleinfelder performed Phase I Investigation of South Mesa WQARF Area. The AMI facility, located near the intersection of Baseline Road and McQueen Road, was identified as a possible source.
1989	Western Technologies, Inc. (WTI) performed an initial assessment of AMI.
1990-1991	Kleinfelder performed Phase II Hydrogeological Investigation, installed 9 monitoring wells and drilled 2 exploratory borings (MW-7X and MW-2S). Depth to water ranged from 138 feet bgs to 164 feet bgs.

YEAR	EVENT
1991	Water Resources Associates (WRA) identified a dry well at AMI and installed a single monitoring well (MW-AM-8S). Soil samples were collected to 60 feet bgs and concentrations of PCE below the Groundwater Protection Level (GPL) are reported. Metals were not analyzed in the soil samples.
1991	SRP conducted a risk assessment and determined a risk-based PCE discharge level of 33 micrograms per liter (ug/L) for SRP Well 28E-0N. PCE in water pumped from SRP Well 28E-0N exceeded 700 ug/L and PCE in water pumped from SRP Well 28.5E-1N ranged from 30-33 ug/L.
1993	A wellhead treatment system was installed on SRP Well 28E-0N and the well was placed back on-line.
1994	SRP Well 28.5E-1N was taken off-line.
1995	Earth Tech performed a soil vapor investigation at AMI. Fifteen samples were collected. Highest PCE concentration reported was 110 ug/L near the northeast corner of the site structure and approximately 100 feet from the former injection well. A septic tank was present on the west side of the site. The nearest soil vapor sample was located more than 40 feet away from the septic tank.
1995	Earth Tech installed 3 vapor extraction wells (VW-1, VW-3, and VW-4) and a vapor extraction system (VES) at the site. Soil samples were collected during drilling of VW-1 and VW-3 and PCE concentrations were below the GPL. Metals were not analyzed in the samples.
1995-1996	On June 30, 1995, Earth Tech began operation of the VES. The VES was operated until June 10, 1996, over which time approximately 1,053 pounds of VOCs were reportedly removed from the vadose zone.
1996	EMCON installed two additional vapor wells at AMI: VW-5 (located near the soil vapor sample location reported with 110 ug/L PCE) and VW-6 (located near the former dry well). Detectable concentrations of PCE were not reported in the soil samples. The samples were not analyzed for metals.
1996	Concentrations of PCE in water pumped from SRP Well 28E-0N were consistently less than 33 ug/L. SRP subsequently removed the wellhead treatment system and continued pumping untreated water into the canal system.
1997	VW-6 was incorporated into the VES. The VES operated from February 13, 1997 through June 12, 1997, over which time an additional 54 lbs of VOCs were extracted. The VES was then shut-down due to low extraction rates. A total of 1,107 lbs or approximately 85 gallons of VOCs were removed from the vadose zone between 1995 and 1997.

YEAR	EVENT
1997	SRP determined that water from SRP Wells 28E-0N was no longer needed. The well was taken off-line and operated only for periodic maintenance and sampling between 1997 and present. The bottom 150 feet of SRP Well 28.5-1N was abandoned to protect downgradient supply wells.
1991-1998	ADEQ conducted periodic sampling of the South Mesa wells.
March 2000	AMEC was selected as ADEQ Contractor to complete the RI of the South Mesa WQARF Site.
March 2000 – February 2001	Compiled data for the SMWRS, prepared a Conceptual Site Model and identified data gaps. Obtained records that a septic tank and a 60-foot deep seepage pit were located on the west side of the AMI site. The seepage pit was not investigated during previous investigations.
May 2001 – July 2001	A geophysical survey and passive soil gas survey were performed at the AMI facility
August 2001 – September 2001	Characterized the nature and vertical extent of vadose zone and groundwater impact at the AMI facility. Ten additional groundwater monitoring points were installed.
June 2002	Installed four additional groundwater monitoring points in a nested monitoring well in the vicinity of 9 th Avenue and Horne Drive in Mesa, Arizona to define the downgradient extent of PCE impact at the SMWRS.
June 2002	Indoor air quality samples were collected at the 1545 North McQueen Road building to assess migration of VOC vapors from the vadose zone into the building.
July 2002	Three additional passive soil vapor samples were collected at the AMI facility to define the areal extent of soil vapor impact to the west.
July 2002	Depth-specific groundwater samples were collected from SRP Well 28E-0N to obtain a vertical contaminant profile.
July 2002	Groundwater monitoring of the SMWRS wells.
December 2002	Collected a second round of indoor air quality samples at the 1545 North McQueen Road building.
January 2004	ADEQ requested a proposal from AMEC to implement soil vapor extraction as an ERA to mitigate the vapor intrusion into the 1545 N. McQueen Road Building. The scope of work includes a bi-annual groundwater monitoring program.
June 2004	Baseline groundwater sampling event for the ERA. Nested vapor well VW-7A, VW-7B, and VW-7C was installed at the AMI facility.
July 2004	The SVE system was connected to vapor wells VW-5 and VW-7.
September 2004	Started the SVE system on VW-5A/B and VW-7A
December 2004	Second ERA groundwater sampling event.
January 2005	SVE is moved to Zone B with vapors extracted from vapor wells VW-5A/B and VW-7B

YEAR	EVENT
June 2005	Third ERA groundwater sampling event.
December 2005	Fourth ERA groundwater sampling event.
June 2006	Fifth ERA groundwater sampling event
December 2006	Sixth ERA groundwater sampling event
April 2007	SVE was moved to VW-7A
May 2007	Seventh ERA groundwater sampling event
August 2007	SVE was moved to VW-5C and VW-7C
December 2007	Eighth ERA groundwater sampling event
May 2008	SVE system was decommissioned and removed from Site.
May 2008	Ninth ERA groundwater sampling event
September 2008	Tenth ERA groundwater sampling event
October 2008	Installed four additional groundwater monitoring points in a nested monitoring well (MW-14) east of the intersection of McQueen Road and Melody Drive in Gilbert, Arizona to evaluate groundwater conditions to the south of the former AMI facility.
November 2008	Collection and analysis of groundwater samples from BARCAD wells MW14-130, MW-14-163, MW-14-186, and MW-14-215.

2.0 PREVIOUS INVESTIGATION AND REMEDIATION RESULTS, 1983-1998

From 1983 to 1998 early investigations were performed by SRP and ADEQ (Section 1.2). Additionally, WTI and WRA conducted investigations at the AMI facility on behalf of AMI. From March 2000 through February 2001, AMEC compiled and reviewed the previous data to identify data gaps and construct a Conceptual Site Model (LAW, 2001c).

It should be noted that soil and groundwater data collected at the SMWRS were collected prior to two ERAs. The ERAs, which included a groundwater pump-and-treat system (Section 2.8) and a SVE system (Sections 2.9 and 2.10), decreased levels of contaminants present. The data is presented in Section 3.0.

The following subsections summarize the results of investigations and remedial actions that were performed at the SMWRS between 1983 and 1998.

2.1 SRP Well Sampling Program

In 1983, SRP collected water samples from SRP wells located in the South Mesa Study area. Samples collected from two of the wells, SRP 28E-0N and SRP 28.5-1N (Figure 1), contained 1.8 µg/L and 0.8 µg/L of PCE, respectively. SRP Well 28E-0N is located approximately 500 feet

north of the former AMI facility. SRP Well 28.5E-1N is located approximately 1.25 miles north-northeast of the former AMI facility.

Available documentation indicated that SRP took SRP Well 28E-0N off-line at the time the PCE was detected. SRP Well 28E-0N was placed back on-line in July 1994 when a wellhead treatment system was installed and operated until 1997. With the exception of periodic operation to perform maintenance and collect water samples, SRP Well 28E-0N has been off-line since May 1997.

SRP Well 28.5E-1N continued to be pumped through 1988, at which time that well was also taken off-line. SRP Well 28.5E-1N was placed back on-line in December 1993 and was taken off-line in November 1994. With the exception of approximately 30.5 acre-feet of water pumped in July 2002, SRP Well 28.5E-1N has been off-line since November 1994.

The most recent sample analytical results reported to AMEC from SRP Wells 28E-0N and 28.5E-1N were collected by SRP in October 2005. Analytical data for the SRP wells (1993-2005) are summarized in Table 2 (SRP, 1996, 2002a, and 2002b). As shown in Table 2, PCE, TCE, 1,2-DCA, and 1,1-DCE were detected in samples above their respective AWQSSs of 5.0 µg/L, 5.0 µg/L, 5.0 µg/L, and 7.0 µg/L. These compounds were initially listed as compounds of potential concern (COPCs) for the SMWRS. The maximum PCE concentration reported in a sample from SRP Well 28E-0N was 745.8 µg/L on September 23, 1985. PCE was detected at a concentration of 1.2 µg/L in the sample collected from SRP Well 28E-0N on October 26, 2005. The maximum PCE concentration reported in a sample from SRP Well 28.5E-1N was 33.1 µg/L on September 16, 1987 (SRP, 1996). PCE was detected at a concentration of 9.8 µg/L in the sample collected from SRP Well 28.5E-1N on October 26, 2005.

2.2 Kleinfelder 1988 Phase I Investigation

In 1987 and 1988, Kleinfelder, under contract to ADEQ, performed a Phase I Investigation of the South Mesa Area. The Phase I Investigation included the following: a reconnaissance of the area to identify potential source facilities; review of available property occupation and ownership records; an aerial photograph review; identification of wells in the area; a review of available groundwater quality and hydrogeologic data; submittal of questionnaires regarding chemical usage and hazardous waste management practices to potential source facilities; review of septic tank records; and review of available drywell records (Kleinfelder, 1988). The findings of the Phase I investigation were presented in the June 1988 Final Summary Report, Task Assignment K-4, South Mesa area, Maricopa County, Arizona and are summarized below.

Kleinfelder Records Review

AGENCY	DEPARTMENT/TYPE OF RECORDS
ADEQ	Groundwater quality analysis; available waste permit data; UST listings; drywell listings; previous geologic and hydrogeologic reports; compliance files; permits; list of permitted hazardous waste transporters; and CERCLA, Superfund Amendments and Reauthorization Act (SARA), and RCRA files
	Fire incident reports regarding information about chemical users, disposers, and accidental spills

AGENCY	DEPARTMENT/TYPE OF RECORDS
ADHS	Disease prevention studies
ADOT	List of permitted transporters of hazardous waster.
ADWR	Well registration, groundwater survey inventory, and well logs
Arizona State Structural Pest Control	List of certified pesticide applicators in the Phoenix area
City of Mesa and Town of Gilbert	Industrial waste discharge files and permits on facilities disposing waste into the sewer system
	Fire Department and Fire Prevention Unit provided fire incident reports and information on chemical usage and facility practices
	Water well locations, construction details, use and zoning code descriptions
EPA	Preliminary Assessment, RCRA, CERCLA, and SARA files
Maricopa County	Maricopa County Assessor's Office regarding parcel information, subdivision maps, parcel owners, and legal addresses
	Maricopa County Bureau of Air Pollution Control regarding information on facilities using volatile organic compounds; files included information on the number of degreasing units in operation and the types of chemicals utilized for degreasing operations on-site
	Maricopa County Department of Civil Defense and Emergency Services community right-to-know filings for local industries to determine which facilities may have had activities that used the chemicals detected in groundwater within the study area
	Maricopa County Department of Public Health list of septic tank users and registered public water companies within the study area
	Maricopa County Planning Department regarding land-use and zoning information to identify the distribution of industrial and commercial property within the study area
Maricopa County Association of Governments	Regional information pertaining to groundwater use and 1985 census data for Maricopa County
Salt River Project	Well location, status, construction data, previous groundwater quality analysis, and operational history of wells within the study area
United States Geological Survey	Geological and hydrogeologic information
	Well construction, location, and water quality
United States Soil Conservation Service	Maps and publications to determine soil characteristics, such as soil texture and infiltration rates
University of Arizona and Arizona State University	General information regarding geology, hydrology, land use and climatology stations for the study area

Upon completion of the data collection, Kleinfelder completed a draft listing of facilities within the SMWRS that they believed should be reviewed further. This list included 295 facilities. After additional review during the second phase of investigation, the list was reduced to 120 facilities

to be investigated further. The suggested additional investigations included one or up to all of the following: send a questionnaire, conduct records search, conduct site inspection, and conduct physical testing.

Following records review and site reconnaissance, Kleinfelder prepared work plans to sample wells and conduct soil sampling. Seven wells were sampled by Kleinfelder and soil samples were collected at eight locations (Kleinfelder, 1989).

2.3 Initial Assessment at AMI (1989)

WTI conducted an investigation at AMI in 1989 to evaluate potential PCE source areas. Concentrations of PCE were detected along the discharge line leading to a drywell, in the degreaser cooling water, in the caustic soap tank, and in the rinse tank (WTI, 1989). The locations of the AMI process equipment are shown on Figure 2.

2.4 Kleinfelder 1990 Phase II Investigation

Kleinfelder performed a Phase II Hydrogeological Investigation beginning in 1990. Phase II consisted of Phase II-A and Phase II-B. The Phase II-A investigation included depth-specific sampling of SRP Well 28E-0N. Groundwater samples were collected at 132 feet bgs, 140 feet bgs, 195 feet bgs, 225 feet bgs, 280 feet bgs, 310 feet bgs, 345 feet bgs, and 360 feet bgs. Samples collected above a depth of 250 feet bgs were collected from the portion of the well screened in the Upper Alluvial Unit (UAU). The samples collected below a depth of 250 feet bgs were collected from the portion of the well screened in the Middle Alluvial Unit (MAU).

A summary of the analytical results for the January 1990 sampling of SRP Well 28E-0N is included in Table 2. The analytical results from groundwater samples were reported with concentrations of PCE, TCE, 1,2-DCA, 1,1-DCE, 1,1,1-TCA, 1,2-DCP, chloroform, and toluene above the laboratory detection limits. PCE, TCE, 1,2-DCA, and 1,1-DCE exceeded their respective AWQSSs of 5.0 µg/L, 5.0 µg/L, 5.0 µg/L, and 7.0 µg/L. PCE was detected at the highest concentrations, ranging from 110 µg/L at 132 feet bgs to 645 µg/L at 140 feet bgs (Kleinfelder, 1992).

The Phase II-B investigation included the installation of nine groundwater monitoring wells within the boundaries of the study area. The wells are identified as MW-1S, MW-1D, MW-2D, MW-3S, MW-4S, MW-5S, MW-5D, MW-6D, and MW-7D on Figure 1 and were installed between March and September of 1991. For these wells, "S" designates shallow and "D" designates deep. With the exception of MW-6D, the "D" means deeper in the UAU. MW-6D is the only SMWRS monitoring well that penetrates the MAU. Kleinfelder also converted the Lewis Well, a former private production well, to a monitoring well, which is identified as MW-LW. Well construction information for these wells is provided in Table 1 of this RI Report.

Kleinfelder also drilled two exploratory borings during the Phase II-B investigation: MW-2S to 275 feet and SB-7X to 700 feet. The two exploratory borings were drilled in the general vicinity of monitoring wells MW-2D and MW-7D.

Prior to commencing the Phase IIB Investigation, Kleinfelder and ADEQ performed an area reconnaissance to identify potential well locations. The final monitoring well sites were selected based on the following criteria (Kleinfelder, 1992):

- The estimated extent of VOC impact in the South Mesa Area.
- The well site locations with respect to potentially responsible parties (PRPs) and affected SRP wells.
- Successful property access negotiations with property owners.
- The ability of the site to accommodate mud-rotary drilling equipment.

Selection of screened intervals was based on geophysical logs. Specifically, the wells were screened in predominantly coarse-grained sediments. Kleinfelder installed dedicated Grundfos® 1.5 horsepower pumps in the nine monitoring wells. The March 1992 Kleinfelder report did not document the installation depths or elevations of the pumps. This information was obtained when AMEC removed the pumps during the July 2000 groundwater-sampling event and replaced the pumps with dedicated Bennett sampling pumps. The installation depths and elevations of the Kleinfelder pumps (LAW, 2001d) are provided below:

MW-1S:	160 feet bgs, 1,053 feet above mean sea level (AMSL)
MW-1D:	220 feet bgs (above screened interval), 993 feet AMSL
MW-2D:	200 feet bgs, 1,026 feet AMSL
MW-3S:	200 feet bgs, 1,022 feet AMSL
MW-4S:	160 feet bgs, 1,062 feet AMSL
MW-5S:	161 feet bgs, 1,055 feet AMSL
MW-5D:	201 feet bgs (above screened interval), 1,015 feet AMSL
MW-6D:	259 feet bgs (above screened interval), 952 feet AMSL
MW-7D:	185 feet bgs (above screened interval), 1,030 feet AMSL
MW-AM-8S:	160 feet bgs, 1,053 feet AMSL
MW-LW:	160 feet bgs, 1,052 feet AMSL

As shown above, the sampling points were installed at similar horizons in wells MW-1S, MW-4S, MW-5S, MW-AM-8S and MW-LW. Additionally, the sampling points were installed at similar horizons in wells MW-2D, MW-3S, MW-5D, and MW-7D. The sampling points in wells MW-1D and MW-6D were installed at deeper horizons than MW-2D, MW-3S, MW-5D and MW-7D.

2.5 Preliminary Assessment/Site Investigation Activities

Between 1987 and 1993, the Environmental Protection Agency (EPA) and ADEQ conducted PA/SIs at several potential source facilities in the area. These investigations involved the collection of soil and soil gas samples in areas of concern; primarily drywells, drum storage

areas, and stained areas. Groundwater wells were also installed/sampled in the SMWRS to better delineate the contaminant plume and investigate potential sources. Results of the investigations indicated that AMI was the primary potential source of concern. Based on the findings of the PA/SIs and the Phase I and II Kleinfelder studies, the former AMI facility was identified as a source of the VOCs detected in the groundwater.

2.6 Water Resource Associates (WRA) 1991 Investigation

In 1991, WRA exposed the drywell at the former AMI facility, which had previously been paved over with asphalt. The drywell was constructed of four-inch diameter polyvinyl chloride casing and extended to a depth of approximately 46.5 feet below ground surface (bgs). The borehole was approximately 2.5 feet in diameter and the annular space between the borehole and the casing was filled with coarse, cobble-sized material (WRA, 1991). A December 14, 1993, response to a WQARF questionnaire prepared by Joseph Ghisletta III, a former owner of the property, indicates that AMI drilled a dry well on the property in approximately April 1982 (HGL, 2013). However, during a March 31, 1999, interview, Richard Iserson, a former owner of AMI, indicated that the dry well was already in place when AMI began operations at the property in 1981.

In 1991, WRA advanced one soil boring 10 to 15 feet north of the former drywell to a depth of approximately 172 feet bgs. Soil samples were collected at approximately 10, 20, 25, 30, 35, 40, 50, and 60 feet bgs using split-spoon samplers containing brass sample tubes (see Figure 2). Due to the reported presence of coarse-grained material and cobbles, soil samples were not collected below approximately 60 feet bgs. The soil samples were analyzed for VOCs using EPA Method 8010. The soil boring was subsequently converted to groundwater monitoring well MW-AM-8S.

The analytical results are summarized in Table 3. As shown in Table 3, PCE was the only analyte present at concentrations above laboratory reporting limits. PCE concentrations reportedly ranged from 0.04 milligrams per kilogram (mg/kg) to 0.28 mg/kg in samples collected between 25 and 60 feet in depth. The reported maximum concentration was reported in the silty soil collected from approximately 50 feet bgs. The reported concentrations were below the minimum groundwater protection level (GPL) of 1.3 mg/kg for PCE (ADEQ, 1996). The soil samples were not analyzed for metals.

2.7 Groundwater Monitoring Activities 1991-1998

Between 1991 and 1998, ADEQ and SRP conducted periodic sampling of the South Mesa wells. Kleinfelder collected samples for ADEQ in 1991, Malcolm Pirnie, Inc. collected samples for ADEQ from 1992 to 1993, and ADEQ collected samples from 1994 to 1998 (ADEQ, 1997 and 1998a-c). The samples were analyzed for VOCs using EPA Method 601/602, with the exception of the January 1994 samples, which were analyzed using EPA Method 502.2. With the exception of general water chemistry parameters for the October 1991, February 1992, and May 1992 sampling events, which included iron and manganese, the samples were not analyzed for metals until the October 1998 sampling event.

The analytical results are summarized in Table 2. VOCs that were detected above the AWQSSs were PCE, TCE, and 1,1-DCE. PCE was reported at the highest concentrations and had the

most extensive distribution in groundwater. PCE was consistently detected above the AWQS of 5 µg/L in wells MW-5S, MW-5D, MW-7D, MW-AM-8S, SRP Well 28E-0N and SRP Well 28.5E-1N. Figure 3 provides PCE concentration versus time graphs for these wells. With the exception of MW-7D, PCE concentrations in these wells declined over time. From 1991 through 1998, PCE concentrations in the samples collected from MW-7D consistently ranged from 30 µg/L to 40 µg/L.

The groundwater investigation delineated an approximate 1.5-mile long by 0.4-mile wide PCE groundwater plume, which encompassed an area of approximately 0.6 square miles or 384 acres (Figure 1).

2.8 Early Response Action at SRP Well 28E-0N, 1991-1997

SRP Well 28E-0N was taken off-line in 1983. SRP wanted to bring the well back into service. In 1991, SRP prepared a Remedial Action Plan (RAP) for operation of a wellhead treatment system on Well 28E-0N. The RAP proposed the use of a packed column air stripper to treat PCE in the groundwater. The water pumped from SRP Well 28E-0N was used for irrigation purposes only. A Risk Assessment, performed by Brown and Caldwell for SRP, indicated a risk-based PCE cleanup level of 33 µg/L (Malcolm Pirnie, 1991). The wellhead treatment system was designed to treat an influent PCE concentration of 500 µg/L to an effluent PCE concentration of less than 33 µg/L.

The wellhead treatment system was installed in 1993 and SRP Well 28E-0N was placed back into service in July 1994. The plan was to pump 6,000 acre-feet (af) of water from the well (SRP 1996). By 1996, influent PCE concentrations to the wellhead treatment system were consistently below the risk-based cleanup level of 33 µg/L and SRP removed the wellhead treatment system and continued pumping SRP Well 28E-0N. In 1997, SRP determined that water from SRP Well 28E-0N was no longer needed. The well was taken off-line and as of November 2001 has only been operated periodically for sample collection or maintenance.

Between July 1994 and July 1997, approximately 7,035.55 af or 2.29 billion gallons of water were pumped from SRP Well 28E-0N. Assuming an average PCE concentration of 34 µg/L, approximately 650 pounds of PCE were removed from the groundwater (approximately 48 gallons of PCE) and treated.

2.9 1995 Soil Vapor Investigation (Earth Tech)

During May 1995, The Earth Technology Corporation (Earth Tech) completed a 15-point soil vapor survey at the former AML facility. The soil vapor samples were collected at selected areas around the property perimeter and at locations believed to be near potential source areas. Soil gas samples were collected from approximately two feet bgs and analyzed for 1,1-dichloroethene (1,1-DCE), TCE, and PCE. PCE was the only analyte reported at concentrations above the analytical laboratory's reporting limit. Figure 2 illustrates the soil gas sample locations and results.

The highest reported PCE concentration was 110 µg/l from SG-6 (estimated to be approximately 25 feet east and 10 feet north of the northwestern corner of the building). Other results from the northern side of the building ranged from <0.10 µg/l at SG-7 to 0.39 µg/l at SG-

3. Sample results from the eastern side of the building ranged from 0.38 µg/l to 1.2 µg/l. Sample results from the southern side of the building ranged from 1.7 µg/l (at SG-15) to 11 µg/l (at SG-14). Sample results from the western side of the building were reported at 9.5 µg/l at SG-10 (Earth Tech, 1995).

Based on the WTI 1989 report, the vapor degreaser unit was located near soil vapor collection points SG-12 and SG-14, which reported PCE concentrations of 8.9 µg/l and 11 µg/l, respectively. No soil vapor samples were collected below the building. Soil gas samples were not collected from SG-9, located adjacent to the former drum storage area and in the vicinity of a possible leach field in the southwest corner of the site. The closest soil gas sample to the presumed leach field was SG-6, which reportedly had the highest PCE soil gas concentrations (110 µg/l).

2.10 1995 Vapor Extraction Well Installation (Earth Tech)

In 1995, Earth Tech installed three vapor extraction wells at the former AMI facility as part of an interim soil remediation program. The locations of the vapor extraction wells are shown on Figure 2.

- VW-1 was installed to a depth of approximately 61 feet bgs, approximately 45 feet north and six feet east of the building's northeastern corner (approximately 21 feet north and five feet east of the former drywell).
- VW-3 was installed to a depth of approximately 65 feet bgs approximately 21 feet north and 18 feet west of the building's northeastern corner (approximately two feet south and 16 feet west of the former drywell).
- VW-4 was located approximately 26 feet north and nine feet west of the building's northeastern corner (approximately three feet north and nine feet west of the former drywell) and was installed to a depth of approximately 110 feet bgs.

The vapor extraction well borings were drilled using the dual-wall percussion method. Soil samples were collected from VW-1 at approximately 21, 31, 41, 51 and 61 feet bgs and from VW-3 at approximately 11, 21, 41, 51, and 61 feet bgs. The soil samples were collected using split-spoon samplers equipped with brass sample tubes.

The soil samples were analyzed for VOCs using EPA Method 8010. The samples were not analyzed for metals. Soil samples were not collected from soil boring VW-4. According to Earth Tech's *"Design Report and Interim Remediation System, Applied Metallics, Inc. 1545 North McQueen Road, Gilbert, Arizona, - South Mesa Water Quality Assurance Revolving Fund Area"* dated August 31, 1995, soil sample locations and depths were selected based on deepest collection and field screening results. The report also indicated that due to the presence of coarse-grained material, soil samples were not collected for analyses below a depth of approximately 61 feet bgs (Earth Tech, 1995).

A summary of the soil analytical results is presented in Table 3. The analytical laboratory results indicated PCE was the only analyte present at concentrations above laboratory reporting limits. (Earth Tech, 1995). As shown in Table 3, the soil sample collected from approximately 51 feet bgs from VW-1 contained 0.24 mg/kg of PCE, which is below the GPL of 1.3 mg/kg for PCE. The soil boring logs indicated a clayey soil was encountered at approximately 51 feet

bgs. PCE concentrations reported in VW-3 ranged from 0.11 to 0.2 mg/kg in samples collected between 41 feet bgs and 61 feet bgs. The maximum concentration was reported in the clayey soil sample collected from approximately 41 feet bgs. The reported concentrations are below the GPL of 1.3 mg/kg for PCE.

2.11 1996 Vapor Extraction Well Installation (EMCON)

From June 10 through June 12, 1996, EMCON, under contract to ADEQ, drilled and installed two vapor extraction wells, identified on Figure 2 as VW-5 and VW-6. Both well borings were drilled to approximately 106 feet bgs using an AP-1000 dual-wall percussion drill rig. VW-5 was drilled near soil gas sample SG-6 and is a nested well with one two-inch diameter well screened from 15 to 55 feet bgs and a second two-inch diameter well screened from 65 to 105 feet bgs. VW-6 was drilled between VW-4 and MW-AM-8S and is a single well screened from 65 to 105 feet bgs.

During drilling, soil samples were collected at 10-foot intervals starting at 10 feet bgs. Soil samples were collected using split-spoon samplers equipped with brass sample tubes. Soil samples were collected at 10, 20, 30, 40, 50, 60, 70, 80, 90, and 105 feet bgs from VW-5 and at 10, 20, 30, 40, 50, 60, 70, 80, 90, and 105 feet bgs from VW-6. The samples were submitted to an on-site mobile laboratory and analyzed for VOCs by EPA Method 8010/8020. The samples were not analyzed for metals. The only VOCs reported in the samples were bromomethane and chloromethane. PCE was not reported above detection limits in the samples (EMCON, 1996).

2.12 Soil Vapor Extraction System Operation

In 1995, Earth Tech installed a soil vapor extraction (SVE) system at the former AMI facility. System operation began on June 30, 1995. Initial PCE concentrations in the extracted vapors were reported as follows: 490 µg/l from VW-1; 1,000 µg/l from VW-3; and, 15,000 µg/l from VW-4. Figure 4 shows a cross-section of the former AMI facility. As indicated in Figure 4, VW-1 is screened from approximately 40 feet bgs to approximately 60 feet bgs, VW-3 is screened from approximately 10 feet bgs to approximately 60 feet bgs, and VW-4 is screened from approximately 65 feet bgs to approximately 110 feet bgs. The highest PCE concentrations were reported in the vapors extracted from VW-4, indicating that the greatest contaminant mass was likely located below 65 feet bgs. As discussed earlier, no soil samples were collected below 61 feet bgs.

Documentation and data available in ADEQ files regarding operation of the SVE system is incomplete. Based on operation and maintenance (O&M) reports prepared by Earth Tech, system O&M was performed by Earth Tech and Environmental Response, Inc. (ERI) from June 30, 1995 to at least June 12, 1997. The SVE system initially removed approximately 66 pounds of VOCs from the soil per day (lbs/day). However, by July 26, 1995, the VOC extraction rate had decreased to approximately 9.7 lbs/day. Between June 30 and July 26, 1995, Earth Tech estimated that approximately 608 lbs. of VOCs had been removed from the vadose zone soils. By March 11, 1996, approximately 996 lbs. of VOCs had been extracted. Operation of the SVE system continued from March 11, 1996 until June 10, 1996, over which time an additional 60 lbs. of VOCs were reportedly extracted.

The system was shutdown on June 10, 1996 to allow for installation and integration of vapor extraction wells VW-5 and VW-6. VW-5 is a nested system, consisting of a shallow well, screened from approximately 15 to 55 feet bgs, and a deep well screened from approximately 65 to 105 feet bgs. VW-6 is screened from approximately 65 to approximately 105 feet bgs (EMCON, 1996). The system apparently remained shutdown until February 13, 1997, when the system was restarted and vapors were extracted from all vapor extraction wells, including VW-5 and VW-6. Initially, the total VOC concentrations in the extracted vapors from VW-5 (deep) and VW-6 were 17 µg/l and 37 µg/l, respectively. The system was operated from February 13 through June 12, 1997, over which an additional 54 lbs. of VOCs were extracted (Earth Tech, 1995). The highest total VOC concentrations were still being reported in VW-4, at approximately 85 µg/l. Between June 30, 1995 and June 12, 1997, Earth Tech estimated that approximately 1,107 lbs of VOCs had been extracted from the subsurface. By June 12, 1997, Earth Tech estimated that approximately 0.51 lbs of VOCs were being removed per day.

After June 12, 1997, the ADEQ documentation did not indicate the operating status of the SVE system. A Memorandum from ADEQ to ERI dated September 17, 1997 indicated that the SVE system was shutdown on June 12, 1997. However, there was information in the ADEQ files that indicated the SVE system was operating during March 1998 and vapor samples were collected from VW-1 and VW-4 on April 22, 1998. There was no data in the ADEQ files indicating when SVE system was finally shutdown by Earth Tech and ERI.

2.13 Modification of SRP Well 28.5E-1N

On June 3, 2002, Mr. James Clarke of AMEC and Mr. Tom Didomizio of ADEQ met with Mr. Mark Hay of SRP to discuss possible diffusive bag sampling of SRP Wells 28E-0N and 28.5E-1N. At that time, Mr. Hay indicated that SRP had modified SRP Well 28.5E-1N in April 1997. The modifications, which involved abandonment of the bottom approximate 150 feet of the well, were performed to remove the well as a vertical contaminant migration pathway to the Middle Alluvial Unit (MAU) and to protect downgradient drinking water wells screened in the MAU (verbal conversation with Mark Hay, June 3, 2002). The revised well construction details are summarized in Table 1. A copy of the well modification report, which was received by AMEC and ADEQ on June 24, 2002, is attached as Appendix C. SRP Well 28.5E-1N was originally 700 feet deep and was screened from 190 feet bgs to approximately 688 feet bgs, with a casing reduction at approximately 495 feet bgs. Based on the information provided by SRP, the well is currently screened from approximately 190 feet bgs to approximately 549 feet bgs. The contact between the Upper Alluvial Unit (UAU) and the MAU in the area occurs at approximately 250 feet bgs. Therefore, the well is screened across the UAU/MAU contact.

2.14 Property Ownership Search

HydroGeoLogic, Inc. (HGL) conducted an historic review of property ownership and tenant occupation of the AMI facility (HGL, 2013). Ownership records date back to pre 1929. The current owner acquired the property in 1985. The table below shows the ownership history of the property:

OWNER	YEAR
E.A. and Alice L. Marshall	Pre - 1929
E.C. Clark	1929
Margaret Pankey	1965
E.C. and Mattie E. Clark	1965 - 1967
Helena Clark Bouton and Elaine Mary Smith	1967
Mattie E. Clark	1967
Hipolito C. and Natividad P. Valenzuela	1967 - 1969
Tommy L. and Mercy P. Gonzales	1969 - 1973
Leroy I. and Karen L. Shreve	1973
Gerald L. Taylor	1973
Roosevelt Mortgage & Trust Company and A.L. Middleton	1973
Warren H. and M. Joanne Herrell	1973 - 1975
Russell S. and Muriel Peterson	1975 - 1977
Theodore R. and Patricia J. Larsen	1977 - 1980
N.V. Investors, No. 1, a California General Partnership	1980 - 1985
Mark S. Gunning, Inc.	1985 - 2008
Mark S. Gunning	2008 - Present

AMI leased the property from 1981 until 1990 (HGL, 2013). AMI ceased operations on March 16, 1990 in part because they were denied permission to discharge wastewater to the Town of Gilbert sewer system. The Maricopa County Assessor's Office indicates that the current building located at the site was constructed in 1978. Aerial photographs reviewed for the RI indicate that the property was not developed prior to this time. A review of directories for the area indicates the first tenant at the facility was in 1978. Several different businesses have occupied the property since. Current tenants at the property include a glass services facility, an auto service facility and a cleaning facility. The table below shows the tenant history for the property:

TENNANT	YEARS OF OPERATION
Tela Corp.	1978–1980
Solid Comfort Air Co.	1979
American Soda Works	1981
Budget Auto Spa	1981
Applied Metallica Inc.	1982–1990*
Alden Material Specialists	1988
General Glass, Inc.	1994–2000
Gilbert Glass, Inc.	1994–2000
Steve's Transmission Service	1995
Coast Communications, Inc.	1996-1999
Hotel Movie Network	2000

*Although city directories do not list AMI at the property until 1982, a December 15, 1993, response to a WQARF questionnaire prepared by Joseph Ghisletta III, a former property owner, indicates that AMI began leasing the facility in April 1981 (HGL, 2013).

3.0 RI AND ERA RESULTS, 2000-2008

In July 2000, a groundwater monitoring program that included replacement of the previously-installed dedicated pumps with approved environmental groundwater sampling pumps. A Conceptual Site Model and data gap evaluation was completed in February 2001 (Section 7.0).

Based on the results of the Conceptual Site Model and data gap evaluation, it was concluded that the nature and extent of soil and groundwater impact at the former AMI facility had not been fully characterized and defined. Previous investigations and remedial actions at the former AMI facility were primarily focused on the former drywell. Other potential sources of contaminants, most notably an on-site septic tank, associated leach pit, and the former process equipment area were not investigated.

Additionally, groundwater was reportedly more than 200 feet deep at the site in the early 1980's, when the releases of contaminants were occurring. The vertical investigation at the former AMI facility was terminated at 165 feet bgs. It was concluded that potential deeper groundwater impacts were possible and the areal extent of impact could not be defined until the vertical extent of contamination had been characterized. Based on this, it was recommended:

- Additional source characterization, and
- Installation and sampling of additional downgradient groundwater monitoring points to define the areal extent of groundwater impact.

The following sections summarize the results of these investigations.

3.1 Former AMI Facility Investigation

The AMI facility characterization was primarily focused on source identification and the vadose zone soil impact. A brief discussion regarding the vertical extent of groundwater impact is provided in Section 3.1.4. The groundwater sample analytical results are further discussed in Section 3.2.

The hydrogeology is a limiting factor to the characterization of the AMI facility. Potential release points were identified at the surface. However, contaminants can migrate both laterally and vertically from the release point to some distance from the release point. When characterizing a VOC release, there is often a strong possibility that residual pockets of non-aqueous phase liquids (NAPL), either pooled or dispersed, may be present in the vadose (unsaturated) and saturated zones. The residual NAPL may not be present directly below the release point. If present, NAPL could present a continuing source of dissolved-phase and/or vapor-phase VOC impact.

Another issue is the presence of vapor-phase VOCs in the vadose zone. Vapor plumes can migrate both laterally and vertically, forming vapor mounds, which can also represent a continuing source of VOCs to both the groundwater and ambient air. The certainty associated with site characterization increases with the number of borings that are drilled and the number of representative samples that are collected and analyzed.

The sediments below the AMI facility (see Section 4.0) from near the surface to a depth of approximately 250 feet bgs are predominantly very dense and consist of large coarse-grained particle sizes ranging from gravel to boulders. Due to the presence of large boulders, larger drill rigs were required to drill borings, collect samples, and install monitoring wells.

A five-phase approach was utilized to identify potential release points and continuing sources of vapor-phase and dissolved-phase impact in the subsurface:

- Phase 1: A surface geophysical survey was used to identify the locations of potential release points, including an on-site septic system (Section 3.1.1).
- Phase 2: A passive soil vapor survey was used to obtain a surficial representation of subsurface VOC occurrence and migration patterns and to identify VOC “hot spots” (Section 3.1.2), possibly indicating continuing impact sources.
- Phase 3: Based on the results of the passive soil vapor survey, a vadose zone soil and soil vapor investigation of the identified “hot spots” was performed. Soil vapor and soil samples were collected in the vicinity of the former drywell to confirm previous remedial actions (Section 3.1.3).
- Phase 4: Based on the results of the passive soil vapor survey, a groundwater investigation of four accessible “hot spots”, including the area of the former drywell, was performed. The borings were completed as nested monitoring wells to monitor up to four hydrologic zones that were identified during a review of the electric geophysical well logs for the SMWRS wells. A discreet groundwater sampling program was included to identify the depth intervals for installation of the depth-specific monitoring points (Section 3.1.4).
- Phase 5: An indoor air quality sampling program of the former AMI facility (1545 North McQueen Road) was performed to assess possible VOC vapor migration into the building (Section 3.1.5).

The following subsections summarize the results of each phase of the investigation. The data was used to:

- Evaluate the geology and hydrogeology of the SMWRS (Section 4),
- Select compounds of potential concern (COPCs), and to
- Evaluate the nature and extent of the contamination (Section 5).

3.1.1 Geophysical Survey – Phase 1

The former AMI facility (1545 North McQueen Road property) was not connected to the Town of Gilbert or City of Mesa sewer system and utilized an on-site septic system for management of sewage. This septic system has reportedly been used on site since the time the property was developed, indicated to be 1979. AMEC reviewed Maricopa County Department of Health Services (MCDHS) Records associated with the septic system. The records showed the approximate locations of the septic tank and an associated leach pit. Based on the information obtained from MCDHS, the septic tank reportedly had a capacity of 1,250 gallons and was of concrete construction. The associated seepage pit was approximately 36 inches in diameter by 65 feet deep and was of rock-lined construction. The septic system was connected to the on-site toilets and sinks. The septic system may also have been used for disposal of on-site process wastes, particularly VOCs and metal-containing wastes. The septic system was not investigated during earlier investigations. However, as indicated in Section 2.9 and shown on Figure 2, the soil vapor sample containing the highest PCE concentration was collected near the sewer line leading to the septic tank.

Underground Detection Service, Inc. (UDS) performed the surface geophysical survey on May 14, 2001. UDS used a combination of electromagnetics (EM) and ground penetrating radar (GPR) to locate the septic tank, associated leach pit, and remnant process equipment piping.

AMEC received the UDS report on May 18, 2001, which is attached as Appendix D. The geophysical survey indicated that the septic tank was located approximately 10 feet northeast of the location indicated by the MCDHS Records. The leach pit was located immediately north of the septic tank. The revised locations of the septic tank and leach pit are shown on Figure 2 and in the UDS report (Appendix D).

The rationale and methodology used to perform the geophysical survey are described in detail in the *Final Applied Metallica Source Characterization Work Plan, South Mesa WQARF Registry Site, Mesa Arizona, ADEQ Task Assignment 00-0094*, prepared by AMEC (LAW), and dated April 3, 2001 (LAW, 2001f). The results are documented in the *Final Passive Soil Gas Survey Report, Phases 1 and 2 of the Applied Metallica Source Characterization*, prepared by AMEC (LAW) and dated July 16, 2001 (LAW, 2001i).

3.1.2 Passive Soil Vapor Survey – Phase 2

After the potential source areas were located using the geophysical investigation, a passive soil vapor survey was performed using the EMFLUX Passive Soil Gas Investigation System. Passive systems have proven to be more accurate in initially assessing sites than active soil gas system. Passive systems do not use pumps or other equipment that might distort the flow of gas through the subsurface. Soil gas also responds to changes in barometric pressure, tidal cycles, temperature, pressure gradients and chemical gradients. An active soil gas sample is often a one-time grab sample while a passive soil gas sample is collected over a period of time and represents a time-weighted average. A passive system records changes in soil gas concentrations in response to the above listed physical parameters, thus providing more accurate results.

Beacon Environmental Services, Inc. (Beacon) was the supplier of the EMFLUX sampling system. With a site plan of the former AMI facility, Beacon designed a sampling plan intended to obtain preliminary source characterization data. Beacon proposed 40 sample locations based on sample grids of 40-foot, 20-foot and 10-foot spacings, with the tighter grids in areas where there was a greater probability of chlorinated solvents having been released into the soils.

Passive soil gas samples are field-screening samples used primarily to:

- Identify potential source areas,
- Evaluate contaminant migration patterns, and
- Select locations for further subsurface and ambient air quality investigation.

The samples are not compliance samples and the results should be confirmed with compliance soil, soil gas, ambient air, and groundwater samples.

Three locations believed to have greater probabilities of chlorinated solvent releases were the former drywell, the former process equipment area, and the septic system. The sampling locations are in Appendix E, shown on Beacon Figure 1, and are included with the Beacon Analytical Report, dated June 12, 2001. Please note that all of Beacon's text and figures, which includes the passive soil gas sampling locations as well as the sample results, are located in Appendix E of the RI Report. The rationale and methodology used to perform the passive soil

vapor survey are described in detail in the *Final Applied Metallica Source Characterization Work Plan, South Mesa WQARF Registry Site, Mesa Arizona, ADEQ Task Assignment 00-0094*, prepared by AMEC (LAW) and dated April 3, 2001 (LAW, 2001f).

AMEC installed the EMFLUX passive soil gas samplers at the site on May 24, 2001 and May 25, 2001. The EMFLUX passive soil gas samplers were recovered on May 29, 2001 and May 30, 2001. The EMFLUX samplers were sent to Beacon on May 30, 2001 for VOC analysis using EPA Method 8021.

A total of 44 passive soil gas samples, including two field duplicate samples and two trip blank samples, were collected and analyzed. The soil gas samples were analyzed for 1,1-DCE, methylene chloride (MeCl), trans-1,2-DCE (t-1,2-DCE), 1,1-DCA, c-1,2-DCE, 1,1,1-trichloroethane (TCA), carbon tetrachloride, 1,2-DCA, TCE, and PCE using EPA Method 8021. 1, 1-DCE, c-1,2-DCE, TCA, TCE and PCE were reported above detection limits. The sample locations (Beacon Figure 1), analytical results, and PCE, TCE and c-1, 2-DCE isopleth maps (Beacon Figures 2 through 4, respectively) are included with the June 2001 Beacon analytical report (Appendix E). The following summarizes the analytical results:

- PCE was detected in all 40 samples and was reported in the highest concentrations. The PCE concentrations ranged from a low of 200 nanograms (ng) in Sample 1 (northeast corner of site) to 12,000 ng in Sample 33 (below building south of bathrooms) and have a mean of approximately 3,078 ng. As shown on Beacon Figure 2, the following three “hot spots” were identified:
 - the southwest corner of the site;
 - near the southeast corner of the septic tank, and
 - near the former location of the steam degreaser.

The lowest PCE concentrations were reported in samples collected around the former drywell.

- TCE was also reported in all 40 samples and ranged from a low of 46 ng in Sample 5 (southeast corner of site) to 810 ng in Sample 39 (southwest corner of site). The TCE mean concentration was approximately 271 ng. As shown on Beacon Figure 3 (Appendix E), four TCE “hot spots” were identified:
 - in the vicinity of Sample 39,
 - next to the septic tank,
 - in the vicinity of the former sulfuric acid/tin tank and
 - near Sample 1.
- C-1,2-DCE was detected in 5 of the 40 samples. C-1,2-DCE concentrations ranged from less than 25 ng (<25 ng) to 300 ng in Sample 35 and had a mean of approximately 34 ng (assume 12.5 ng for non-detect). As shown on Beacon Figure 4, c-1,2-DCE “hot spots” are located:
 - near the septic tank and
 - near Sample 17.

- TCA was detected in 3 of the 40 samples. TCA concentrations ranged from <25 ng to 140 ng in Sample 20 (former location of the steam degreaser), with a mean concentration of approximately 18 ng (assume 12.5 ng for non-detect). The TCA concentrations were detected in the 3 samples collected near the former location of the vapor degreaser.
- 1,1-DCE was only detected in 1 of the 40 samples. Sample 33, located immediately south of the bathroom, contained 43 ng of 1,1-DCE.

The results of the passive soil vapor survey are documented in the *Final Passive Soil Gas Survey Report, Phases 1 and 2 of the Applied Metallica Source Characterization*, prepared by AMEC (LAW), and dated July 16, 2001 (LAW, 2001i).

As discussed in the June 2001 Beacon report (Appendix E), a large PCE “hot spot” is located in the southwest corner of the former AMI facility, encompassing Samples 33 and 39. The passive soil vapor survey conducted in May 2001 did not define the areal extent of this “hot spot” to the west. Therefore, on June 27, 2002, AMEC installed three additional EMFLUX passive soil gas samplers across McQueen Road (west) from the site. The additional samples were labeled 41 through 43. The locations are shown on Beacon Figure 1, included with the July 2002 Beacon Analytical Report (Appendix F). Two field duplicate samples and one trip blank sample were also collected.

On July 2, 2002, AMEC recovered the EMFLUX passive soil gas samplers and the EMFLUX samplers were sent to Beacon on July 3, 2002 for VOC analysis using EPA Method 8021. The Beacon analytical report and PCE isopleth map dated July 30, 2002 are included in Appendix F.

PCE was the only VOC detected in Samples 41 through 43. PCE concentrations ranged from a high of 130 ng in Sample 41 to a low of 26 ng in Sample 43. The PCE concentrations for Samples 41 through 43 were included with the May 2001 results and the revised PCE isopleth map was provided as Beacon Figure 2 in Appendix F. The results of the passive soil vapor survey were documented in the *Final Indoor Air Quality and Additional Passive Soil Gas Sampling Report, Applied Metallica Facility*, prepared by AMEC (MACTEC) and dated December 10, 2002 (MACTEC, 2002b).

3.1.3 Vadose Zone Soil Investigation – Phase 3

Based on the results of the May 2001 passive soil vapor survey, six soil borings were drilled at the former AMI facility during August and September 2001. The rationale and methodology used to perform the vadose zone soil investigation are described in detail in the following documents:

- *Final Applied Metallica Source Characterization Work Plan, South Mesa WQARF Registry Site, Mesa Arizona, ADEQ Task Assignment 00-0094*, prepared by AMEC (LAW) and dated April 3, 2001 (LAW, 2001f),
- *Applied Metallica Source Characterization Field Sampling Plan*, prepared by AMEC (LAW) and dated June 13, 2001 (LAW, 2001h); and,

- *Final Applied Metallica Source Characterization Quality Assurance Project Plan for the South Mesa WQARF Registry Site, Mesa, Arizona, ADEQ Task Assignment 00-0094, dated September 7, 2001 (LAW, 2001k).*

The results of the vadose zone soil investigation are documented in the *Final Soil, Soil Gas and Groundwater Sampling Report, Phase 3 of the Applied Metallica Source Characterization*, prepared by AMEC (LAW), and dated January 25, 2002 (LAW, 2002b).

From August 20 through August 31, 2001, three borings, identified as LB-1 (southwest corner of the site at passive soil vapor sample 39), LB-2 (septic tank), and LB-3 (former drywell), were drilled to 240 feet bgs and ultimately completed as multi-completion BARCAD wells. Due to the depth of each boring and the presence of the river run sediments, borings LB-1 through LB-3 were drilled using the dual-wall percussion method. Additionally, between September 11, 2001 and September 13, 2001, three borings, identified as LB-4, LB-6 and LB-7, were drilled and sampled to 60 feet bgs below the former process area. These borings were drilled inside the building using a low profile hollow stem auger drill rig, which limited drilling and sampling to the soils overlying the river run. The boring locations are shown on Figure 5.

The Maxisimulprobe sampling system provided by BESST, Inc. was utilized to collect discrete soil and soil vapor samples during drilling. The Maxisimulprobe is similar in design to a split-spoon soil sampler and is equipped with a separate vapor sampling chamber, which allows collection of a soil sample and soil vapor sample using the same tool. When a soil sample is collected during soil vapor sampling, the soil vapor sampling does not influence the VOC concentrations in the soil sample. When the desired sampling depth is attained, the Maxisimulprobe is driven at least 20 inches into the undisturbed sediments using a downhole hammer or similar driving device. The following subsections summarize the results of the vadose zone investigation.

3.1.3.1 Soil Sampling

The sediments from the surface to approximately 60 feet bgs consisted of interbedded clay, silt, and sand. Discrete soil samples were collected from the borings at approximately 10-foot intervals from 10 feet bgs to 60 feet bgs. Soil sampling was also attempted at approximately 10-foot intervals from 60 feet bgs to 110 feet bgs from borings LB-1 through LB-3. However, the coarse-grained nature of the sediments often prevented collection of representative soil samples. The following summarizes the soil sample analytical results.

3.1.3.1.1 Volatile Organic Compounds

Only the soil samples successfully collected from the upper finer-grained soils from 10 feet bgs to 60 feet bgs were analyzed for VOCs. The coarse-grained nature of the sediments often prevented collection of representative soil samples. Discrete soil vapor sampling was used to characterize the nature and extent of VOC impact in the soils below a depth of 60 feet bgs (Section 3.1.3.2).

The soil samples were submitted to Transwest Geochem, Inc. (TGI) mobile laboratory and field screened for the presence of PCE, TCE, c-1,2-DCE and t-1,2-DCE using EPA Method 8021. The TGI mobile laboratory was not Arizona Department of Health Services (ADHS) licensed to analyze soil samples for PCE, TCE, c-1,2-DCE and t-1,2-DCE using EPA Method 8021. The

method was designated as a field screening method. In order to confirm the field screening results, the samples containing the highest field screening concentrations of VOCs were submitted to Del Mar Analytical (DMA) for ADHS-licensed analysis using EPA Method 8260B. In the event the field screening samples did not contain laboratory detectable concentrations of VOCs, the two samples containing the highest soil vapor VOC concentrations were selected for confirmation analysis.

The TGI soil sample VOC analytical report is attached as Appendix G and the DMA soil sample analytical report is attached as Appendix H. The soil sample analytical results are summarized in Table 4. As shown in Table 4, VOCs, including PCE, were not detected above the laboratory reporting limits (LRLs) or practical quantitation limits (PQLs). The LRLs and PQLs were below the minimum soil cleanup levels, which are the Residential Soil Remediation Levels (RSRLs) and Groundwater Protection Levels (GPLs).

3.1.3.1.2 Metals

As previously indicated, AMI plated chromium, copper, nickel, and zinc on electronic components. Additionally, arsenic had been detected above the Aquifer Water Quality Standard (AWQS)

in groundwater samples collected from well MW-AM-8S. A total of 40 soil samples collected from borings LB-1 through LB-4, LB-6 and LB-7 were analyzed for the following metals:

- arsenic (EPA Method 6010B);
- total chromium (EPA Method 6010B);
- hexavalent chromium (EPA Method 7196A);
- copper (EPA Method 6010B);
- nickel (EPA Method 6010B); and
- zinc (EPA Method 6010B).

The analytical results are summarized in Table 5 and the DMA report, including quality assurance/quality control (QA/QC) and chain-of-custody documents, is attached as Appendix H.

As shown in Table 5, total chromium, copper, nickel and zinc were detected above LRLs in the samples. However, the reported concentrations did not exceed the RSRLs and GPLs for these metals. Arsenic and hexavalent chromium were not detected above LRLs in the samples.

3.1.3.1.3 Cyanide

AMI utilized cyanide in the metals plating process. A total of 40 soil samples were analyzed for total cyanide using EPA Method 9014. The analytical results are summarized in Table 5 and the DMA report, including QA/QC and chain-of-custody documents, is attached as Appendix H. Cyanide was not detected in the samples above the LRL and the LRL is below the RSRL of 1,300 mg/kg.

3.1.3.2 Soil Vapor Sampling

During drilling of borings LB-1, LB-2, LB-3, LB-4, LB-6, and LB-7, a total of 44 discreet soil vapor samples were collected, submitted to the TGI mobile laboratory, and analyzed for PCE,

TCE, c-1,2-DCE and t-1,2-DCE using EPA Method 8021. The soil vapor analytical results are summarized in Table 6 and on Figure 6. The TGI analytical report, including QA/QC and chain-of-custody documents, is attached as Appendix G. The following summarizes the analytical results:

- Discreet soil gas samples were collected from boring LB-1 at 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, and 110 feet bgs. PCE was the only compound reported above laboratory detection limits in the samples. Concentrations ranged from 0.72 milligrams per cubic meter (mg/m^3) in sample LB-1-SG-90 to 480 mg/m^3 in sample LB-1-SG-30. Sample LB-1-SG-110, which was the deepest soil gas sample collected, contained 3.5 mg/m^3 of PCE.
- Vapor extraction rates are calculated using concentrations reported as parts per million of vapor volume (ppmv) using the following equation:

$$M = ((V) \times (C) \times (MW))/CF) \times 1,440 \text{ min./day} \times 1.0\text{E}^{-6}$$

Where:

M = mass removal in pounds per day (lbs/day)
V = velocity in standard cubic feet per minute (scfm)
C = concentration in ppmv
MW = molecular weight (165.86 lbs/mole for PCE)
CF = conversion factor of 379 scf/lbs mole

PCE concentrations in ppmv ranged from 0.11 ppmv in sample LB-1-SG-90 to 70.7 ppmv in sample LB-1-SG-30. Assuming a vapor extraction flow rate of 200 scfm, estimated PCE mass removal rates will range from 0.014 pounds per day (lbs/day) at 90 feet bgs to 9 lbs/day at 30 feet bgs.

- Discreet soil gas samples were collected from boring LB-2 at 10, 20, 30, 40, 50, 60, 70, and 80 feet bgs. PCE concentrations in the samples ranged from less than (<) 0.5 mg/m^3 in samples LB-2-SG-60, LB-2-SG-70 and LB-2-SG-80 to 19 mg/m^3 in sample LB-2-SG-50.
- PCE was not detected in consecutive samples LB-2-SG-60 through LB-2-SG-80. Soil gas samples were not collected below 80 feet bgs.
- PCE concentrations ranged from <0.07 ppmv in samples LB-2-SG-60, LB-2-SG-70 and LB-2-SG-80 to 2.8 ppmv in sample LB-2-SG-30. Assuming a vapor extraction flow rate of 200 scfm, estimated PCE mass removal rates will range from <0.009 lbs/day at 80 feet bgs to 0.35 lbs/day at 50 feet bgs.
- c-1,2-DCE was reported at a concentration of 1.0 mg/m^3 in sample LB-2-SG-50, which converts to 0.25 ppmv and an extraction rate of 0.02 lbs/day.
- Discreet soil gas samples were collected from boring LB-3 at 10, 20, 30, 40, 50, 60, and 70 feet bgs. PCE was the only compound reported above laboratory detection limits in the samples and concentrations ranged from <0.5 mg/m^3 in samples LB-3-SG-10, LB-3-SG-20, LB-3-SG-40, and LB-3-SG-70 to 1.6 mg/m^3 in sample LB-2-SG-30.
- PCE concentrations in ppmv ranged from <0.07 ppmv in samples LB-3-SG-10, LB-3-SG-20, LB-3-SG-40, and LB-3-SG-70 to 0.24 ppmv in sample LB-3-SG-50. Assuming a

vapor extraction flow rate of 200 scfm, estimated PCE mass removal rates will range from <0.009 lbs/day at 10, 20, 40 and 70 feet bgs to 0.03 lbs/day at 50 feet bgs.

- Boring LB-4 was drilled to 60 feet bgs and discrete soil gas samples were collected at 10, 20, 30, 40, 50, and 60 feet bgs. PCE was the only compound reported above laboratory detection limits in the samples. Concentrations ranged from <1.0 mg/m³ in sample LB4-SG-20 to 8.3 mg/m³ in sample LB4-SG-40.
- PCE concentrations in ppmv ranged from <0.15 ppmv in samples LB4-SG-20 to 1.53 ppmv in sample LB4-SG-40. Assuming a vapor extraction flow rate of 200 scfm, estimated PCE mass removal rates will range from <0.02 lbs/day at 20 feet bgs to 0.19 lbs/day at 40 feet bgs.
- Boring LB-6 was drilled to 60 feet bgs and discrete soil gas samples were collected at 10, 20, 30, 40, 50, and 60 feet bgs. PCE was the only compound reported above laboratory detection limits in the samples and concentrations ranged from 1.5 mg/m³ in sample LB6-SG-10 to 82 mg/m³ in sample LB6-SG-60.
- PCE concentrations in ppmv ranged from 0.22 ppmv in samples LB6-SG-10 to 12.08 ppmv in sample LB6-SG-60. Assuming a vapor extraction flow rate of 200 scfm, estimated PCE mass removal rates will range from <0.03 lbs/day at 10 feet bgs to 1.03 lbs/day at 60 feet bgs.
- Boring LB-7 was drilled to 60 feet bgs and discrete soil gas samples were collected at 10, 20, 30, 40, 50, and 60 feet bgs. PCE was the only compound reported above laboratory detection limits in the samples and concentrations ranged from 2.0 mg/m³ in sample LB7-SG-20 to 21 mg/m³ in sample LB7-SG-60. PCE concentrations in ppmv ranged from 0.29 ppmv in sample LB7-SG-20 to 3.09 ppmv in sample LB7-SG-60. Assuming a vapor extraction flow rate of 200 scfm, estimated PCE mass removal rates will range from 0.04 lbs/day at 20 feet bgs to 0.39 lbs/day at 60 feet bgs.

3.1.4 Groundwater Investigation

The discussion of the groundwater investigation at the former AMI facility is limited to the more recent results of discrete groundwater samples that were collected during drilling of borings LB-1 through LB-3 and the installation of BARCAD multi-completion wells in these borings. Analytical results for groundwater samples collected from the BARCAD wells are discussed in Section 3.2.

During drilling of borings LB-1 through LB-3, discrete groundwater samples were collected using the Maxisimulprobe sampling system. Prior to drilling, AMEC reviewed an electric boring log for SMWRS monitoring well MW-6D, which is located approximately 100 yards south of the AMI facility. As shown in Table 1, MW-6D is approximately 295 feet deep. The UAU is approximately 250 feet thick at the AMI facility. The electric log characterizes the entire thickness of the UAU.

Based on review of the electric log, AMEC identified at least three sediment horizons within the saturated portion of the UAU that contained a higher percentage of fine-grained sediments. AMEC anticipated that VOC concentrations could vary in the groundwater in relation to changes in lithology.

The discreet groundwater samples were collected to identify the ideal depth intervals for installation of groundwater monitoring points in the borings. To minimize drill rig standby time, the samples were submitted to a TGI mobile laboratory and field screened for PCE, TCE, c-1,2-DCE and t-1,2-DCE using EPA Method 8021. The discreet groundwater sample analytical results are summarized in Table 7 and on Figure 7. The TGI analytical report, including QA/QC and chain-of-custody documents, is attached as Appendix G.

As shown in Table 7 and on Figure 7, PCE, TCE and c-1,2-DCE were detected in the samples. The PCE and TCE concentrations generally increased with depth between 130 and 170 feet bgs, with the highest PCE concentrations detected in samples collected between 150 and 170 feet bgs.

There were decreases in the PCE and TCE concentrations in the samples collected between 140 feet bgs and 150 feet bgs. Sample LB-1-W-140 reported with <1.0 µg/L of PCE. The decreased PCE and TCE concentrations in samples collected between 140 and 150 feet bgs corresponded to observed increases in the percentage of fine-grained sediments and a lower water yield in this interval.

Two hydrologic zones, referred to as Zones UAU1 and UAU2, were identified from approximately 120 to 140 feet bgs (UAU1) and from approximately 155 to 175 feet bgs (UAU2). The interval from approximately 140 to 155 feet bgs was identified as a clay layer. A second clay layer was identified from approximately 175 to 195 feet bgs. A third hydrologic zone, referred to as Zone UAU3, was identified from approximately 195 to 205 feet bgs. The sediments between approximately 205 and 220 feet bgs also contained higher percentages of fine-grained sediments, thus indicating a third clay layer at this depth interval. The sediments from approximately 220 feet bgs to approximately 240 feet bgs were predominantly coarse-grained and yielded more water than the overlying zones. A fourth hydrologic zone, referred to as Zone UAU4, was identified from approximately 220 feet bgs to the UAU/MAU contact, which occurs at approximately 250 feet bgs.

Table 7 also shows the hydrologic zone from which each sample was collected. PCE concentrations ranged from <1.0 µg/L to 88 µg/L, TCE concentrations ranged from <1.0 µg/L to 8.5 µg/L, and c-1,2-DCE concentrations ranged from <1.0 µg/L to 42 µg/L. The highest PCE, TCE, and c-1,2-DCE concentrations were present in the Zone UAU2 samples. PCE and TCE were detected above the AWQS of 5.0 µg/L in samples collected from Zones UAU1, UAU2 and UAU3.

Using the discreet groundwater sample analytical results, field observation of lithology changes, and the electric log for MW-6D, nested BARCAD monitoring wells were installed in borings LB-1 through LB-3 as follows:

Boring No.	Well Identification and Zone
LB-1	MW-9-130 (UAU1), MW-9-175 (UAU2), MW-9-205 (UAU3), MW-9-235 (UAU4)
LB-2	MW-10-130 (UAU1), MW-10-170 (UAU2), MW-10-235 (UAU4)
LB-3	MW-11-170 (UAU2), MW-11-200 (UAU3), MW-11-240 (UAU4)

Well construction details are provided in Table 1. Boring logs and well construction diagrams are provided in Appendix I. A detailed description of the BARCAD system is presented in the *Final Soil, Soil Gas and Groundwater Sampling Report, Phase 3 of the Applied Metallica Source Characterization*, prepared by AMEC (LAW), and dated January 25, 2002 (LAW, 2002b).

3.1.5 Indoor Air Quality Assessment

The results of the passive and active soil vapor sampling programs indicated that an area of elevated vapor-phase PCE concentrations was located below the former AMI facility (1545 North McQueen Road). In 2002, ADEQ contracted AMEC to collect indoor air quality samples to assess the migration of VOC vapors into the building. The samples were collected over an eight-hour period to represent the time period of a normal work day. The samples were analyzed for VOCs using Method TO-15. The sampling rationale, methodology and results are described in the *Final Indoor Air Quality and Additional Passive Soil Gas Sampling Report, Applied Metallica Facility*, prepared by AMEC (MACTEC) and dated December 10, 2002 (MACTEC, 2002b).

On June 27, 2002, AMEC collected the first round of indoor air quality (IAQ) samples. The locations of the indoor air quality samples are shown on Figure 8. The 1545 North McQueen Road building (the former AMI facility) currently consists of five suites, identified as Suites 1 through 5. Gilbert Glass, Inc. occupied Suites 1 through 3 until June 9, 2002. Suites 1 through 3 were vacant at the time of the first round of sampling. Suites 4 and 5 were rented and were periodically occupied (see Section 4.5 for additional property use and tenant information). The following describes the rationale for selection of each sample location:

Sample Number	Location
Sample 1:	Suite 1 near passive soil gas sample No. 33 (see Appendix E), which contained the maximum PCE concentration.
Sample 2:	Suite 1 first floor office.
Sample 3:	Suite 1 mezzanine level above restrooms. Evaluated vapor concentrations near the ceiling.
Sample 4:	Suite 4 near the former location of the vapor degreaser and passive soil gas sample 20 (see Appendix E).
Sample 5:	Suite 5.
Sample 6:	Suite 3 near passive soil gas sample 23 (see Appendix E).
Sample 7:	Outside near existing SVE system. Evaluated background conditions.

The samples were submitted to Precision Analytical Laboratories, Inc. (PAL). The PAL analytical report, including QA/QC and chain-of-custody documents, is attached as Appendix J. The following compounds were reported in the samples above detection limits; 2-butanone (methyl ethyl ketone [MEK]), 2-propanol, 4-ethyltoluene, acetone, benzene, 1,2,4-trimethylbenzene, cyclohexane, dichlorodifluoromethane (freon-12), ethylbenzene, heptane,

hexane, m- & p-xylene, methyl-tertiary-butyl-ether (MTBE), methylene chloride, o-xylene, tetrahydrofuran, toluene, trichlorofluoromethane (freon-11), PCE, and TCE. Most of these compounds were detected in Sample 7, which was collected outdoors. A majority of these compounds were considered background air contaminants. PCE and TCE were not detected in Sample 7. PCE and TCE have been detected in soil and soil vapor samples below the site, and are considered COPCs at the site. Table 8 summarizes the PCE and TCE analytical results for Samples 1 through 7.

As shown in Table 8, PCE was detected in five of the six samples, ranging from 2.0 parts per billion of vapor volume (ppbv) to 57 ppbv. TCE was detected in four of the six samples, ranging from 0.76 to 0.97 ppbv. The highest PCE and TCE concentrations were detected in Suite 1, which is located immediately above the area of the highest PCE concentrations reported in the passive and active soil gas samples. The maximum PCE concentration of 57 ppbv was detected in Sample 2, which was collected in the first floor office of Suite 1. (Note: Suites 1 through 3 had been vacant for at least three weeks and had not been ventilated or air conditioned during that time.)

In September 2002, a retail mirror and glass business opened a lease with the owner of the 1545 North McQueen Road (former AMI facility) property for Suite 1. On December 6, 2002, ADEQ requested collection of a second round of IAQ samples from the 1545 North McQueen Road building (former AMI facility). The objectives of the second round of IAQ sampling were to confirm the June 27, 2002 results and to evaluate if the PCE and TCE concentrations had changed with time and property usage. The additional IAQ samples were collected on December 17, 2002 and were collected as close as possible to the same locations as the June 27, 2002 samples. Sample locations 4 and 5 could not be accessed. Samples were not collected from these locations on December 17, 2002. The analytical results for the December 17, 2002 samples are summarized in Table 8 and the PAL analytical report is included in Appendix J.

As shown in Table 8, with the exception of the location 2 IAQ sample, the comparison between the December 17, 2002 and June 27, 2002 results indicated minimal changes in PCE and TCE concentrations. However, the PCE and TCE concentrations at sample location 2 increased approximately three and four times, respectively.

The analytical results were compared to the EPA Region 9 PRGs. The Region 9 Ambient Air PRGs are based on residential exposures. These residential PRGs may be converted to commercial ambient air PRGs by multiplying by the appropriate factor. The adjustment factor uses 25 years for the exposure duration, 250 days/year for the exposure frequency, and 8 hours/24 hours daily exposure times. The following summarizes the meaning or implications of these standards and guidelines:

- The EPA Region 9 residential ambient air PRGs are risk-based tools for evaluating and cleaning up contaminated sites. They are risk-based concentrations that are intended to assist risk assessors and others in initial screening-level evaluations of environmental measurements and are being used to streamline and standardize all stages for the risk decision-making process. The Region 9 PRG table combines current EPA toxicity values with "standard" exposure factors to estimate contaminant concentrations in environmental media (soil, air, and water) that the agency considers protective of

humans (including sensitive groups), over a lifetime. PRGs may be viewed as preliminary cleanup goals. However, exceeding a PRG suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate (EPA, 2004). The published PRGs are based on the most stringent one in a million (1E-06) residential scenarios, and a 30 year exposure. For the purposes of this investigation, the EPA Region 9 PRGs are referred to as the residential PRGs or RPRGs. The RPRGs for PCE and TCE are 0.41 µg/m³ and 1.2 µg/m³, respectively.

- Considering that the 1545 North McQueen Road building is used for commercial purposes and exposure is limited, a less stringent commercial scenario PRG is more appropriate. The commercial PRGs (CPRGs) which are also based on a 1E-06 risk, are calculated by first calculating the unit Incremental Lifetime Cancer Risk (ILCR) assuming industrial inhalation as follows:

$$\text{Unit ILCR} = \text{CSFi} \times [(C(\mu\text{g}/\text{m}^3) \times \text{IR} \times \text{EF} \times \text{ED}) / (\text{BWa} \times \text{ATc} \times 1000\mu\text{g}/\text{mg})]$$

Where:

CSFi = 0.01 l/mg/kg-day for PCE and 0.4 l/mg/kg/day for TCE

C = unit concentration of 1 µg/m³

IR = 20 m³/day

EF = 250 days/year

ED = 25 years

BWa = 70 kg

ATc = 25,550 days (365 x 70) (lifetime = 70 years)

Based on the above calculations, the unit risks for PCE and TCE are 6.989E-07 and 2.79E-05, respectively. The commercial PRGs, assuming a 1E-06 ILCR, are calculated as follows:

$$[(1\text{E}-06/1\mu\text{g}/\text{m}^3)/\text{unit risk}] = \text{CPRG (industrial inhalation, } \mu\text{g}/\text{m}^3)$$

Based on this calculation, the CPRGs for PCE and TCE, assuming a 1E-06 ILCR, are 143 µg/m³ and 3.58 µg/m³, respectively.

- The ILCRs provide the cancer risk based on exposure to the chemical. The ILCR for a contaminant is calculated as follows using the concentration of the contaminant and the CPRG:

$$\text{Conc. } (\mu\text{g}/\text{m}^3) / \text{PRG } (\mu\text{g}/\text{m}^3) / 1\text{E}-06$$

The standard for acceptable exposure per the National Contingency Plan (NCP) is 1E-04, or one in ten thousand ILCR (EPA, 1990). This is also defined as the *de maximus* risk. The *de minimus* risk is published as 1E-06 or one in one million.

According to the NCP, if the ILCR exceeds 1E-04, remedial actions are required. If the ILCR falls between 1E-04 and 1E-06, then remedial actions may be considered to minimize exposure. If the ILCR is less than 1E-06, then no further action is required.

As shown in Table 8, the commercial ILCRs (CILCRs) were calculated for PCE and TCE. The CILCRs are cumulative. Therefore, cumulative CILCRs were also provided in Table 8 and the cumulative CILCR was used in the decision-making process.

As shown on Table 8, the IAQ sample results indicated that the PCE ambient air concentrations in the Suite 1 office were reduced from the high of 180 ppbv on December 17, 2002 to 0.85 ppbv on November 21, 2007. The CILCR for this concentration is 4E-08, which is below the *de minimis* CILCR of 1E-06. The CILCRs are cumulative for VOCs.

For the December 17, 2002 sample, PCE was not the primary site-specific COC present. The TCE concentration in the December 17, 2002 sample increased the cumulative CILCR to 2E-05. TCE was not detected in the November 21, 2007 sample. The cumulative CILCR for PCE and TCE is 4E-08, which was below the *de minimis* CILCR of 1E-06.

3.1.6 Early Response Action Soil Vapor Extraction

In January 2004 ADEQ requested that soil vapor extraction (SVE) be implemented as an ERA to remove subsurface VOCs. On June 26-27, 2004, VW-7 was drilled and installed at the former AML facility. The approximate location is shown on Figure 2. VW-7 was drilled using a Speedstar 50K Air Rotary Casing Hammer (ARCH) drill rig owned by Water Development Corporation Exploration and Wells (WDC) of Phoenix, Arizona. VW-7 was drilled as a single boring with three nested VWs identified as VW-7A, VW-7B, and VW-7C. The nominal boring diameter was approximately 14 inches. During drilling, samples of the drill cuttings were logged by a AMEC field scientist. Three coarse-grained zones identified as Zones A (25 to 40 feet bgs), B (45 to 60 feet bgs), and C (65 to 98 feet bgs) were identified below the former AML facility. VW-7A is screened from 25 to 40 feet bgs, VW-7B is screened from 45 to 60 feet bgs, and VW-7C is screened from 68 to 98 feet bgs.

On April 9, 2004, AMEC submitted an application for a Non-Title V Air Quality Permit (AQP), to operate the SVE system to the Maricopa County Environmental Services Department, Air Quality Division. On August 10, 2004, an AQP was issued to ADEQ. Vapor wells VW-5 and VW-7 were connected by pipe to the existing SVE system on the east side of the building. SVE was performed to extract PCE vapors from soils below the building from vapor wells VW-5 and VW-7 from July 14, 2004 to July 23, 2004.

SVE was performed first on the Zone A VWs and then progressed downward to Zones B and C until the PCE vapor cleanup goal was achieved for each well and zone. SVE was started on VW-5A/B and VW-7A on September 13, 2004. AMEC has been performing monthly operation and maintenance sampling of the system since September 13, 2004. Monthly SVE operating parameters and vapor concentrations of PCE, TCE, c-1,2-DCE, 1,1-DCE, 1,1-DCA, and TCA are shown in Table 14. SVE vapor sample analytical reports are included in Appendix N (Volume VI). Installation of the SVE system is documented in the following:

- *Early Response Action Installation Report, South Mesa WQARF Registry Site, Mesa and Gilbert, Arizona, ADEQ Task Assignment 04-0101, dated January 19, 2005 (MACTEC 2005a)*

In January 2005, the SVE was moved from Zone A to Zone B. SVE was conducted on VW-5A/B and VW-7B until December 2005. SVE was then conducted on VW-7B until March 2007. PCE concentrations in the vapors extracted from VW-7B had become asymptotic, ranging from 120 ppbv to 340 ppbv between May 2005 and March 2007. It was concluded at that time that short-circuiting between Zones A and B in VW-7B was possibly causing the asymptotic conditions. In April 2007 SVE was re-started on VW-7A. In August 2007, the SVE was moved from Zones A and B to Zone C. The SVE system operated on Zone C until October 12, 2007.

Monthly status reports were submitted to ADEQ documenting monthly parameters and vapor sample analytical results. Between September 2004 and October 2007, more than 168 pounds of PCE were removed from subsurface soils by the SVE system.

Based on the results of the SVE system monitoring, the SVE system was decommissioned and removed from the site in May 2008. The vapor wells were closed and abandoned in accordance with the Arizona Department of Water Resources (ADWR) well abandonment guidelines, the property was re-paved and the east AMI facility wall was patched and re-painted.

3.2 SMWRS Groundwater Investigation

AMEC has been performing groundwater monitoring of the SMWRS wells since July 7, 2000. The following documents are references for the SMWRS groundwater investigation.

- *Groundwater Field Sampling Plan*, prepared by AMEC (LAW), and dated February 7, 2001 (LAW, 2001a);
- *Groundwater Quality Assurance Project Plan*, prepared by AMEC (LAW), and dated February 7, 2001 (LAW, 2001b).
- *Final July 2000 Quarterly Groundwater Sampling Report*, prepared by AMEC (LAW), and dated February 16, 2001 (LAW, 2001d).
- *Final Third Quarter 2000 Groundwater Sampling Report*, prepared by AMEC (LAW), and dated February 20, 2001 (LAW, 2001e).
- *Final Fourth Quarter 2000 Groundwater Sampling Report*, prepared by AMEC (LAW), and dated May 7, 2001 (LAW, 2001g).
- *Final First Quarter 2001 Groundwater Sampling Report*, prepared by AMEC (LAW), and dated June 15, 2001 (LAW 2001i).
- *Final Second and Third Quarter 2001 Groundwater Monitoring Report*, prepared by AMEC (LAW), and dated December 17, 2001 (LAW 2001j).
- *Remedial Investigation/Feasibility Study Work Plan*, prepared by AMEC (LAW), and dated January 2, 2002 (LAW, 2002a).
- *Final Fourth Quarter 2001 Groundwater Monitoring Report*, prepared by AMEC (LAW), and dated April 9, 2002 (LAW, 2002c).
- *Twenty-Ninth Monthly Status Report, July 27, 2002 through August 23, 2002, and Results of August 13, 2002 Sampling of MW-12*, prepared by AMEC (LAW), and dated September 5, 2002 (LAW, 2002d).
- *Final July 2002 Groundwater Monitoring Report*, prepared by AMEC (LAW), and dated November 1, 2002 (MACTEC, 2002a).
- *Final June 2004 Groundwater Monitoring Report*, prepared by AMEC (MACTEC), and dated January 19, 2005 (MACTEC, 2005b).

- *Final December 2004 Groundwater Monitoring Report*, prepared by AMEC (MACTEC), and dated June 3, 2005 (MACTEC, 2005c).
- *Final June 2005 Groundwater Monitoring Report*, prepared by AMEC (MACTEC), and dated November 30, 2005 (MACTEC, 2005d).
- *Final December 2005 Groundwater Monitoring Report*, prepared by AMEC (MACTEC), and dated May 8, 2006 (MACTEC, 2006a).
- *Final June 2006 Groundwater Monitoring Report*, prepared by AMEC (MACTEC), and dated December 22, 2006 (MACTEC, 2006b).
- *Final December 2006 Groundwater Monitoring Report*, prepared by AMEC (MACTEC), and dated May 10, 2007 (MACTEC, 2007).
- *Groundwater Monitoring Report, May 2007 Monitoring Event*, prepared by AMEC (MACTEC), dated March 3, 2008 (MACTEC, 2008).
- *Groundwater Monitoring Report, December 2007 Monitoring Event*, prepared by AMEC (MACTEC), dated June 26, 2008 (MACTEC, 2008a).
- *Groundwater Monitoring Report, May 2008 Monitoring Event*, prepared by AMEC (MACTEC), and dated October 15, 2008 (MACTEC, 2008b).

The SMWRS well network currently consists of 29 wells as follows:

- 10 conventional groundwater monitoring wells identified as MW-1S, MW-1D, MW-2D, MW-3S, MW-4S, MW-5S, MW-5D, MW-6D, MW-7D, and MW-AM-8S;
- 18 BARCAD multi-completion groundwater monitoring wells identified as MW-9-130, MW-9-170, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170, MW-11-200, MW-11-240, MW-12-159, MW-12-183, MW-12-217, MW-12-238; MW-14-130, MW-14-163, MW-14-186, and MW-14-215.
- A former private production well, known as the Lewis Well, that has been converted to a monitoring well, identified as MW-LW; and,
- A currently inactive SRP production well, identified as SRP Well 28E-0N.

The well locations are shown on Figure 1. Well construction details are provided in Table 1. Based on the depth of the sampling point, the zone that each well monitored is also provided in Table 1.

In July 2000, AMEC replaced the dedicated pumps in the SMWRS conventional monitoring wells with new Bennett Sampling Pumps. The previously installed dedicated pumps consisted of medium capacity, 15 to 30 gallon per minute (gpm), electric submersible pumps. The depths at which these pumps were installed are described in Section 2.4. These pumps were designed as groundwater extraction pumps and were not intended for use as environmental, particularly VOC, sampling pumps. The conventional pumps could not be used to perform micropurge or low-flow groundwater sampling methods.

As shown in Table 3-1 below, several of the monitoring wells were screened across one or more of the hydrologic zones in the UAU. The conventional pumps were not able to monitor individual hydrologic zones. The previous sampling systems likely did not monitor an individual hydrologic zone.

Table 3-1. Hydrologic Zones Screened by Wells	
MW-1S	UAU1 and UAU2
MW-1D	UAU4
MW-2D	UAU2, UAU3 and UAU4
MW-3S	UAU2, UAU3 and UAU4
MW-4S	UAU1 and UAU2
MW-5S	UAU1 and UAU2
MW-5D	UAU3 and UAU4
MW-6D	MAU
MW-7D	UAU3 and UAU4
MW-AM-8S	UAU1 and UAU2
MW-LW	UAU2

The Bennett sampling system was selected for the following reasons:

- The original sampling suite requested by ADEQ included dissolved hydrogen, which is a natural attenuation indicator for chlorinated solvents. Electric submersible pumps generate hydrogen, providing false positive data. The Bennett Sampling Pump, which is a pneumatic, piston-driven pump, was the only deep installation pump at the time that did not generate hydrogen.
- The Bennett Sampling Pump is a low-flow system, adjustable to flow rates of one gpm or less, which is ideal for micropurging and measurement of chlorinated solvent natural attenuation parameters. Micropurging is now preferred to the standard three to five well volume purging methods because a representative, depth-specific groundwater sample can be collected while minimizing the amount of water that is purged and must be managed as investigation derived waste (IDW). A sample can be collected after purging less than two gallons of water as opposed to more than 50 gallons of water that must be purged using the standard three to five well volume methods, thus minimizing IDW management costs.
- Due to high chloride and total dissolved solid (TDS) concentrations, the groundwater at the SMWRS was corrosive to metal. Unlike electric submersible pumps, the Bennett Sampling Pump can be suspended above the water table and a plastic drop tube assembly used to extend the pump intake to the desired sampling depth. This extended the life of the pump and minimized maintenance costs while still collecting representative groundwater samples.

As indicated in Section 3.1.4, 10 nested BARCAD monitoring wells were installed at the former AMI facility in August 2001. These wells are identified as MW-9-130, MW-9-170, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170, MW-11-200, and MW-11-240. In June 2002, four additional nested BARCAD wells, identified as MW-12-159, MW-12-183, MW-12-217, and MW-12-238, were installed near the northern boundary of the SMWRS (see Figure 1). The boring log and well construction diagram for MW-12 is included in Appendix I. In September 2008, four additional BARCAD wells, identified as MW-14-130, MW-14-163, MW-14-186, and MW-14-215 were installed near the southern boundary of the SMWRS (Figure 1). The boring log and well construction diagram for MW-14 is included in Appendix I.

The BARCAD system is a micropurging system and can be installed permanently as a well point. Up to five BARCAD systems can be installed in a single 10-12 inch diameter boring, thus providing an economical nested, depth-specific well system.

The BARCAD system does not have mechanical parts and consists of a microporous well screen that is equipped with a one-way valve. Water flows through the one-way valve into the one-inch diameter PVC casing and to the piezometric surface for the particular monitoring interval. A dedicated one-quarter inch diameter Teflon tube is installed in the casing to a depth approximately one foot above the top of the BARCAD. The following describes the sampling procedure:

- The sampling tube is connected to the sampling apparatus at the surface.
- Compressed nitrogen or air is then used to pressurize the casing, which causes the one-way valve to seal and pushes water up the sampling tube.
- Nitrogen or air is supplied until the casing is evacuated of water. At this time, the pressure is relieved and the casing is allowed to refill with water. This water is representative of the aquifer.
- Nitrogen or air is again supplied, which seals the valve and pushes the sample to the surface.
- The nitrogen or air flow rate is carefully regulated to prevent aeration of the sample. The only portion of the water in the casing that comes into contact with the nitrogen or air is the top of the water column.
- The maximum discharge rate is approximately one gpm. The water flow rate can be adjusted by decreasing the nitrogen or air flow rate.
- During purging, the time required to completely evacuate the casing is recorded. Sample collection is discontinued before the casing is completely evacuated and the casing allowed to refill before any additional sample is collected.
- Complete evacuation of the casing and possible aeration of a sample is of greatest concern when collecting samples for VOC analysis. A maximum of 120 milliliters of water is required to perform VOC analysis using EPA Method 8260B. Therefore, evacuation of the water column prior to VOC sample collection should not be an issue of concern.

Based on the depth of the sampling point, the SMWRS monitoring wells were grouped as follows:

Well Groupings per Hydrologic Zone		
UAU1 Wells	130-159 ft. bls	MW-9-130, MW-10-130, MW-12-159
UAU2 Wells	155-183 ft. bls	MW-1S, MW-4S, MW-5S, MW-AM-8S, MW-9-175, MW-10-170, MW-11-170, MW-12-183, MW-LW
UAU3 Wells	185-217 ft. bls	MW-2D, MW-3S, MW-5D, MW-7D, MW-9-205, MW-11-200, MW-12-217
UAU4 Wells	235-245 ft. bls	MW-1D, MW-9-235, MW-10-235, MW-11-240, MW-12-238
MAU Wells	272 ft. bls	MW-6D

Passive diffusive bag samplers (DBSs) were also used to collect depth-specific groundwater samples at the SMWRS. This sampling approach collected representative depth-specific groundwater samples for VOC analysis without purging. DBSs were used to obtain vertical contaminant profiles from wells MW-1S, MW-2D, MW-3S, MW-4S, MW-5S, and SRP Well 28E-0N.

The groundwater analytical data is summarized in Table 2. With the change in the sampling method, specifically use of micropurging, DBSs, and monitoring of individual hydrologic zones, the groundwater analytical data collected from 1991 to 1998 is provided in Table 2 for information purposes only and is not used in the decision-making process. The groundwater data collected by AMEC from the SMWRS wells from July 2000 through May 2008 is being used in the decision-making process.

As shown in Table 2, samples were not collected from several of the SMWRS wells during the groundwater sampling program. Changes to the sampling program are described below:

- On September 20, 2000, the dedicated pump in MW-4S was inoperable and a sample was not collected.
- Due to access limitations, analytical results and with ADEQ approval, MW-LW was removed from the sampling program following the December 2000 sampling event.
- Access to SRP Well 28E-0N was received in June 2002 to collect DBSs.
- Due to access limitations and with ADEQ approval, SRP Well 28E-0N was removed from the sampling program following the September 2000 sampling event. However, AMEC received access to SRP Well 28E-0N in June 2002 to collect DBSs.
- Based on historic analytical results and with approval of ADEQ, wells MW-1S, MW-1D, MW-2D, MW-3S, MW-4S, MW-5S, and MW-6D were removed from the sampling program following the September 2001 sampling event.
- DBSs were collected from wells MW-1S, MW-2D, MW-3S, MW-4S, and MW-5S on January 9, 2002.
- With ADEQ's approval, the only wells sampled on August 13, 2002 were wells MW-12-159, MW-12-183, MW-12-217, and MW-12-240.
- Monitor wells MW-12-159, MW-12-183, MW-12-217, and MW-12-240 were removed from the sampling program starting with the December 2006 sampling event.
- Due to low water levels, BARCAD wells MW-9-130 and MW-10-130 could not be sampled on August 13, 2002, June 15, 2004, and December 14, 2004. A groundwater sample also could not be collected from MW-12-159 on December 14, 2004 due to low water levels.
- Water levels have risen since December 2004 and water levels were successfully collected from these wells in June and December 2005, May and December 2006, May and December 2007, and May and September & November 2008.
- Well MW-12-159 was removed from the sampling program in December 2006.

The following subsections summarize the VOC, metals, and natural attenuation parameter analytical results.

3.2.1 Volatile Organic Compounds

The groundwater samples were submitted to DMA and analyzed for VOCs using EPA Method 8260B. DMA was acquired by Test America during 2006. Therefore, analytical reports for 2006 and following indicate Test America as the analytical laboratory. The DMA and Test America analytical reports are attached as Appendix K and the VOC analytical results are summarized in Table 2. As shown in Table 2, since July 2000, chloroform, 1, 1-DCA, cis-1, 2-DCE, MEK, MTBE, PCE, toluene, and TCE have been reported above LRLs in the groundwater samples.

DBSs were collected from wells MW-1S, MW-2D, MW-3S, MW-4S, and MW-5S in January 2002 and from SRP Well 28E-0N in July 2002. The analytical results for the DBSs are also included in Appendix K and summarized in Table 2.

Acetone, bromodichloromethane, bromoform, and dibromochloromethane have also been detected in water samples collected from BARCAD wells MW-9-130, MW-9-175, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170, MW-11-200, and MW-11-240, MW-12-159, MW-12-183, MW-12-217, and MW-12-238. However, these compounds have not exceeded their respective AWQs, are not considered COPCs and are not listed in Table 2.

Of the detected VOCs, PCE and TCE are the only VOCs that have exceeded the AWQs since July 2000. These VOCs are considered compounds of interest (COIs). Additionally, elevated concentrations of c-1, 2-DCE (which can be a degradation product of PCE and TCE) have been detected in the wells. Therefore, c-1, 2-DCE is also considered a COI.

As indicated above, PCE, TCE and c-1,2-DCE are listed as COIs. The following subsections summarize the groundwater analytical results for each COI.

3.2.1.1 PCE

PCE has been reported in the highest concentrations and has the most extensive distribution at the SMWRS. The approximate PCE distribution above the AWQS of 5.0 µg/l is shown on Figure 1. The distribution is based on the results of the December 2006 groundwater sampling event, the results of the January 6, 2002 DBS sampling event of wells MW-1S, MW-2D, MW-3S, MW-4S, and MW-5S, and the presence of PCE above the AWQS of 5.0 µg/l in SRP Well 28.5E-1N. PCE concentrations in the SMWRS wells have ranged from <1.0 µg/l to 110 µg/l.

Wells MW-5D, MW-7D, and MW-AM-8S are the only conventional monitoring wells that have been reported with concentrations of PCE above the AWQS of 5.0 µg/l. The highest PCE concentration in a conventional monitoring well has been reported in monitor well MW-AM-8S at 300 µg/l. Figure 9a shows the 2000 through 2008 PCE concentration versus time graphs for wells MW-5D, MW-7D, and MW-AM-8S.

The PCE concentrations in MW-5D and MW-7D have remained relatively unchanged since July 2000. PCE concentrations in MW-AM-8S have fluctuated, ranging from a low of 4.4 µg/l in December 2007 to a high of 300 µg/l in January 1994. However, PCE concentrations in well MW-AM-8S remained relatively unchanged from June 2005 to September 2008, ranging from 4.4 µg/l to 18 µg/l. (Note: these PCE concentrations exceed the AWQS of 5.0 µg/l).

As indicated in Section 3.1.4, 10 BARCAD groundwater monitoring points, identified as monitoring wells MW-9-130, MW-9-175, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170, MW-11-200, and MW-11-240, were installed at the former AMI facility during August 2001. These wells have been included in the sampling program since September 2001. A comparison of the PCE results for the BARCAD wells to the discreet groundwater sample analytical results indicates lower PCE concentrations for the BARCAD well samples from Zones UAU1 and UAU2 (see below). Higher PCE concentrations were detected in the BARCAD wells in Zones UAU3 and UAU4.

Comparison of PCE Concentrations between BARCAD Samples and Discreet Samples				
Zone	BARCAD Sample Points	Maximum PCE Concentration ¹ (µg/l)	Discreet Sample Points	PCE Concentration (µg/l) ¹
UAU1	MW-9-130 MW-10-130	15 ²	LB-1-W-130 (MW-9)	59 ²
		9.6	LB-2-GW-130 (MW-10)	12
			LB-3-W-130 (MW-11)	2.7
UAU2	MW-9-175 MW-10-170 MW-11-170	8.7	LB-2-GW-170 (MW-10)	88
		8.3	LB-3-W-170 (MW-11)	23
		3.7		
UAU3	MW-9-205 MW-11-200	5.3	LB-1-W-205 (MW-9)	4.6
		4.3	LB-3-W-200 (MW-11)	11
UAU4	MW-9-235 MW-10-235 MW-11-240	18	LB-1-W-240 (MW-9)	<1.0
		1.3	LB-2-GW-240 (MW-10)	<1.0
		2.4	LB-3-W-240 (MW-11)	<1.0

1. Represents maximum PCE concentrations reported for sampling point.

2. Bold numbers indicate AWQS was exceeded.

Figures 9b through 9e are PCE concentration versus time graphs for the Zone UAU1 through Zone UAU4 BARCAD wells, respectively.

On July 10, 2002, AMEC collected 10 DBSs from SRP Well 28E-0N. The DBSs were installed at the following depths:

- 130 feet bgs (UAU1)
- 170 feet bgs (UAU2)
- 200 feet bgs (UAU3)
- 240 feet bgs (UAU4)
- 270 feet bgs (MAU)
- 290 feet bgs (MAU)
- 310 feet bgs (MAU)
- 330 feet bgs (MAU)
- 350 feet bgs (MAU).
- 370 feet bgs (MAU).

The analytical results are summarized in Table 2. PCE was the only VOC detected and ranged in concentration from 4.1 µg/l in the 370 feet bgs (MAU) sample to 8.3 µg/l in the 130 feet bgs (UAU1) sample. The following samples contained PCE above the AWQS of 5.0 µg/l:

- 130 feet bgs (UAU1), 8.3 µg/l
- 200 feet bgs (UAU3), 5.2 µg/l
- 240 feet bgs (UAU4), 5.6 µg/l
- 290 feet bgs (MAU), 5.4 µg/l
- 310 feet bgs (MAU), 5.9 µg/l
- 330 feet bgs (MAU), 5.4 µg/l
- 350 feet bgs (MAU), 5.0 µg/l.

The PCE concentrations do not vary significantly with depth and appear to be uniformly distributed across the screened interval of the well.

3.2.1.2 TCE

TCE is listed as a COI for the following reasons:

- TCE has been periodically detected in the SMWRS wells above the AWQS (5.0 µg/l),
- TCE is a commonly used degreasing and cleaning solvent and
- TCE is a reductive dechlorination daughter product of PCE.

There is no indication that TCE was used at the former AMI facility. Because of the low concentrations and limited distribution, the detected TCE is likely a reductive dechlorination daughter product of PCE.

Since the July 2000 sampling event, TCE has been detected in samples collected from wells MW-AM-8S, MW-9 (130 and 175), MW-10-130, MW-11-200, MW-12 (183 and 217) and in discrete groundwater samples LB-1-W-130, LB-2-GW-130, and LB-2-GW-170.

TCE is limited in extent to the AMI facility. TCE exceeded the AWQS of 5.0 µg/l in a sample collected from MW-AM-8S on March 6, 2001 (5.8 µg/l) and in discrete groundwater samples LB-2-GW-130 (7.3 µg/l) and LB-2-GW-170 (8.8 µg/l). The maximum concentration of detected TCE was 8.8 µg/l in discrete sample LB-2-GW-170. TCE detections in MW-12-183 and MW-12-217 in June 2000 ranged from 1.1 µg/l to 2.6 µg/l and were below the AWQS of 5.0 µg/l.

3.2.1.3 c-1, 2-DCE

c-1, 2-DCE is a reductive dechlorination daughter product of PCE and TCE and has been detected at elevated concentrations in the SMWRS wells. c-1, 2-DCE is listed as a COI.

Since the July 2000 sampling event, c-1,2-DCE has only been detected in AMI wells

- MW-AM-8S,
- MW-9 (130 & 175 ft bgs),
- MW-10 (130 & 170 ft bgs),
- MW-11 (170, 200 & 240 ft bgs), and in
- Discrete groundwater samples LB-1-W (130, 188 & 205 ft bgs), LB-2-GW (130 & 170 ft bgs) and LB-3-W (130, 170 & 200 ft bgs).

However, the concentrations were below the AWQS of 70 µg/l.

Detected c-1,2-DCE concentrations have ranged from a low of 2.9 µg/l in the July 5, 2000 sample collected from MW-AM-8S to 53 µg/l in MW-10-170. MW-10-170 is adjacent to the on-site septic tank.

The elevated c-1, 2-DCE concentrations in the samples from MW-10-130 and MW-10-170 may indicate that reductive dechlorination of PCE is occurring below the septic tank. Elevated c-1, 2-DCE concentrations were reported in samples collected from wells MW-9 (130 & 175 ft bgs), MW-10 (130 & 170 ft bgs) and MW-11 (170, 200, and 240 ft bgs).

3.2.2 Metals

The metals analytical suite originally included the following: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, total chromium, hexavalent chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, nickel, selenium, silver, strontium, vanadium and zinc.

Following the December 2000 groundwater sampling event, several of these metals either did not have listed AWQSSs, had not been detected, or had not exceeded listed AWQSSs. Therefore, with the approval of ADEQ, the metals analytical suite was reduced to arsenic, chromium, iron, manganese, and nickel, which were listed as COIs.

Arsenic, chromium and nickel were initially retained due to periodic detections of these metals above their respective AWQSSs of 0.05, 0.10 and 0.10 milligrams per liter (mg/L) in AMI well MW-AM-8S. Iron and manganese are natural attenuation indicators and were therefore retained as COIs.

Following the December 2001 sampling event, it was apparent that heavy metals were not COPCs in the groundwater (see Section 5). Therefore, with the approval of ADEQ, arsenic, chromium, iron, manganese, and nickel were removed from the analytical suite following the December 2001 sampling event. The analytical results for arsenic, chromium, iron, manganese, and nickel are summarized in Table 2.

3.2.3 General Water Chemistry and Natural Attenuation Indicator Data

At the request of ADEQ, the groundwater samples collected from the SMWRS wells during the July, September, December 2000 and March 2001 groundwater sampling events were analyzed for general water chemistry and natural attenuation indicator compounds. The samples were submitted to Microseeps, Inc. (Microseeps) and the analytical suite included the following: alkalinity as carbonate; alkalinity as bicarbonate; ammonia as N; biologic oxygen demand (BOD); dissolved carbon dioxide; chemical oxygen demand (COD); chloride; dissolved ethane; dissolved ethene; dissolved hydrogen; dissolved methane; nitrate; nitrite; dissolved oxygen; soluble organic carbon (SOC); total organic carbon (TOC) and total phosphate. The Microseeps analytical reports are attached as Appendix L. The analytical results are summarized in Table 9.

The groundwater general chemistry data is discussed further in Section 4 and the natural attenuation indicator data is discussed further in Section 6.

4.0 SITE CHARACTERISTICS

This section discusses the characteristics of the SMWRS, including the physiographic setting, geology, hydrogeology, climate, and land and water use.

4.1 Physiographic Setting

The SMWRS is located within the Eastern Salt River Valley, which is part of the Basin and Range Physiographic Province as described by Fenneman (1931). The Eastern Salt River Valley is a portion of a structural depression formed by Cenozoic crustal extension and is characterized by broad sloping valleys bounded by generally northwesterly trending mountain ranges. Mountain ranges bounding the Eastern Salt River Valley include the following: San Tan Mountains on the south; Mazatzal and Superstition Mountains on the east; McDowell and Phoenix Mountains on the north; and Phoenix Mountains, Papago Buttes and South Mountains on the west (Laney and Hahn, 1986).

The Eastern Salt River Valley lies within a broad alluvial valley composed of Cenozoic (Oligocene to Recent) sedimentary deposits. The alluvial basin extends to maximum projected depths of approximately 10,000 feet near Chandler, as defined by gravity survey methods (Oppenheimer, 1981) and predominantly consists of consolidated to unconsolidated sands and gravels, with local discontinuous clays and silts.

The land surface of the SMWRS gently slopes to the south, ranging from a surface elevation of approximately 1,230 feet above mean sea level (AMSL) in the north end of the SMWRS to approximately 1,205 feet AMSL in the south end of the SMWRS. The slope gradient is approximately 0.006 feet per foot (ft/ft).

4.2 Geology

4.2.1 Regional Geology

The geologic structure in the East Salt River Valley is predominantly controlled by Basin and Range crustal extension causing widespread northeast-trending normal faulting. Generally, the lithology of the East Salt River Valley is divided into six units. These units can be further subdivided into consolidated bedrock and unconsolidated alluvial basin fill. The six units are identified from deepest to shallowest as follows:

- Crystalline basement Tertiary granitic and Precambrian metamorphic rocks,
- Tertiary extrusive volcanic rocks,
- Tertiary sedimentary rocks identified as the Red Unit, and
- Three unconsolidated alluvial basin fill units identified as the Lower Unit, Middle Unit, and Upper Unit (Laney and Hahn, 1986). The Lower Unit, Middle Unit, and Upper Unit are further referred to as the Lower Alluvial Unit (LAU), Middle Alluvial Unit (MAU), and Upper Alluvial Unit (UAU) (US Bureau of Reclamation, 1976, and Brown and Pool, 1989).

As evidenced by the displacement within the local sedimentary deposits, the faulting apparently occurred during the Early Tertiary Period, approximately 15 million years ago. High angle normal faults separate large mountain blocks by a series of broad, down-faulted alluvial valleys.

Pre-Basin and Range sediments and portions of the older LAU deposits are offset by these high-angle normal faults throughout the Eastern Salt River Valley. Younger sedimentary basin-fill deposits were not subject to this faulting and evidence of regional displacement is not detected in the UAU and MAU.

The LAU is encountered in wells in the vicinity of the SMWRS at depths ranging from 800 feet to the west and approximately 1,100 feet to the east. Therefore, it is unlikely that the deepest wells and borings within the boundaries of the SMWRS have penetrated the LAU. The thickness of this unit increases in an easterly direction. However, there is no available data regarding the thickness of the Lower Unit within the area. Hammett and Herther also refer to the LAU as Lower Basin Fill (Hammett & Herther, 1995). The LAU is comprised of weakly to highly consolidated fanglomerate and alluvial deposits that were laid down during the first stages of the Basin and Range disturbance. Grain-size distributions within the LAU indicate a trend toward finer-grained materials to the east-southeast, with clastics ranging from approximately 30 percent sand and gravel in the northwest, to 10 percent sand and gravel in the southeast (Kleinfelder, 1988).

The MAU ranges from 600 to 800 feet thick in the vicinity of the SMWRS and is typically encountered at depths ranging from 180 to 350 feet bgs. Grain-size distributions show a southwesterly trend toward fine-grained materials, with approximately 50 percent sand and gravel northeast of the SMWRS to approximately 35 percent sand and gravel to the southwest of the SMWRS (Kleinfelder, 1988). Hammett and Herther refer to the MAU as Upper Basin Fill (Hammett & Herther, 1995).

The MAU is comprised of unconsolidated to moderately consolidated fanglomerate and alluvial deposits that were laid down during the later stages of the Basin and Range disturbance. The contact between the UAU and the MAU is typically characterized by a sharp “kick” to the left on a 16-inch resistivity log, thus indicating a transition from coarse-grained sediments to fine-grained sediments.

The UAU is observed at the surface throughout the area. The thickness of the UAU generally increases in an easterly direction and ranges from 180 feet thick in the west to more than 300 feet thick near the SMWRS (Kleinfelder, 1988). The UAU is also referred to as Stream Alluvium by Hammett & Herther. These sediments are unconsolidated alluvial deposits. They also include floodplain, fan and playa deposits (Hammett & Herther, 1995). Grain-size distributions for the Upper Unit indicate a general distribution of 80 percent or more sand and gravel (Kleinfelder, 1988).

4.2.2 Local Geology

Non-waterbearing bedrock formations are not observed at the surface within the SMWRS boundaries. The deepest well within the SMWRS boundaries is SRP Well 28.5E-1N (Figure 1), which was approximately 700 feet deep before modification in 1997 (Section 2.13). Kleinfelder drilled an exploratory boring to approximately 700 feet deep, which is identified as SB-7X and was located near monitoring well MW-7D (Figure 1). The deepest well located within 0.5 miles of the SMWRS boundaries is Mesa Well 14, which is reported by ADWR as being 954 feet deep. Bedrock units were not encountered in these wells. It is estimated that bedrock is greater than 2,500 feet deep within the area (Oppenheimer, 1981). However, according to

Laney and Hahn, the sedimentary basin may locally exceed a thickness of 10,000 feet (Laney and Hahn, 1986).

As indicated above, the wells within and near the SMWRS penetrate the two shallowest geologic units, the UAU and the MAU. The LAU has not been penetrated.

AMEC reviewed the boring and resistivity logs for the following borings: MW-6D, which is located in the south end of the SMWRS; MW-5D, which is located in the approximate center of the SMWRS; and boring SB-7X, which was drilled in the northern half of the SMWRS near MW-7D (Figure 1). These borings are the deepest borings drilled and geophysically logged by ADEQ within the SMWRS and would be the most likely to encounter the MAU.

MW-5D, MW-6D and SB-7X were drilled and logged to depths of 239 feet bgs (MAU), 300 feet bgs (MAU), and 700 feet bgs (MAU), respectively. Predominantly clayey sediments were encountered at depths of 220 feet bgs, 250 feet bgs and 230 feet bgs in MW-5D, MW-6D and SB-7X, respectively. The 16-inch resistivity logs indicate that the UAU/MAU contact is possibly present at approximately 250 feet bgs at MW-6D and at approximately 230 feet bgs at SB-7X. Therefore, the MAU ranges from 700 to 800 feet thick within the SMWRS.

With the exception of MW-6D, the monitoring wells present in the SMWRS are entirely installed and screened within the UAU (Table 1). SRP Wells 28E-0N and 28.5E-1N are also primarily screened within the UAU. Malcolm-Pirnie reported that the UAU/MAU contact was present at approximately 350 feet bgs in SRP Well 28E-0N (Malcolm-Pirnie, 1993). However, based on the geophysical logs for MW-6D and SB-7X, the MAU is possibly present at less than 300 feet bgs and SRP Wells 28E-0N and 28.5E-1N are screened across the contact. Therefore, the UAU ranges from 220 to 250 feet thick within the boundaries of the SMWRS.

Based on geophysical logs and boring logs for wells and soil borings drilled in the area, the subsurface lithology at the SMWRS is summarized as follows:

- 0-30 feet bgs: silty clay to clayey silt with some fine sand, some intervals weakly to moderately cemented with calcium carbonate.
- 30-40 feet bgs: fine to medium grained poorly graded sand with some silt.
- 40-50 feet bgs: silty clay to clayey silt with some fine sand, some intervals moderately cemented with calcium carbonate.
- 50-55 feet bgs: fine to medium grained, poorly graded sand with some silt.
- 55-62 feet bgs: silty clay to clayey silt with some fine sand, some intervals moderately cemented with calcium carbonate.
- 62-140 feet bgs: cobbles gravel and sand with less than two percent fine-grained constituents, cobbles to approximately three inches in size. First water encountered at approximately 122 feet bgs. Moderate water yield observed.
- 140-145 feet bgs: cobbles, sand and gravel with a greater percentage (less than 20 percent) of fine-grained constituents filling void spaces, cobbles to approximately three inches in size. Low water yield observed.
- 145-175 feet bgs: cobbles, sand and gravel with less than five percent fine-grained constituents filling void spaces, cobbles to approximately three inches in size. Moderate water yield observed.

- 175-195 feet bgs: very dense sediments containing approximately 50 percent silt and low plasticity clay and 50 percent cobbles sand and gravel. Silt and clay fill void spaces between larger particles. Very low water yield observed and some cuttings are observed as slightly moist to nearly dry.
- 195-205 feet bgs: fine to coarse grained, moderately graded sand with gravel and cobbles. Moderate water yield observed.
- 205-215 feet bgs: very dense sediments containing approximately 50 percent silt and low plasticity clay and 50 percent cobbles, sand and gravel. Silt and clay fill void spaces between larger particles. Very low water yield observed and some cuttings were observed as slightly moist to nearly dry.
- 215-250 feet bgs: cobbles, sand and gravel with less than two percent fine-grained constituents, cobbles to 12 inches in size and occasional predominantly sandy intervals (flowing sands). Large water yield was observed and several hundred gallons of water were removed from boring during drilling.
- 250-1,000+ feet bgs: Middle Alluvial Unit (MAU), predominantly silty and clayey sediments with sandy intervals.

The geophysical logs for borings MW-6D and MW-7X are included as Appendix M. Boring logs for borings LB-1, LB-2, LB-3, LB-4, LB-6, LB-7 and MW-12 are included as Appendix I. Figure 4 is a cross-section of the former AMI facility and Figure 10 is a north to south geologic cross section of the SMWRS.

4.3 Hydrogeology

4.3.1 Regional Hydrogeology

The LAU was not penetrated by the monitoring or production wells located within the boundaries of the SMWRS or within 0.5 miles of the SMWRS. Testing of a pumping well located northwest of the area reported a hydraulic conductivity for the Lower Unit of approximately 1,400 gallons per day per square foot (gpd/ft²) with an estimated storage coefficient of 0.0007, which suggests confined conditions (Schmidt, 1988).

Based on a pumping test of SRP Well 29.3E-0S (located approximately 1 mile east of the area), hydraulic conductivity values in the MAU were estimated to be approximately 800 gpd/ft² (Schmidt, 1987).

The UAU is reportedly the most productive aquifer unit in the area. However, due to poor water quality, limited production occurs from the UAU. The hydraulic conductivity for the UAU northwest of the SMWRS ranges from 1,300 to 3,600 gpd/ft² (Schmidt, 1987).

4.3.2 Local Hydrogeology

Based on the findings of the previous investigations and RI activities performed by AMEC, the following describes the hydrogeology of the SMWRS.

4.3.2.1 Aquifer Characteristics

Wells at the SMWRS have penetrated two aquifer units, the UAU and the MAU. The following subsections discuss the characteristics of each unit.

4.3.2.1.1 Upper Alluvial Unit

The RI activities at the SMWRS have primarily focused on the UAU. General aquifer characteristics available in literature for the UAU are discussed in Section 4.3.1. In 1996, SRP performed groundwater modeling and a capture zone analysis for SRP Well 28E-0N. SRP reported the following characteristics for the UAU (SRP, 1996):

- Generally varying from unconfined to confined (confining intervals increasing with depth);
- Aquifer thickness is approximately 250 to 350 feet;
- Hydraulic conductivity ranges from 50 to 500 feet/day;
- Lateral hydraulic gradient is approximately 0.0002 ft./ft.;
- Vertical hydraulic gradient estimated at approximately 0.09 ft./ft.;
- Saturated aquifer thickness was approximately 222 feet;
- Estimate of porosity (for sand and gravel) is between 10 and 30 percent (Kleinfelder, 1990); and,
- Calculated (estimated) groundwater velocity is 0.6 to 9.6 feet per day (ft/day) (Kleinfelder, 1990).

Based on the findings of the RI and review of available boring and geophysical logs, the UAU ranges from approximately 250 feet thick at MW-6D to approximately 240 feet thick at MW-12. The UAU/MAU contact is present at an elevation of approximately 960 feet AMSL at the former AMI facility and at an elevation of approximately 985 feet AMSL in the vicinity of MW-12. The piezometric surface in the UAU is relatively flat across the SMWRS, currently occurring at elevations ranging from 1,106 feet AMSL to 1,109 feet AMSL. The saturated thickness of the UAU ranges from approximately 130 feet near MW-12 to approximately 150 feet at the AMI facility.

Based on observations during the AMI Source Characterization and review of available boring and geophysical logs, AMEC identified four hydrologic zones within the UAU as follows:

- 120 feet bgs to 140 feet bgs;
- 155 feet bgs to 175 feet bgs;
- 195 feet bgs to 205 feet bgs; and
- 220 feet bgs to 250 feet bgs (UAU4 and contact with the MAU).

These zones are referred to as zones UAU1, UAU2, UAU3, and UAU4, respectively. Each zone is separated by fine-grained units consisting of clays and silts. The saturated thickness of the UAU is characterized as being predominantly coarse-grained, containing a large percentage of boulder, cobble, gravel and sand sized particles. The fine-grained units were characterized by lower water yields and larger percentages of clay and silt-sized particles, typically between 15 and 50 percent.

Discreet groundwater samples collected from the clay layers contained relatively lower concentrations of PCE than discreet groundwater samples collected from adjacent hydrologic zones (Table 7). Sample LB-2-GW-130 (zone UAU1) contained 12 µg/L of PCE and underlying sample LB-2-GW-150 contained <1.0 µg/L of PCE. Subsequent underlying sample LB-2-GW-170 (zone UAU2) contained 88 µg/L of PCE.

As indicated in Section 4.2.2, the clay layers present from approximately 185 feet bgs to 195 feet bgs at the former AMI facility, contained approximately 50 percent clay and silt sized particles and yielded very little water.

Water yield of the hydrologic zones increases with depth. The water yields for zones UAU1 through UAU3 were relatively moderate. However, zone UAU4 yielded large quantities of water and the water appeared to be under pressure. This correlated with the particle size distribution observed for Zone UAU4, specifically a higher percentage of cobbles and boulders and a lower percentage of clay and silt-sized particles.

The Rotasonic drilling method was used to drill MW-12 and a continuous core of the UAU was available for observation and logging (Appendix I). The saturated portion of the UAU at MW-12 contained a higher percentage of silt and clay-sized particles as compared to the former AMI facility. Zones UAU1 through UAU3 were distinguishable.

As previously indicated, the land surface elevation at MW-12 is approximately 14 feet higher than the AMI facility. Zone UAU1 was identified from approximately 139 feet bgs to 158 feet bgs, Zone UAU2 was identified from approximately 182 feet bgs to approximately 197 feet bgs, and Zone UAU3 was identified from approximately 215 feet bgs to 220 feet bgs. Zone UAU4 was observed from approximately 230 feet bgs to 235 feet bgs and the sediments contained a larger percentage of fine-grained particles as compared to the Zone UAU4 sediments at the AMI facility. The sediments below a depth of 238 feet bgs were characterized as medium plasticity clay. The UAU/MAU contact was identified at a depth of approximately 238 feet bgs.

4.3.2.1.2 Middle Alluvial Unit

Due to the lack of wells and monitoring points within the MAU, there is minimal information regarding the characteristics of the MAU at the SMWRS. Based on the available information, there are only two wells screened entirely in the MAU near and at the SMWRS. Those wells are Mesa Well No. 14 and MW-6D (Figure 1). Based on the available information, the MAU appears to be saturated throughout its entire thickness, which is greater than 750 feet thick.

4.3.2.2 Groundwater Levels and Movement

4.3.2.2.1 Upper Alluvial Unit

The earliest recorded depth to water for the SMWRS is 1940, when depth to water in SRP Well 28E-0N was reported at 56 feet bgs. In 1951, depth to water in SRP Well 28.5E-1N was reported at 140 feet bgs. The review of water level data for the SMWRS monitoring wells indicate that depth to water has historically ranged from approximately 113 feet bgs to 175 feet bgs, with water levels generally rising between 1991 and 1997 (ADEQ, 1997). However, according to Kleinfelder, groundwater in the vicinity of the AMI facility may have been greater

than 200 feet deep in 1983 (Kleinfelder, 1988). The depth to water reported in SRP Well 28E-0N on January 11, 1983 was 274.2 feet (SRP, 1996). However, SRP reported that the depth to water in SRP Well 28E-0N ranged from 157 feet to 175 feet between January 1, 1973 and January 1, 1981.

According to SRP records and the available data, SRP Well 28E-0N was shut down in 1983 due to the detection of PCE in water samples collected from the pump discharge. With the exception of periodic operation to collect water samples, the well remained off-line until 1994, when a wellhead treatment system was installed. During the time period that SRP Well 28E-0N was off-line, water levels began to rise. Reported depths to water in SRP Well 28E-0N on July 9, 1986, January 29, 1988 and November 7, 1991 were 177.8 feet, 134.3 feet, and 142.2 feet, respectively. Depth to water in MW-AM-8S was measured at approximately 150 feet bgs in 1991. According to the ADEQ data, water levels continued rising with time, with the highest water levels recorded in April 1997.

Between July 2000 and December 2002, water levels fluctuated seasonally, typically changing approximately 5 feet between summer and winter months. Water levels began steadily declining in 2002, apparently in response to drought conditions. By June 2004, water levels had declined to the lowest elevations in more than 10 years. However, since December 2004, water elevations have been steadily increasing and have reached all-time highs since 1973. Figure 11 shows a water elevation hydrograph for SRP Well 28E-0N and MW-AM-8S, which is representative of the AMI facility.

Figure 12 presents July 2000 through December 2006 groundwater elevation hydrographs for wells MW-1S, MW-3S, MW-4S, MW-5S, MW-AM-8S, and MW-LW. Figure 13 presents July 2000 through December 2006 groundwater elevation hydrographs for wells MW-1D, MW-2D, MW-5D, MW-6D, and MW-7D. As shown in Table 1, MW-6D is screened entirely in the upper portion of the MAU. The elevation hydrograph for MW-6D mimics the elevation hydrographs for MW-1D, MW-5D, and MW-7D. At least the upper portions of the MAU appear to be in hydraulic communication with the UAU.

BARCAD wells MW-9-130 (UAU1), MW-9-175 (UAU2), MW-9-205 (UAU3), MW-9-235 (UAU4), MW-10-130 (UAU1), MW-10-170 (UAU2), MW-10-235 (UAU4), MW-11-170 (UAU2), MW-11-200 (UAU3), MW-11-240 (UAU4), MW-12-159 (UAU1), MW-12-183 (UAU2), MW-12-217 (UAU3), MW-12-238 (UAU4), MW-14-130 (UAU1), MW-14-163 (UAU2), MW-14-186 (UAU3), and MW-14-215 (UAU4) monitor individual hydrologic zones. These wells are nested which allows vertical gradients between hydrologic zones at each well location to be evaluated. Wells MW-6D (MAU) and MW-9-235 (UAU4) are located approximately 250 feet from each other. Vertical gradients between UAU4 and the upper portion of the MAU can also be evaluated. Based on groundwater elevation data and groundwater sampling reports prepared by AMEC, vertical gradient information between each hydrologic zone is summarized below:

Table 4-1. Vertical Gradient Information	
Zones	Vertical Gradient
UAU1/UAU2	Apparent neutral to slight upward gradient at the AMI facility, less than 0.005 ft./ft. Apparent neutral to slight downward gradient at MW-12, approximately 0.007 ft./ft.

Table 4-1. Vertical Gradient Information	
Zones	Vertical Gradient
UAU2/UAU3	Apparent downward gradient at the AMI facility, between 0.007 and 0.02 ft/ft. Apparent neutral to slight upward gradient at MW-12, approximately 0.001 ft/ft.
UAU3/UAU4	Apparent upward gradient at the AMI facility, between 0.02 ft/ft. and 0.04 ft/ft. Apparent upward gradient at MW-12, approximately 0.04 ft/ft.
UAU4/MAU	Groundwater elevations between MW-6D and MW-9-235 indicate an apparent neutral to slight upward gradient.

As indicated above, there are indications of vertical gradients between the hydrologic zones within the UAU. As previously indicated, with the exception of wells MW-1D, MW-6D, and MW-LW, the SMWRS wells screen across two or more of the hydrologic zones in the UAU. The groundwater level measured in a well that screens across two or more zones may not accurately represent the groundwater level for an individual zone at that well. AMEC has been plotting data for all the wells, which provides a piezometric surface that is representative of the entire saturated thickness of the UAU and upper 30 feet of the MAU. Considering the locations and construction of the wells and that the entire interval is saturated, AMEC believes all the wells can be plotted on one surface without installing additional monitoring points.

Figures 14 through 26, 28, 29, 30, 32, 34, and 36 are groundwater elevation maps for July 2000, August 8, 2000, September 6, 2000, October 3, 2000, November 7, 2000, December 1, 2000, January 3, 2001, February 2, 2001, March 6, 2001, June 6, 2001, September 6, 2001, December 5, 2001, and July 17, 2002, June 2004, December 2004, June 3, 2005, December 15, 2005, June 3, 2006, December 2006, May 2007, December 2007, and May 2008, respectively. As shown in these figures, up until June 2005 groundwater generally flowed in a north to northeasterly direction at a relatively shallow gradient of less than 0.0007 ft./ft. Specifically, groundwater elevations typically did not decline more than five feet in the downgradient direction across the SMWRS. However, as shown on Figures 30, 32, 34, and 36, since June 2005 groundwater has been flowing in a southerly direction, with groundwater elevations declining between two and three feet from north to south. The changes in groundwater elevations and flow direction since June 2004 may be attributed to local changes in groundwater pumping and recharge.

As previously stated, groundwater flow direction and gradient can be evaluated for Zone UAU4. Figures 27, 31, 33, 35, and 37, respectively, show the July 17, 2002, June 3, 2005, December 15, 2005, June 3, 2006, and December 2006 groundwater elevations and flow directions for Zone UAU4. As shown on Figure 27, groundwater in Zone UAU4 on July 17, 2002 flowed in a northeasterly direction at a gradient of approximately 0.0006 ft/ft, which was consistent with the flow direction and gradient typically observed for the SMWRS at that time. However, in June 2005, the groundwater flow direction had changed to a southerly direction and has remained in southerly direction through May 2008. Groundwater elevations declined two to three feet from north to south across the study area.

4.3.2.2.2 Middle Alluvial Unit

Due to the lack of wells screened entirely in the MAU in the area, there is insufficient data to evaluate the groundwater flow direction and gradient for the MAU. Making the assumption that the entire thickness of the UAU and MAU from the water table are entirely saturated, specifically the units are in hydraulic communication, it can also be assumed that groundwater in the MAU flows in approximately the same direction as the groundwater in the UAU.

4.3.2.3 Groundwater Quality

Ambient or pre-release groundwater quality is an important consideration in evaluating the characteristics of an aquifer, which ultimately determines the uses of the groundwater. The following subsections discuss groundwater quality for each aquifer unit.

4.3.2.3.1 Upper Alluvial Unit

The UAU predominantly receives recharge from the surface. Therefore, the UAU is susceptible to chemical impacts from the surface. The RI of the SMWRS has demonstrated that groundwater in the UAU contains tetrachloroethene (PCE) above the Aquifer Water Quality Standard (AWQS) of 5.0 micrograms per liter ($\mu\text{g/L}$). However, there are pre-existing groundwater quality issues that have influenced use of groundwater pumped from the UAU.

Prior to development of the area, groundwater within the UAU was considered to be of high quality and a readily available supply of water. However, input of agricultural chemicals, predominantly nitrates, has degraded the groundwater quality of the UAU. Groundwater samples collected from October 1991 through August 1992 and from July 2000 through March 2001 were analyzed for general chemistry parameters, including chloride, nitrate, sulfate, and total dissolved solids (TDS). The analytical results are summarized on Table 9.

The AWQS for nitrate (as nitrogen [N]) is 10 milligrams per liter (mg/L). As shown on Table 9, nitrate concentrations in the groundwater samples ranged from 6 to 19 mg/L, with the concentrations typically above the AWQS of 10 mg/L. Samples collected from well MW-AM-8S from July 2000 to March 2001 contained higher nitrate concentrations than the other wells and samples collected from MW-AM-8S in 1991 and 1992. AMEC concluded that the July 2000 through March 2001 nitrate results for MW-AM-8S were anomalous.

The sulfate concentrations, which are likely naturally occurring, ranged from 33 mg/L to 680 mg/L. Sulfate does not have an AWQS. However, sulfate has been linked to intestinal disorders and the EPA Secondary Maximum Contaminant Level (SMCL) is 250 mg/L. The groundwater in the UAU contains sulfate concentrations near or above the SMCL of 250 mg/L.

The groundwater also contains high concentrations of chloride. Chloride concentrations ranged from 380 mg/L to 940 mg/L. Chloride is a component of total dissolved solids (TDS) in water. Groundwater samples collected from the SMWRS wells from July 2000 to March 2001 were not analyzed for TDS. However, as shown in Table 9, groundwater samples collected from the SMWRS wells from October 1991 through August 1992 were analyzed for TDS. The TDS concentrations ranged from 1,100 mg/L to 2,100 mg/L, which are in excess of the SMCL of 500 mg/L.

4.3.2.3.2 Middle Alluvial Unit

As previously discussed, due to the lack of monitoring points, minimal information exists regarding the MAU at the SMWRS. MW-6D is the only accessible MAU monitoring point at the SMWRS. However, MW-6D monitors only the upper 30 feet of the MAU. As shown on Table 9, the groundwater in the upper portion of the MAU is similar in quality to the groundwater in the UAU. Specifically, the groundwater contains excessive concentrations of nitrate, sulfate and TDS.

The City of Mesa has four production wells located in the vicinity of the SMWRS, identified as Mesa Wells 10, 13, 14 and 15. These wells are screened entirely in the MAU and the locations are shown on Figure 1. In October 1988, Kleinfelder collected groundwater samples from these wells. The samples were analyzed for VOCs, metals and general chemistry parameters and the general water chemistry results are summarized in Table 9 (Kleinfelder, 1988).

The water quality data indicates the water from Mesa Wells 10, 13, 14 and 15 contains relatively low concentrations of nitrate, ranging from 0.54 mg/L to 1.48 mg/L, which are below the AWQS of 10 mg/L, and relatively low concentrations of sulfate, ranging from 42 mg/L to 45 mg/L, which are below the SMCL of 350 mg/L. TDS concentrations range from 674 mg/L to 728 mg/L, which are slightly higher than the SMCL of 500 mg/L. Based on the available water quality data, the groundwater in the deeper portions of the MAU appears to be of relatively good quality and of higher quality than groundwater in the UAU.

4.4 Climate

The Salt River Valley is located within the Sonoran Desert Climatic Region, and is characterized by hot summers and cool winters. Average maximum temperatures reach a high of 105 degrees Fahrenheit (°F) in July and a low of 65 °F in December. Minimum temperatures range from an average of 80 °F in July to an average of 39 °F in December (Green and Sellers, 1964).

Precipitation averages 7.2 inches annually within the SMWRS. The majority of the precipitation occurs in both the warmer summer months of July through September, and the colder winter months of December through March. Little precipitation occurs during spring and fall. Average annual evaporation is 72 inches, with the greatest evaporation occurring during the hot summer months (Sellers, 1974).

4.5 Current Land and Water Use

Land and water use at the SMWRS is described in detail in the *Land and Water Use Study Report* attached as Appendix A. The Land and Water Use Study Area is larger than the SMWRS and has the following boundaries:

- Broadway Road on the North;
- Stapley Road (Mesa)/Cooper Road (Gilbert) on the East;
- Guadalupe Road on the South;
- Union Pacific Railroad tracks/Center Street on the West.

The boundaries of the Land and Water Use Study Area are shown on Figure 38. The following subsections summarize current land and water uses at the SMWRS.

4.5.1 Current Land Use

The Land Use Study is predominantly focused on the former AMI facility, which is located at 1545 North McQueen Road in Gilbert, Arizona. Land use plans for the portions of the Land and Water Use Study Area within the City of Mesa (Mesa) and Town of Gilbert (Gilbert) were reviewed and are summarized. Current land uses for the study area involved a review of zoning and planning documents for Gilbert and Mesa. Because shallow, soil impacts apparently do not extend to properties surrounding the AMI facility, other property owners within the study area were not contacted or interviewed regarding future land uses. The following subsections discuss current land use for the 1545 North McQueen Road property, Gilbert and Mesa.

4.5.1.1 1545 North McQueen Road Property

Mr. Mark Gunning, the current owner of the 1545 North McQueen Road property (formerly occupied by the AMI facility), was interviewed regarding current and future land uses for the referenced property. Mr. Gunning stated that the property is currently being used for commercial use and that the current zoning for the property is C-2, general commercial by the Town of Gilbert.

The building currently consists of five suites, identified as Suites 1 through 5. Currently Suites 1 and 4 are occupied by commercial tenants.

4.5.1.2 Town of Gilbert

Current land use for the Gilbert segment of the Study Area (Gilbert segment) consists of single residences, multiple residences, neighborhood/general commercial, industrial, and public facilities (Figure 39). Baseline Road separates Gilbert from Mesa and demarcates the Gilbert segment from the Mesa segment. The Gilbert segment is bounded as follows: to the north by Baseline Road; to the east by Cooper Road; to the south by Guadalupe Road; and, to the west by the tracks of the Union Pacific Railroad (former Southern Pacific Railroad) (Figure 38). The Gilbert segment occupies approximately 950 acres of land.

Based on the review of the zoning map obtained from the Town of Gilbert Planning and Zoning Department (Figure 39), current zoning for the Gilbert segment includes:

- AG (agriculture),
- R1-43 (rural residential – one acre per dwelling unit),
- R1-10 (10,000 sq. ft. per dwelling unit),
- R1-7 (7,000 sq. ft. per dwelling unit),
- R-2 (two family duplex residential),
- C-1 (light commercial),
- C-2 (general commercial),
- I-1 (garden industry),
- I-2 (light industry),
- I-3 (general industry) and
- PF/OS (public facility/open space).

An elementary school and future fire station are also shown on the zoning map. Current zoning in the vicinity of the Gilbert segment includes the above plus:

- R1-5 (5,000 sq. ft. per dwelling unit),
- R-3 (multi-family – 18 dwelling units per acre) and
- PCS-1 (planned neighborhood shopping center).

Current zoning to the north (Baseline Road) is reflected in those zoned areas for the Mesa segment of the Study Area. An aerial photograph taken of the Gilbert segment in 2001 (Figure 40) also shows the industrial, commercial, and residential use areas.

4.5.1.3 City of Mesa

Current land use for the Mesa segment of the Study Area (Mesa segment) consists of single residences, multiple residences, neighborhood/general commercial, industrial, and public facilities (Figure 41). The Superstition Freeway cuts the Mesa segment in half from east to west and accounts for approximately 1/12 of the Mesa segment. The Mesa segment is bounded as follows: to the north by Broadway Road; to the east by Stapley Drive; to the south by Baseline Road; and, to the west by Center Drive (Figure 38). The Mesa segment occupies approximately 1,650 acres of land.

Based on the review of the zoning map obtained from the City of Mesa Planning Department (Figure 41), current zoning for the Mesa segment includes:

- AG (agriculture),
- R1-6 (single residence),
- R-2 (restricted multiple residence),
- R-3 (limited multiple residence),
- R-4 (general multiple residence),
- O-S (office-Service),
- C-1 (neighborhood commercial),
- C-2 (limited commercial),
- C-3 (general commercial),
- M-1 (limited industrial)
- M-2 (general industrial), and
- PF (public facilities).

Schools, parks, bonus intensity zone (B.I.Z.), and planned area development (P.A.D.) are shown on the map as un-coded. Current zoning in the vicinity of the Mesa segment includes those listed above.

Current zoning to the south (Baseline Road) is reflected in those zoned areas for the Gilbert segment of the Study Area. An aerial photograph taken of the Mesa Segment in 2001 (Figure 40) also shows the industrial, commercial, and residential use areas.

4.5.2 Current Water Use

The following subsections describe current groundwater and surface water uses within the boundaries of the SMWRS.

4.5.2.1 Current Groundwater Use

The SMWRS is located within the boundaries of Mesa and Gilbert, both of which are water providers in the area and have the right to pump and deliver groundwater to customers. SRP also is a water provider and owns and operates wells in the area. SRP also has the right to pump and deliver groundwater to customers. AMEC also identified several possible private groundwater users. Table 10 provides a list of registered production wells within the boundaries of the Land and Water Use Study Area.

4.5.2.1.1 City of Mesa

Mesa currently operates one well within the boundaries of the Land and Water Use Study Area. This well is identified as Mesa Well 14 and is located at the intersection of Horne Street and Dolphin Avenue in Mesa, Arizona (see Figure 1). Well construction details for Mesa Well 14 are provided in Table 10. Mesa Well 14 is screened in the MAU and provides a backup supply of drinking water to the City of Mesa. Mesa Well 14 is periodically used, primarily during dry up of SRP canals and shortages of surface water supplies. The following quantities of water have recently been pumped from Mesa Well 14:

- 362.27 acre-feet (af) during 1998;
- 37.38 af (1999);
- 223.2 af (2000); and
- 44.79 af (2001).

As discussed in Section 4.3.2.3.2, with the exception of TDS concentrations slightly above the SMCL of 500 mg/L, Mesa Well 14 delivers relatively good quality water.

4.5.2.1.2 Town of Gilbert

The Town of Gilbert currently owns no wells within the boundaries of the Land and Water Use Study Area. However, in an E-mail communication to AMEC dated October 30, 2002, Mr. Greg Elliot of SRP indicated that SRP Well 29E-1N is connected to the Gilbert water supply system (SRP, 2002e). As shown on Figure 1, SRP Well 29E-1N is located at the northwest corner of Stapley Drive and Southern Avenue in Mesa, which is within the boundaries of the SMWRS and Land and Water Use Study Area. According to SRP, this well is minimally pumped and apparently provides a backup supply of water to Gilbert. According to SRP Records, SRP Well 29E-1N has not been pumped since January 2000, during which time 0.14 af of water were pumped. The maximum amount of water pumped from the well was 1,506.84 af pumped in 1990 (SRP, 1996). From January 1991 through May 2002, a total of 42.79 af of water was pumped from the well (SRP, 1996 and 2002a).

4.5.2.1.3 Salt River Project

As shown in Table 1, SRP currently owns six irrigation wells within the boundaries of the Land and Water Use Study Area. SRP Wells 28E-0N and 28.5E-1N are located within the boundaries of the SMWRS study area. As indicated in Table 2, these wells are impacted by PCE above the AWQS of 5.0 µg/L. According to information obtained from ADWR and SRP, SRP Well 28.5E-1N was taken off-line in 1994 and SRP Well 28E-0N was taken off-line in 1997. Both wells have been minimally pumped since 1997 for maintenance and groundwater sampling purposes. As of the date of this report, SRP Well 28E-0N had not been pumped during 2002. Approximately 30.70 af of water was pumped from SRP Well 28.5E-1N during July 2002 (SRP, 2002c).

SRP owns an additional well within the boundaries of the SMWRS, identified as SRP Unnumbered (Figure 1). This well is apparently inactive and has not been pumped for at least 20 years. This well is reportedly currently owned by Ms. Vera Herrera.

4.5.2.1.4 Private Users

The SMWRS and Land and Water Use Study Area are located in the Phoenix Active Management Area (PAMA), an area where groundwater use is controlled and regulated. Private parties must have the right to pump and use the groundwater prior to using it.

There are two rights that parties can use to pump groundwater within the PAMA, an exempt right or a non-exempt right. All property owners have the right to pump up to 35 gallons per minute (gpm) of groundwater for use at that property. This right is referred to as an “exempt right” and carries the conditions that the

- on-site well must be registered with the Arizona Department of Water Resources (ADWR),
- the well must meet applicable well installation criteria, and
- the water must be used at the property on which the well is located.

Pumping of more than 35 gpm requires a “non-exempt right”. Three non-exempt rights available to private parties are listed below:

- Grandfathered Irrigation Rights, which are attached to the property;
- Type 1 rights, which are typically converted Grandfathered Irrigation Rights and are attached to the property; and
- Type 2 rights, which are floating rights and are attached to wells.

Table 10 includes a list of private well owners within the boundaries of the Land and Water Use Study Area. Table 11 provides a list of parties holding Type 1 rights within the boundaries of the Land and Water Use Study Area and Table 12 provides a list of parties holding Type 2 rights within the PAMA. It should be noted that a person holding a Type 2 right can pump water from anywhere in the PAMA as long as the wells are registered with ADWR and the quantity pumped from a single well or combination of wells does not exceed the annual allocation for that certificate.

ADEQ conducted a groundwater use survey that consisted of mailing out groundwater use survey forms to property owners holding water rights within the Study Area. The survey was mailed out on December 9, 2002 to 37 property owners within the Study Area, with a request to respond back by January 10, 2003. Out of the 37 surveys mailed out, nine responses were received. 14 forms were returned by the post office marked address unknown or insufficient address. Of the nine returned survey forms received, none of the property owners stated either ownership of a well or plans to use groundwater in the future.

On January 27, 2003, the ADEQ contacted a Ms. Betty Coyle Hochstetter regarding the use of a domestic well (ADWR number 55-644248) on the property located at 740 East Eighth Avenue in Mesa, Arizona. Ms. Hochstetter no longer owns the property, but contended that there never was a well on the property. She believes that what was thought to be a well was really a large hole in the ground formed as a result of the rotted roots of a removed pecan tree. The house was apparently built on a former pecan orchard. She referred ADEQ to Ms. Nellie Owens Rogers who still lives in the area at 748 South Horne in Mesa and whose family owned the property which contained the pecan orchard.

On February 14, 2003, the ADEQ talked with Ms. Rogers at her residence in Mesa. According to Ms. Rogers, there never was a well on the former Hochstetter property. She stated that wells were located along South Horne and have since been paved over. Ms. Rogers confirmed that her family and her father purchased the property in this area in the late 1800s and a pecan orchard had existed on the property.

ADEQ then interviewed a Ms. Stella Diaz, sister of Vera Herrera and the current owner of the house at 740 East Eighth Avenue. Ms. Diaz stated that there was no well on the property. She stated that there was a hole in the backyard that they used to dispose of leaves. Apparently the hole never filled up even though they keep putting leaves in it. At one time they tried dumping dirt in the hole. ADEQ did not observe any wells on the former Hochstetter property but did observe the location of the hole filled with leaves. Based on the interviews and the site reconnaissance, potential use of groundwater from the Hochstetter well for domestic purposes was ruled out.

Based on the results of the groundwater use survey, the Cooley Well (55-636810), located at 765 East Baseline Road in Gilbert, Arizona, was the only identified private well within the Study Area. ADEQ attempted to contact the current owners of the property to verify the existence and/or use of the well. ADEQ was unable to locate the current owners of the property. The current occupants of the property had no knowledge of a well being located on the property. ADEQ staff performed a visual survey of the property and were unable to locate the supposed well.

4.5.2.2 Current Surface Water Use

The only surface water located within the Land and Water Use Study Area are several shallow ponds at the Kokopelli Golf Club, located in the southwest corner of the Land and Water Use Study Area. On March 23, 2000, John Lineman of the Kokopelli Golf Club was contacted regarding the source of water for the ponds. Mr. Lineman indicated the water was obtained from treated effluent supplies provided by Gilbert and from the Western Canal. The ponds are not supplied by pumped groundwater.

Other surface water bodies located close to the Land and Water Use Study Area include the Western Canal, which is located approximately 0.5 miles south of Guadalupe Road in Gilbert and Chandler, and the Consolidated Canal, which is located approximately 2 miles east.

According to SRP, water pumped from Well 28E-0N was conducted via a piped lateral west and south to a connection with a westward flowing open lateral at Alma School Road, approximately one-half mile south of Guadalupe Road. This lateral eventually discharges to the Western Canal. The Western Canal flows to the west. As indicated above, the ponds at Kokopelli Golf Club receive water from the Western Canal. However, considering that the lateral discharges to the west and downstream of the Kokopelli Golf Club, the surface water use at the Kokopelli Golf Club should not be impacted.

5.0 NATURE AND EXTENT OF CONTAMINATION

5.1 Source of the Release

Based on the Phase I and II Investigations and the PA/SI work conducted by ADEQ, a metal-plating facility and drywell located near the intersection of Mesa Drive and Baseline Road were identified as a source of the VOC impact in the SMWRS. The former AMI facility operated a metal plating facility at 1545 North McQueen Road in Gilbert, Arizona (Figure 1). AMI leased the property from 1979 to 1990. The drywell was located on the same property. Figure 2 shows a site plan of the former AMI facility.

AMI used a chemical called *Perclene*, which contained 99 percent PCE (Water Resources Associates [WRA], 1991). Wastewater from the facility was discharged to the on-site drywell (The Earth Technology Corporation [Earth Tech], 1995). Other suspected sources of PCE included tanks, process equipment and drums stored inside and outside the building.

AMI operated a facility that produced metal-plated electronic parts. Parts were plated with tin, copper, chromium, nickel and zinc. Metals and cyanide in soil and groundwater were issues of concern within the SMWRS. The plating process required the use of acids (chromic, nitric, sulfuric and hydrochloric) and cyanide (copper plating process). Acids (nitric, sulfuric, hydrochloric, acetic and phosphoric) and chlorinated solvents were used to clean/degrease parts prior to plating.

Based on the findings of soil and groundwater investigations performed at the former AMI facility, sources of contaminants to the subsurface included the former drywell, process equipment, the septic system, and the leach field in the western portion of the former AMI facility.

5.2 Selection of Compounds of Potential Concern

Compounds of potential concern (COPCs) were selected and separated from naturally occurring or background compounds. Based on the investigations that have been performed at the SMWRS, the hazardous substances that were released were VOCs, metals, and potentially cyanide. The releases potentially impacted three environmental media: air, vadose zone (unsaturated) soils, and groundwater. All detected compounds were initially considered COPCs. Compounds were then eliminated from further consideration through comparison to

background concentrations and regulatory or risk-based criteria. The following subsections discuss the selection of COPCs for each medium that may have been impacted.

5.2.1 Groundwater

The investigation performed by ADEQ delineated an approximate 1.5-mile long VOC groundwater plume apparently originating from the former AMI facility (Figure 1). Since 1983, groundwater samples collected from the SMWRS wells have been analyzed for VOCs, metals, and general chemistry. The following subsections discuss the selection of COPCs.

5.2.1.1 Volatile Organic Compounds

VOCs reported by EPA Methods 502.2, 601, 602, 8021, and 8260 include the following:

- ethers (i.e., methyl-tertiary-butyl ether [MTBE]);
- ketones (i.e., methyl-ethyl-ketone [MEK]);
- alcohols;
- aromatic hydrocarbons (i.e., benzene, toluene, ethylbenzene, and xylene [BTEX]);
- halogenated hydrocarbons, also referred to as chlorinated or halogenated solvents, (i.e. PCE and TCE) and
- trihalomethanes (THMs) (i.e., chloroform, bromodichloromethane and dibromochloromethane).

VOCs do not occur naturally in groundwater. The VOCs detected in the groundwater resulted from a release and were initially considered COPCs.

A summary of groundwater analytical results from the SMWRS well network is provided in Table 2. Table 7 is a summary of VOC analytical results for discrete groundwater samples that were collected during drilling of BARCAD wells MW-9 through MW-12.

Acetone, BDCME, bromoform, and DBCME have also been detected in water samples collected from BARCAD wells MW-9, MW-10, MW-11, and MW-12. The reported concentrations of these compounds have not exceeded their respective AWQSS. Therefore, these compounds were not considered COPCs and were not listed in Table 2.

The AWQSS are the established cleanup standards for Arizona groundwater. As shown in Tables 2 and 7, the VOCs that have exceeded their AWQSS prior to 2008 were 1,2-DCA, 1,1-DCE, PCE, and TCE. Since July 2000, PCE and TCE were the only VOCs that exceeded the AWQSS. PCE and TCE remained as COPCs in the groundwater requiring further assessment. The extent of VOC contamination presented in Section 5.3.1 is limited to these 2 COPCs.

5.2.1.2 Metals

As indicated above, the former AMI was a metal plating facility and heavy metals were initially considered COPCs in groundwater. The metals analytical suite initially consisted of the following: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, total chromium, hexavalent chromium, cobalt, copper, iron, lead, lithium magnesium, manganese, nickel, selenium, silver, strontium, vanadium and zinc.

Groundwater samples collected from July 2000 to March 2001 were analyzed for heavy metals. Following the December 2000 groundwater sampling event, several of these metals either had not been detected, had not exceeded listed AWQSS, or did not have listed AWQSS. The metals analytical suite was subsequently reduced to arsenic, chromium, iron, manganese, and nickel.

Arsenic, chromium and nickel were retained due to periodic detections of these metals above their respective AWQSS of 0.05 mg/L, 0.10 mg/L, and 0.10 mg/L in AMI facility well MW-AM-8S.

As discussed in Section 3.2.2, arsenic, chromium, iron, manganese, and nickel are also eliminated from further consideration as COPCs in the groundwater for the following reasons:

- Detected concentrations of arsenic and chromium above their respective AWQS of 0.05 mg/L and 0.010 mg/L were limited to MW-AM-8S.
- Detected concentrations of manganese above the AWQS of 4.9 mg/L resulted from acetone-enhanced reduction of naturally occurring Mn^{+4} and was limited to wells MW-9-135, MW-9-175, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235 and MW-11-170, MW-11-200, and MW-11-240.
- Detected concentrations of nickel above the AWQS of 0.10 mg/L were limited to well MW-AM-8S.

5.2.2 Soil

The soil investigation was limited to the AMI facility. Initial soil investigation work was performed prior to and during operation of the SVE system at the AMI facility. The COPCs that were selected for further evaluation were selected from the soil, soil vapor, and ambient air sample data that were collected in May 2001, August 2001, September 2001, and July 2002. The following subsections discuss the selection of COPCs for further consideration in the soil.

5.2.2.1 Volatile Organic Compounds

As discussed in Section 3.1.3, evaluation of the nature and extent of VOCs in the vadose zone soil was performed by collecting soil samples, soil vapor samples (passive and active), and ambient air samples. Due to the previous use of PCE as a degreaser at the site, PCE was the primary chemical of concern (COC). Under certain conditions, specifically the presence of biologically available organic carbon and certain electron acceptors, PCE will reductively dechlorinate in the environment to TCE, c-1,2-DCE, and possibly vinyl chloride (see Section 6). Vinyl chloride has not been detected in groundwater samples collected from the SMWRS wells. However, TCE and c-1,2-DCE have been detected in groundwater samples. Therefore, TCE and c-1,2-DCE were included as COCs in the soil.

As discussed in Section 3.1.2, a passive soil vapor survey, involving the collection of 43 passive soil gas samples, was performed to obtain a surficial representation of the vadose zone VOC impact and to identify areas for additional subsurface investigation. The passive soil vapor samples were analyzed for 1, 1-DCE, methylene chloride, t-1,2-DCE, 1,1-DCA, c-1,2-DCE, TCA, carbon tetrachloride, 1,2-DCA, TCE, and PCE using EPA Method 8021. 1, 1-DCE, c-1,2-DCE, TCA, TCE and PCE were the only compounds reported above detection limits. Therefore, 1, 1-DCE, c-1,2-DCE, TCA, TCE, and PCE were initially listed as COCs in the soil.

PCE was detected in all 43 samples, TCE was detected in 40 of the 43 samples, c-1, 2-DCE was detected in five of 43 samples, TCA was detected in three of 43 samples, and 1,1-DCE was detected in 1 of 43 samples. TCA and 1,1-DCE were;

- not reportedly used at the site,
- detected in a minimal number of samples, and
- not detected in groundwater samples collected from July 2000 through August 2002.

Therefore, TCA and 1,1-DCE were eliminated from further consideration as COPCs. (Note: TCA and 1,1-DCE are reported on the EPA Method 8260 analytical reports although TCA and 1,1-DCE were not targeted during at the time.)

Six soil borings were used to perform the subsurface investigation. During drilling of the soil borings, 36 soil samples and 44 soil gas samples were collected and analyzed for VOCs, with the primary COCs being PCE, TCE and c-1,2-DCE. PCE, TCE and c-1, 2-DCE were not detected above laboratory reporting limits (LRLs) and minimum soil cleanup levels in the soil samples. However, as shown in Table 6, PCE was detected in 33 of the 44 soil gas samples, and c-1, 2-DCE was detected in one of the 44 soil gas samples. TCE was not detected in the soil gas samples.

The detected PCE concentrations in the soil gas samples were compared to the EPA Region 9 PRGs for ambient air. As indicated in Table 6, the detected PCE concentrations ranged from 0.89 mg/m³ to 480 mg/m³, which were above the PCE PRG of 0.00067 mg/m³. As shown in Table 6 and on Figure 6, detectable vapor phase PCE extended to the water table.

As shown in the figures provided by Beacon in Appendices E and F, a large area of elevated PCE soil gas concentrations was present below the 1545 North McQueen Road building, primarily below Suites 1 through 3. Migration of VOCs into the building from the vadose zone was a possible exposure route.

To evaluate the migration of VOCs into the building, ambient air samples were collected inside and outside the building. The following compounds were reported in the samples above detection limits:

- 2-butanone (methyl ethyl ketone [MEK]),
- 2-propanol,
- 4-ethyltoluene,
- acetone,
- benzene,
- 1,2,4-trimethylbenzene,
- cyclohexane,
- dichlorodifluoromethane (Freon-12),
- ethylbenzene,
- heptane,
- hexane,
- m- & p-xylene,
- methylene chloride,

- o-xylene,
- tetrahydrofuran,
- toluene,
- trichlorofluoromethane (Freon-11),
- PCE, and
- TCE.

Most of these compounds were detected in Sample 7, which was collected outdoors. Therefore, a majority of these compounds were considered background air contaminants. PCE and TCE were not detected in Sample 7 or were detected at concentrations lower than the indoor samples and had been detected in soil and soil vapor samples below the site. Therefore, it was concluded that PCE and TCE vapors were migrating into the building from the underlying soils.

The PCE and TCE concentrations are summarized in Table 8 and are compared to four evaluation standards, the EPA Region 9 PRGs (commercial [CPRG] and residential [RPRG]) (EPA, 2004) and residential and commercial incidental lifetime cancer risk standards (RILCR and CILCR, respectively). The detected PCE and TCE concentrations did not exceed the commercial standards (CPRGs, and CILCRs).

As discussed in Section 3.6, AMEC began operation of an SVE system in September 2004 to mitigate migration of PCE and TCE vapors into the building. The vapor analytical results are summarized in Table 14 and the vapor analytical reports are provided in Appendix N. Through November 2007, more than 168 pounds of PCE were removed from the subsurface by the SVE system.

Vapor samples were collected from the SVE system on October 12, 2007. Analytical results indicated that the VOC concentrations had reached asymptotic or relatively unchanging conditions and a decrease in VOC vapor concentrations was no longer observed.

One confirmation Indoor Air Quality (IAQ) sample was collected on November 21, 2007. PCE was the only VOC detected in the IAQ sample. PCE ambient air concentrations had decreased from the December 2002 high of 118 ppbv to 0.85 ppbv on November 21, 2007. The 2007 detected PCE concentration was below the *de minimus* CILCR.

Based on the October 2007 vapor sampling results and the November 2007 IAQ sampling results, the SVE system was shut down and decommissioned. The SVE system was removed from the site in May 2008.

5.2.2.2 Metals

The former AMI facility plated chromium, copper, nickel, tin and zinc on metal parts. Therefore, chromium, hexavalent chromium, copper, nickel and zinc were listed as COCs in the soil. As discussed previously in Section 5.2.1.2, 40 soil samples collected from borings LB-1 through LB-4, LB-6 and LB-7 were analyzed for arsenic, total chromium, hexavalent chromium, copper, nickel, and zinc. The analytical results are summarized in Table 5. As shown in Table 5, total chromium, copper, nickel and zinc were detected above LRLs in the soil samples but the reported concentrations did not exceed the RSRLs and GPLs for these metals. Arsenic and

hexavalent chromium were not detected above LRLs in the samples. Based on this and the elimination of these metals as COPCs in groundwater, total chromium, hexavalent chromium, copper, nickel, and zinc were also eliminated as COPCs in the soil.

Arsenic had been detected above the AWQS of 0.05 mg/L in groundwater samples collected from MW-AM-8S. Therefore, arsenic was listed as a COC in groundwater.

5.2.2.3 Cyanide

AMI used cyanide in the metals plating process. A total of 40 soil samples were analyzed for total cyanide using EPA Method 9014. The analytical results are summarized in Table 5. Cyanide was not detected in the samples above the LRL. The LRL is below the RSRL of 1,300 mg/kg. Therefore, cyanide was eliminated as a COPC in the soil.

5.3 Extent of Contamination

In order to identify potential receptors and evaluate risks, which are used to draft the remedial objectives, the nature and extent of contamination in each contaminated media must be defined. Two media at the site are contaminated groundwater and soil. Ambient air was also contaminated. However, this is considered an exposure pathway from the soil. Therefore, ambient air was already discussed as part of the soil discussion.

5.3.1 Groundwater

The COPCs in the groundwater are PCE and TCE. The following subsections discuss the extent of contamination for each COPC in groundwater.

5.3.1.1 PCE

PCE was the most extensive COPC at the SMWRS. As discussed in Section 4.3, there are two aquifers of concern at the SMWRS, the UAU and MAU. Additionally, the UAU is subdivided into four hydrologic zones, identified as Zones UAU1 through UAU4. Currently, groundwater flows in a southerly direction. As shown on Figure 1, the plume migration pathway approximately follows a southwest to northeast line connecting the AMI facility, MW-7D, SRP Well 28E-0N, and MW-12. Based on the results of the groundwater investigation presented in Sections 3.1.4, and 3.2.1, Subsections 5.3.1.1.1 – 5.3.1.1.5 below summarize the extent of PCE contamination in each aquifer or sub zone:

5.3.1.1.1 UAU1

PCE concentrations ranged from 1.3 – 59 µg/L. The maximum concentration was detected in the former AMI facility sample LB-1-W-130. The AWQS plume extent is defined on the west by MW-1S-130; on east by MW-4S-135 and MW-5S-130; and on the north by MW-12-159 (Figure 1).

The groundwater flow direction shifted to a southerly direction in June 2005. An additional BARCAD well was installed south of the former AMI facility. Based on an October 2008 sampling event, the extent of PCE impact to the south of the former AMI facility is apparently defined. However, at least one additional sampling event is required to confirm this conclusion.

5.3.1.1.2 UAU2

PCE concentrations ranged from 1.0 – 110 µg/L. The maximum concentration of 110 µg/L was detected in monitor well MW-AM-8S (located on the former AMI facility). The AWQS plume extent was defined on the west by MW-1S; on east by MW-4S, MW-5S and MW-2D and on the north by MW-2D and MW-12-183.

The groundwater flow direction shifted to a southerly direction in June 2005. An additional BARCAD well was installed south of the former AMI facility. Based on an October 2008 sampling event, the extent of PCE impact to the south of the former AMI facility is apparently defined. However, at least one additional sampling event is required to confirm this conclusion.

5.3.1.1.3 UAU3

PCE concentrations ranged from 5.4 – 41 µg/L. The maximum concentration of 41 µg/L was detected in mid-plume well MW-7D. The AWQS plume extent was defined on the west by MW-3S; on east by MW-2D, and on the north by MW-2D and MW-12-217.

The groundwater flow direction shifted to a southerly direction in June 2005. An additional BARCAD well was installed south of the former AMI facility. Based on an October 2008 sampling event, the extent of PCE impact to the south of the former AMI facility is apparently defined. However, at least one additional sampling event is required to confirm this conclusion.

5.3.1.1.4 UAU4

PCE concentrations ranged from 1.1 – 18 µg/L. The maximum concentration of 18 µg/L was detected in well MW-9-235 in December 2004. The AWQS plume extent was defined on the west by MW-1D and MW-3S-225; on east by MW-2D-240, and on the north by MW-2D-240 and MW-12-238.

The groundwater flow direction shifted to a southerly direction in June 2005. An additional BARCAD well was installed south of the former AMI facility. Based on an October 2008 sampling event, the extent of PCE impact to the south of the former AMI facility is apparently defined. However, at least one additional sampling event is required to confirm this conclusion.

5.3.1.1.5 MAU

Minimal data is currently available for the MAU. PCE concentrations ranged from 4.1 – 13 µg/L. The maximum concentration of 13 µg/L was detected in SRP well 28E-0N-5 in December 2004.

The entire saturated thickness of the UAU is apparently contaminated with PCE above the AWQS of 5.0 µg/L. The range of PCE concentrations is 1.0 to 110.0 µg/L. The maximum concentrations are present in Zone UAU2. The PCE plume in the UAU is approximately 0.35 miles wide by 1.5 miles long, covering an area of approximately 0.53 square miles or 336 acres (Figure 1).

The extent of the PCE plume in the MAU is unknown. Prior to partial abandonment in 1997, SRP Well 28.5E-1N was 700 feet deep. The detected PCE concentration in that well in October 2005 was 9.8 µg/L. It is unknown if a continuous PCE plume is present between SRP Wells

28E-0N and 28.5E-1N. Data from Mesa Well No. 14 is necessary to evaluate the downgradient extent of contamination in the MAU and evaluate possible impacts to Mesa Well No. 14.

5.3.1.2 TCE

As previously discussed, TCE has been detected in groundwater samples above the AWQS of 5.0 µg/L. TCE has been detected at lower concentrations than PCE and was not as widespread in extent at the SMWRS. TCE was reportedly not used by AMI. Because of the lower TCE concentrations and limited extent of TCE impact, it is believed that the TCE detected in the SMWRS wells likely originated from PCE degradation.

5.3.1.2.1 Upper Alluvial Unit

TCE has historically exceeded the AWQS of 5.0 µg/L in AMI facility well MW-AM-8S and in samples collected from SRP Well 28E-0N. Discreet groundwater samples LB-2-GW-130 and LB-2-GW-170 also contained 7.3 µg/L and 8.5 µg/L of TCE, respectively, which were above the AWQS of 5.0 µg/L (Table 7). TCE was not reported above the laboratory detection limit of 1.0 µg/L in the depth-specific groundwater samples collected from SRP Well 28E-0N in July 2002. TCE in the UAU above the AWQS of 5.0 µg/L was limited to the vicinity of the former AMI facility.

5.3.1.2.2 Middle Alluvial Unit

As shown in Table 2, samples collected from SRP Well 28E-0N contained TCE concentrations above the AWQS of 5.0 µg/L. However, later samples collected from SRP Well 28E-0N, including the July 2002 diffusive bag samples, did not contain TCE above the laboratory detection limits. Samples collected from SRP Well 28.5E-1N also contained TCE below the AWQS of 5.0 µg/L.

5.3.2 Soil

The COPCs in soil are PCE and TCE. The following subsections discuss the extent of contamination in the soil.

5.3.2.1 PCE

PCE was not detected in the soil samples collected from borings LB-1, LB-2, LB-3, LB-4, LB-6 and LB-7 (see Figure 5 for locations). The presence of residual NAPL or dissolved-phase PCE was not indicated in the soil samples.

The PCE impact in the vadose zone was apparently limited to vapor-phase PCE. The highest vapor-phase PCE concentrations were detected in the samples collected from the sandy intervals present from approximately 20 feet bgs to 35 feet bgs [Zone A] and from approximately 45 feet bgs to 60 feet bgs [Zone B] (Table 6). The PCE concentrations attenuate with depth through the coarse-grained sediments from approximately 62 feet bgs to the water table [Zone C]. However, the presence of detectable vapor-phase PCE near the water table indicated that the vapor-phase PCE impact extended to the water table, particularly at boring LB-1.

Based on the comparison of the soil gas results for boring LB-1 to the passive soil gas survey results, a soil vapor mound, similar in profile to LB-1, may have been present along a line connecting the former process area with LB-1. The passive soil vapor gas results indicated that the vapor plume was defined in extent to the east, north, west, and south. The investigation confirmed that operation of the SVE system was effective in removing PCE from the vicinity of the drywell. More than 168 pounds of PCE were removed by the SVE system since September 2004.

The initial indoor air quality samples collected on June 27, 2002 indicated that PCE vapors were migrating into the 1545 North McQueen Road building from the underlying soils. The highest PCE concentrations were detected in the indoor air quality samples collected from Suite 1, which directly overlies the area of highest PCE concentrations detected in the passive soil gas samples.

The SVE system operated from September 2004 to October 2007 to mitigate the migration of PCE vapors into the building. Since September 2004 more than 168 pounds of PCE have been removed from below the building by the SVE system. The SVE system was shut down in October 2007 and was decommissioned in May 2008.

5.3.2.2 TCE

TCE was reportedly not used as a solvent by AMI. However, TCE is a known reductive dechlorination daughter product of PCE. Naturally occurring anaerobic bacteria will reductively dechlorinate PCE in both the vadose zone and groundwater as long as there is organic carbon (electron donor), moisture, nutrients, and electron acceptors (nitrate, sulfate, ferric iron or tetravalent manganese) available. The passive soil gas samples collected at the septic system and at sample No. 39 contained the highest TCE concentrations. Septic system leachate contains high concentrations of organic carbon, nutrients and electron acceptors, which increase the reductive dechlorination activity.

TCE was not detected in the depth-specific active soil gas samples collected from borings LB-1, LB-2, LB-3, LB-4, LB-6 and LB-7 but was detected in the indoor air quality samples. The laboratory detection limit for the active soil gas samples was 1.0 mg/m^3 or $1,000 \text{ }\mu\text{g/m}^3$ and the laboratory detection limit for the passive soil gas (indoor air quality) samples was $0.50 \text{ }\mu\text{g/m}^3$.

Although TCE was not detected in the active soil gas samples, the indoor air quality samples indicated that TCE was present in the vadose zone at concentrations ranging from $0.50 \text{ }\mu\text{g/m}^3$ to $1,000 \text{ }\mu\text{g/m}^3$ (less than the detection limit for the active soil gas samples).

Two areas where elevated TCE concentrations were detected during the passive soil gas surveys (Beacon Figure 3, Appendix E) are listed below:

- The western portion of the AMI facility - centered around soil gas sample No. 39. (The highest PCE concentrations were also obtained in this area.) The area is defined on the west by samples 41 through 43, on the south by sample 40, and on the east by samples 32 and 33.
- The septic tank area - defined on the south by sample 32, on the east by samples 21 and 22, on the north by sample 28 and on the west by samples 34 and 36.

In addition, elevated TCE concentrations were also detected in two smaller areas located at samples 1 and 18. As with PCE, the highest TCE concentrations were detected in the indoor air quality samples collected in Suite 1.

6.0 CONTAMINANT FATE AND TRANSPORT

6.1 Contaminant Characteristics

The COPCs in both soil and groundwater are PCE and TCE. PCE was the compound that was released at the AMI facility and had the most extensive distribution in the soil and groundwater at the SMWRS. TCE, which was reportedly not used at the AMI facility, was limited in extent and may have been a localized reductive dechlorination daughter product of PCE. The following subsections discuss the characteristics of each COPC.

6.1.1 PCE

The PCE impact at the SMWRS was most extensive in the groundwater. The former AMI facility, which was identified as a source of the release, is no longer in business. The release sources have been removed. PCE is not currently used at the 1545 North McQueen Road property. No known release sources are currently present.

PCE is a dense, volatile organic compound having the following properties:

- Density of 1.63 g/cm³;
- Henry's Law Constant of 0.0131 atm-m³/mol and
- Molecular weight of 165.8 grams.

PCE has:

- One of the lowest vapor pressures of the chlorinated solvents (0.018 atm)
- One of the lowest volatilization rates, and
- Tendency to migrate as a liquid through the vadose zone, losing little mass to volatilization.

PCE is relatively insoluble in water, having, at 200 mg/L or 200,000 µg/L, one of the lowest solubility limits of the chlorinated solvents. A NAPL PCE source can remain in the subsurface for a long period of time before it is completely volatilized or dissolved.

PCE tends to sorb to organic carbon and clay in the soil, having a relatively high sediment/water coefficient (K_{oc}) of 364 milliliters per gram (ml/g). Due to the relatively high Henry's Law Constant, PCE tends to partition from the vapor phase to the dissolved phase.

6.1.2 TCE

TCE was reportedly not used by AMI. However, TCE was detected in soil gas and groundwater samples collected at the SMWRS. TCE is a known reductive dechlorination daughter product of PCE (Section 6.4). The limited presence of TCE may have resulted from localized reductive dechlorination of PCE.

TCE is also a dense VOC and has the following properties:

- Density of 1.46 g/cm³;
- Henry's Law Constant of 0.0071 atm-m³/mol; and,
- Molecular weight of 131.5 grams.
- Vapor pressure of 0.076 atm and a
- Solubility limit of 1,100,000 µg/L.

TCE is more volatile and soluble than PCE. TCE also tends to sorb to organic carbon and clay in the soil. However, the K_{oc} of 126 ml/g is approximately one-third the K_{oc} of PCE. In comparison to PCE, TCE is not as readily retained as NAPL in the vadose zone, typically volatilizing or draining. TCE has a lower Henry's Law Constant than PCE. TCE is more likely to partition from the dissolved phase to the vapor phase than PCE. Due to the lower K_{oc} , TCE is more mobile than PCE in soil and groundwater.

6.2 Fate and Transport Processes

This section discusses fate and transport processes, not including biological processes, associated with PCE and TCE. Biological processes are described in Section 6.4.

6.2.1 PCE

PCE was used as a product by AMI to degrease metal parts and clean electronic components. PCE has been identified in the subsurface in the vapor and dissolved phases. Sources of PCE to the subsurface include: the former drywell, the septic tank and the former process equipment area. The southwest corner of the former AMI facility was identified by Earth Tech as a presumed leach field. The leach field was another possible source.

PCE can be released to the subsurface as follows:

- As leakage from equipment or disposal of waste product to the site; and
- As dissolved phase in water or other liquids.

As discussed in Section 6.1.1, PCE, though volatile, tends to remain as a liquid and will migrate as a liquid through the subsurface. Additionally, if dissolved in water, PCE does not readily volatilize from the water. PCE, when released, tends to penetrate surface materials, such as asphalt and concrete, before evaporating. Once in the subsurface, PCE will migrate through the vadose zone and eventually to groundwater with relatively minimal losses due to volatilization compared to other VOCs. However, PCE will volatilize in the subsurface and a vapor trail will be left, particularly in coarser-grained soils with large void spaces.

PCE is relatively insoluble in water and there is a relatively large vapor-phase component in the subsurface. Based on mass extraction calculations and data reported by Earth Tech, approximately 130 gallons of PCE were removed from the soil and groundwater by two earlier ERAs. As previously indicated, an additional 168 pounds (approximately 12 gallons) of PCE was removed by the SVE system since September 2004.

The former AMI facility was not fully characterized until after SVE and groundwater remedial actions were performed. Based on the results of the former AMI facility characterization and the chemical properties of PCE, the following interpretation of PCE migration patterns is presented below:

1. PCE was intermittently discharged to the former drywell and septic system during operation of the AMI facility. PCE was also intermittently leaked or spilled in the process equipment area. The practice of discharging wastes to the drywell and septic system was probably discontinued following the 1983 discovery of PCE in SRP Well 28E-0N.
2. Released PCE migrated both vertically and laterally through the vadose zone. Lateral migration occurred through the sandy intervals present from approximately 40 to 50 feet bgs and from 55 to 62 feet bgs.
3. Based on the passive and active soil gas sample analytical results, PCE entering this interval primarily migrated toward the west and southwest, collecting in the southwest corner of the AMI facility.
4. Passive soil gas survey data indicated that PCE did not migrate across McQueen Road. Soil gas data, collected during SVE operation and during the former AMI facility characterization, did not indicate the presence of NAPL PCE in the vadose zone.
5. PCE penetrated the fine-grained intervals present from approximately 40 to 50 feet bgs and from 55 to 62 feet bgs and migrated into the coarse sediments. Due to the low retentive capacity of the coarser sediments, the PCE drained vertically towards the water table, which was present at a depth of 180 feet bgs or more at the time the PCE discharges occurred.
6. As the PCE migrated vertically, NAPL PCE was possibly deposited on and within the fine-grained intervals identified at approximately 140 feet, 175 feet, and 205 feet bgs. Based on the fact that the PCE impact in the groundwater extends to Zone UAU4, PCE penetrated the three clay zones.
7. Following the discovery of PCE in samples collected from SRP wells 28E-0N and 28.5E-1N in 1983, pumping of groundwater in the area was minimized or discontinued. After 1983, water levels at the AMI facility began to rise, eventually encountering PCE above and within the clay layers.
8. From 1995 to 1997, the SVE system removed approximately 1,107 pounds of VOCs from the vadose zone near the former drywell. Based on the results of the passive soil vapor survey and analytical results for soil gas samples collected from boring LB-3, the SVE system effectively removed a majority of the PCE from this area, eliminating a source of groundwater impact.
9. Based on the passive and active soil gas data, an extensive vapor plume was present beneath the 1545 North McQueen Road building, extending from the former process

equipment area to the southwest corner of the AMI facility. SVE system operation since September 2004 removed more than 168 pounds of PCE from the ground.

The subsurface impact at the SMWRS involves both the vadose and saturated zones. The following subsections discuss PCE fate and transport physical processes in the vadose and saturated zones. Biologic processes are discussed in Section 6.4.

6.2.1.1 Vadose Zone

6.2.1.1.1 NAPL PCE

As indicated above, the data did not indicate the presence of residual NAPL PCE in the vadose zone. The release sources had been removed. The former AMI facility was covered by pavement and the building. Water infiltration was minimal.

6.2.1.1.2 Vapor-Phase PCE

The primary physical processes that affected the distribution of vapor-phase PCE in the vadose zone were gravity flow, advective transport, dispersion, and dissolution. Each physical process is described below:

Gravity Flow

Vapor-phase PCE in the vadose zone can move both laterally and vertically via gravity flow. PCE vapors are heavier than air. PCE vapors will naturally migrate vertically downward through the vadose zone under the influence of gravity.

As shown in Table 6, the highest vapor-phase PCE concentrations were present in the sandy intervals present at 30 and 50 feet bgs. The PCE concentrations were significantly lower in the finer-grained intervals. The concentrations decreased with depth through the coarser sediments.

Advective Transport

Advective transport of vapor-phase PCE is via airflow in the vadose zone. Though airflow in the vadose zone would not be expected under natural conditions, changes in barometric pressure can cause air to flow in the vadose zone and thus cause advective transport of vapors, particularly if the soil is open to the atmosphere.

It appeared that PCE vapors were entering the 1545 North McQueen Road building from the vadose zone. Based on the presence of PCE inside the building, contaminant losses were occurring from the vadose zone to ambient air. Advective transport can also be artificially influenced by SVE operation. The SVE system created a pressure gradient, which caused air and vapor-phase PCE to flow toward the extraction well and the SVE system.

Vapor-phase PCE can migrate in the vadose zone via dispersion. Dispersion is the process by which chemical constituents in soil are spread and mixed within the formation air by diffusion and mixing caused by microscopic variations within and between the pores. Dispersion is caused by differences in the velocity that air/vapor travels at the pore volume and differences in

the rate at which air/vapor travels through different strata in the flow path. Dispersion causes dilution of contaminants both longitudinally and laterally to the air/vapor flow direction. There is no loss of contaminant mass through dispersive processes, and the dilution occurs by spreading the contaminant over a larger area. Dispersion is in part responsible for lateral migration of contaminants in the vadose zone.

As shown in Table 6, the highest vapor-phase PCE concentrations were detected in the sandy interval samples collected at 30 and 50 feet bgs. The concentrations were significantly lower in the finer-grained intervals. Lateral dispersion appeared to be more prevalent in the sandy and coarse-grained intervals.

Dissolution

Dissolution is apparently a major component of the PCE impact to groundwater at the SMWRS. Due to its relatively high Henry's Law Constant, PCE will readily partition from the vapor-phase to the dissolved-phase when the vapor-phase PCE comes into contact with water. As water levels rose in Zones UAU1 and UAU2 in 1983 and 1990, vapor-phase PCE was likely encountered and dissolved into the groundwater.

As shown by the soil gas sample analytical results for boring LB-1, the vapor mound that existed below the building and in the southwest corner of the former AMI facility extended to the water table.

6.2.1.2 Groundwater

6.2.1.2.1 Dissolved-Phase PCE

The primary physical processes that affected the distribution of dissolved-phase PCE in the groundwater was advective transport, dispersion, sorption, and volatilization. Each physical process is described below:

Advective Transport

Advective transport results in the movement of contaminants at the same rate and in the same direction as the average linear velocity of the groundwater. Groundwater has historically flowed in a northeasterly direction, resulting in PCE migration in that direction. However, in June 2005, the predominant groundwater flow regime at the SMWRS was in a southerly direction, resulting in migration of PCE back toward the former AMI facility and possibly to the south of the AMI facility.

There are also apparent vertical flow gradients present between the Zones UAU1, UAU2, UAU3, UAU4, and the MAU. Advective transport typically follows the general groundwater flow direction, with the VOC concentrations being greatest near the AMI facility and in Zones UAU2 and UAU3. Based on the vertical contaminant profile results for SRP Well 28E-0N, dissolved-phase PCE is apparently migrating vertically from the UAU to the MAU. Though the concentrations are relatively evenly distributed across the screened interval of the well, there is a decreasing concentration trend with depth.

Dispersion

Dispersion is the process by which chemical constituents in groundwater are spread and mixed within the formation water by diffusion and mixing caused by microscopic variations within and between the pores. Dispersion is caused by differences in the velocity that water travels at the pore volume and differences in the rate at which water travels through different strata in the flow path. Dispersion causes dilution of contaminants both longitudinally and laterally to the groundwater flow direction. There is no loss of contaminant mass through dispersive processes, and the dilution occurs by spreading the contaminant over a larger area. Thus, dispersion is in part responsible for lateral or cross-gradient migration of contaminants in groundwater.

Lateral dispersion at the SMWRS is relatively high due to the overall low groundwater flow velocity that results from the shallow groundwater gradient. The apparent cross-gradient extent of contamination, based on PCE concentrations exceeding the AWQS, is approximately 0.4 miles (see Figure 1). Due to the finer-grained nature of the MAU, groundwater flow velocity in the MAU may be slower than in the UAU. Dispersion is likely a significant factor in PCE distribution in the MAU.

Sorption

Sorption is the process by which chemicals are sorbed onto the surface of sediments. This process results because the surfaces of solids, especially clays and organic soil material, have an electrical charge due to isomorphous replacement, broken bonds, or lattice imperfections. The electrical charge is imbalanced and may be satisfied by adsorbing a charged ion.

Halogenated VOCs characteristically have a high affinity to organic material and can be adsorbed to the surface of organic material in an effort to achieve an ionic balance. Based on the nature of sediments at the SMWRS, which are generally coarse-grained and relatively low in organic material, it appears that sorption plays a relatively small role in the distribution of PCE at the SMWRS, particularly in the coarser-grained UAU. Sorption may play a greater role in PCE distribution in the finer-grained MAU.

Volatilization

In the case of dissolved-phase PCE in the groundwater, volatilization refers to mass transfer from the dissolved-phase to the vapor-phase. Chemical properties affecting volatilization include:

- Vapor pressure and
- Solubility.

Other factors influencing volatilization rates are:

- Concentration in water,
- Temperature and the
- Sorptive and diffusive characteristics of the soil.

Due to its relatively high Henry's Law Constant, PCE partitions from the dissolved-phase to the vapor-phase at a much slower rate than other VOCs. There are likely some dissolved-phase contaminant losses from the groundwater due to volatilization. However, based on the above, they are likely minimal. As indicated previously, the vapor-phase PCE detected in the passive and active soil gas samples collected at the AMI facility resulted from volatilization of residual NAPL in the vadose zone and did not originate from volatilization of dissolved-phase PCE from the groundwater.

6.2.2 TCE

TCE was not reportedly used as a solvent by AMI. TCE is present in the vadose zone in the vapor-phase and is limited in extent in the groundwater in the dissolved-phase. Based on the available data, primarily the relatively low concentrations of TCE in both the vapor- and dissolved-phases, the detected TCE likely resulted from biologic reductive dechlorination of the PCE. A detailed discussion of reductive dechlorination is provided in Section 6.4.

6.2.2.1 Vadose Zone

Based on the data, TCE was present only in the vapor-phase in the vadose zone. TCE was not detected in the active soil gas samples collected from borings LB-1, LB-2, LB-3, LB-4, LB-6, and LB-7. However, TCE was detected in the passive soil gas samples and in the indoor air quality samples.

The fate and transport processes that influence vapor-phase TCE were the same as the processes previously described for PCE. TCE has a slightly higher vapor density than PCE. Vapor-phase TCE will migrate vertically under the influence of gravity at a faster rate than PCE. The vapor-phase TCE was likely present at the highest concentrations in the sandy intervals at 30 feet and 50 feet bgs. It was unlikely that the vapor-phase TCE extended to the water table. The vapor-phase TCE was apparently not a source of dissolved-phase TCE in the groundwater.

6.2.2.2 Groundwater

The TCE impact to the groundwater at the SMWRS was apparently limited to dissolved-phase TCE and limited to the former AMI facility. However, TCE has been historically detected as far downgradient as MW-7D. The TCE was primarily present in Zones UAU1 and UAU2. However, TCE has been detected in wells MW-5D, MW-7D, and MW-11-200, which were Zone UAU3 wells. The highest TCE concentrations were detected in discrete groundwater samples LB-2-GW-130 (Zone UAU1) and LB-2-GW-170 (Zone UAU2), which were collected below the septic tank.

TCE was also detected in samples collected from wells MW-12-183 and MW-12-217. TCE was also present in the portion of the SMWRS between SRP Well 28.5E-1N and MW-12. The concentrations of TCE detected in MW-12-183 and MW-12-217 were below the AWQS of 5.0 µg/L. The fate and transport mechanisms for dissolved-phase TCE in the groundwater are the same as those previously discussed for PCE. The TCE was transported advectively downgradient with groundwater flow. The TCE concentrations decreased downgradient and cross-gradient via dispersion. TCE has a lower Henry's Law Constant than PCE and volatilizes

more readily from groundwater than PCE. There may be concentration losses due to volatilization at the water table.

6.3 Contamination Migration Trends

PCE has been detected at the highest concentrations and has the most extensive distribution in the soil and groundwater at the SMWRS. Therefore, the discussion of contaminant migration trends is limited to PCE.

6.3.1 Vadose Zone

SVE system operation since 1995 has likely resulted in PCE migration toward the vapor extraction wells (VW-1, VW-3, VW-4, VW-5, VW-6 and VW-7).

6.3.2 Groundwater

6.3.2.1 PCE

Based on the groundwater monitoring data, dissolved-phase PCE was migrating downgradient with the groundwater flow toward the north-northeast. However, since June 2005, groundwater has been flowing in a southerly direction. Lateral and downgradient concentration decreases were due to dilution and dispersion. The main body of the PCE plume apparently follows a line that extends from the AMI facility to MW-7D and then to SRP Well 28.5E-1N.

One BARCAD well (MW-14) was drilled and installed in September 2008. The well has four monitoring points in the UAU (130, 163, 186 and 215 feet bgs). Groundwater samples were collected in November 2008. VOCs (PCE, TCE and 1,1-DCE) were not detected in any of the groundwater samples collected from the four monitoring points in monitor well MW-14.

Based on the concentration trends for MW-AM-8S, PCE concentrations at the former AMI facility have been decreasing with time, possibly due to the changes in groundwater flow direction. As shown by the relatively unchanging PCE concentrations with time in samples collected from MW-7D, a continuing source of dissolved-phase PCE may still be present.

PCE also appears to be migrating vertically from the UAU to the MAU via SRP Wells 28E-0N and 28.5E-1N. Due to insufficient monitoring points, downgradient migration trends in the MAU are unknown.

6.3.2.2 TCE

As indicated previously, TCE is limited to the vicinity of the former AMI facility and the portion of the SMWRS between SRP Well 28.5E-1N and MW-12.

6.4 Natural Attenuation Processes

Natural attenuation refers to decreases or attenuation of chemical concentrations as a result of biological processes. If favorable conditions exist or can be created or enhanced, bacteria can effectively degrade or transform hazardous compounds to inert or less-hazardous compounds. Bacteria that can degrade or transform hazardous compounds have been shown to occur

naturally in the environment. In most cases, these bacteria are in a dormant state until conditions become favorable for them to activate. In the event the bacteria aren't present, they can be introduced, along with enhancements.

A critical component for these bacteria to become active is a source of hydrogen. Bacteria utilize hydrogen as an energy transfer mechanism, essentially moving electrons from the compound they are utilizing as a food source to the waste materials. This is also referred to as oxidation. The food source, or electron donor, is organic carbon, which can occur in the form of a hydrocarbon (fuels, coal, alcohols) or carbohydrate (sugars, plant materials). All organic carbon is not biologically appealing or available. Bacteria prefer shorter-chain organic carbon compounds that they can easily breakdown, typically avoiding longer-chain hydrocarbons.

As with all living organisms, bacteria must also be able to breathe or respire. Therefore, a second critical component is the presence of a compound that the bacteria can breathe, which is referred to as an electron acceptor. There are two types of bacteria present, aerobic (or oxygen respiring) bacteria, and anaerobic (or non-oxygen respiring) bacteria.

Aerobic bacteria are relatively simple, consuming organic carbon and transferring hydrogen and electrons to the oxygen they breathe, producing water as a waste product and exhaling carbon dioxide. Aerobic bacteria can be extremely active and aggressive and will rapidly consume organic carbon. Aerobic bacteria are primarily responsible for the natural attenuation of fuel hydrocarbon releases. If oxygen is not available, aerobic bacteria will not become active. Aerobic bacteria may become so prolific that they consume the available oxygen before they consume the organic carbon, thus creating an anaerobic condition. In the cases where oxygen is not naturally present or the oxygen has been consumed by aerobic bacteria, anaerobic bacteria may become active.

If benzene is the electron donor, anaerobic conditions may occur at a benzene concentration as low as 1,000 µg/L.

Anaerobic bacteria are the bacteria that are primarily responsible for biodegradation of halogenated VOCs (HVOCs). There are four types of anaerobic bacteria that may become active:

- nitrate reducers,
- iron/manganese reducers,
- sulfate reducers, and
- carbon dioxide reducers (methanogenic bacteria).

The anaerobic bacteria that are active at a given time and point in a plume are dependent on the available hydrogen concentrations as follows:

- Nitrate Reduction: <0.1 nanoMolars (nM)
- Iron and Manganese Reduction: 0.2-0.8 nM
- Sulfate Reduction: 1-4 nM
- Methanogenesis: 5-15 nM

Another necessary condition for a certain anaerobic bacteria to become active is that there is a supply of electron acceptor available, specifically the presence of nitrate, iron, manganese, sulfate, and carbon dioxide. Nitrate, sulfate, and carbon dioxide can be present in the soil or dissolved in the groundwater. Ferric iron (Fe^{+3}) and tetravalent manganese (Mn^{+4}) coat the soil particles and are insoluble in water.

Anaerobic bacteria are considered to be active when the following conditions are observed:

- Oxygen concentrations less than 0.5 mg/L in water and less than 16 percent in soil vapor.
- Presence of biologically appealing organic carbon.
- Hydrogen concentrations in excess of 0.1 nm.
- Decreased concentrations of nitrate, sulfate, and carbon dioxide relative to background concentrations.
- Increased concentrations of nitrite, sulfide, and methane relative to background concentrations.
- Detection of ferrous iron (Fe^{+2}) and bivalent manganese (Mn^{+2}), which are soluble reductive products of Fe^{+3} and Mn^{+4} .

Other factors in the soil and groundwater that will promote or inhibit natural attenuation include pH, temperature, groundwater velocity, and soil mineralogy. Addition of an electron donor and bacteria does not always mean that natural attenuation of contaminants via biologic processes will occur.

During the July 2000, September 2000, December 2000, and March 2001, AMEC collected natural attenuation indicator data from the SMWRS wells. The data included ammonia, biological oxygen demand (BOD), carbon dioxide (CO_2), chemical oxygen demand (COD), chlorine, ethane, ethene, dissolved hydrogen (DH), methane, nitrate, nitrite, dissolved oxygen (DO), sulfate, sulfide, and total organic carbon (TOC). The results are presented in Table 9. Groundwater samples were also analyzed for Fe^{+2} and Mn^{+4} . The Fe^{+2} and Mn^{+4} analytical results are presented in Table 2 and are discussed further in Sections 3.2.2.3 and 3.2.2.4. The following sections discuss natural attenuation of PCE and TCE.

6.4.1 PCE/TCE

Under certain favorable conditions, anaerobic bacteria can degrade PCE and TCE, which are referred to as chlorinated ethenes (CEs). The conditions that must be present are a sufficient supply of biologically appealing organic carbon, absence of oxygen (anaerobic conditions) and the bacteria must consume the available supply of electron acceptor. In this instance, the bacteria will substitute the CE as an electron acceptor. The bacteria that are capable of utilizing a CE as an electron acceptor are known as dehalorespiring bacteria and the process is referred to as reductive dechlorination.

As previously discussed, the TCE and c-1, 2-DCE detected in the soil gas and groundwater samples collected at the SMWR S likely originated via reductive dechlorination. Each subsequent step results in a daughter compound. TCE is a reductive dechlorination daughter product of PCE. C-1,2-DCE is a reductive dechlorination daughter product of TCE.

It has been demonstrated that reductive dechlorination of PCE and TCE can occur under hydrogen concentrations ranging from <0.1 nM (nitrate reducing) to greater than 15 nM (methanogenic range). However, complete reductive dechlorination of PCE and TCE to ethene occurs when the hydrogen concentrations are in the sulfate reducing range.

Based on the presence of TCE and c-1,2-DCE in soil gas and groundwater samples, reductive dechlorination of PCE and TCE is occurring at the SMWRS. However, the reductive dechlorination is extremely localized. The following subsections discuss reductive dechlorination of PCE and TCE in the vadose and saturated zones.

6.4.1.1 Vadose Zone

TCE and c-1, 2-DCE were detected in the passive soil vapor samples. TCE was detected in the indoor air quality samples. However, TCE was not detected in the active soil gas samples and c-1,2-DCE was only detected in sample LB-2-SG-50. As shown in Table 6, the undiluted detection limit for TCE and c-1,2-DCE in the active soil gas samples was 1.0 mg/m^3 and the TCE and c-1,2-DCE detection limits in samples LB-1-SG-10, LB-1-SG-20, LB-1-SG-30, and LB-1-SG-40, which required dilution, were 5 mg/m^3 , 10 mg/m^3 , 20 mg/m^3 , and 5 mg/m^3 , respectively.

Based on the presence of TCE and c-1,2-DCE in the passive soil gas samples and the presence of TCE in the indoor air quality samples, vapor-phase TCE and c-1,2-DCE are likely present in the vadose zone.

There is an indication that reductive dechlorination of PCE to TCE and TCE to c-1,2-DCE is occurring on a localized scale in the vadose zone at the AMI facility, most likely in the upper 40 feet of the vadose zone.

Vinyl chloride (VC) was not analyzed in the passive and active soil gas samples. However, VC was sampled for in the Indoor Air Quality (IAQ) samples and no VC was detected. VC has not been detected in groundwater samples and it is unlikely that c-1,2-DCE is reductively dechlorinating to VC in the vadose zone.

Referring to the passive soil gas survey results (Appendix E), TCE and c-1,2-DCE were present at the highest concentrations in the western portion of the former AMI facility, near the septic tank and passive soil gas sample 39 and in the vicinity of passive soil gas sample points 17 and 18. Due to the fact that septic tank leachate contains high concentrations of organic carbon, reductive dechlorination of PCE and TCE in this area would be expected.

The presence of elevated TCE and c-1,2-DCE in passive soil vapor samples 17 and 18 is anomalous. These samples were collected near the former location of the steam degreaser. Oils and grease removed by the PCE are also electron donors. The oils and grease dissolved in the PCE may have created conditions favorable for localized reductive dechlorination.

6.4.1.2 Groundwater

Reductive dechlorination indicator data was collected by AMEC during the July 2000, September 2000, December 2000, and March 2001 sampling events. The results are

summarized in Table 9. Iron and manganese data were also collected through the December 2001 groundwater sampling event (Table 2).

The first indicator of reductive dechlorination in the groundwater is the presence of daughter products. TCE and c-1,2-DCE have been detected in groundwater samples collected from the SMWRS.

The second indicator is the aerobic or anaerobic nature of the groundwater. As shown in Table 9, the groundwater contains greater than 2.0 mg/L of dissolved oxygen. The groundwater is generally aerobic, thus prohibiting wide-scale reductive dechlorination. However, the presence of TCE and c-1, 2-DCE indicates that reductive dechlorination of PCE and TCE can occur and is occurring on a localized scale in the groundwater at the SMWRS.

VC has not been detected in the groundwater samples. The data indicates that reductive dechlorination is not proceeding beyond c-1, 2-DCE.

As shown in Table 7, elevated concentrations of TCE and c-1,2-DCE were detected in discrete groundwater samples LB-2-GW-130 and LB-2-GW-170. Boring LB-2 was drilled next to the septic tank. As indicated above, septic tank leachate contains high concentrations of organic carbon. Based on the presence of c-1, 2-DCE, the septic tank provided sufficient organic carbon to promote reductive dechlorination of PCE and TCE to c-1,2-DCE.

Based on the data, c-1, 2-DCE has been detected at elevated concentrations in MW-AM-8S. The c-1, 2-DCE in this well may be originating from the area of the septic tank or may be the result of oil/grease enhanced reductive dechlorination beneath the former process area.

Reductive dechlorination of PCE and TCE was also apparent in BARCAD wells MW-9-130, MW-9-175, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170, MW-11-200, and MW-11-240. As discussed in Section 3.2.1.1, the PCE concentrations in the groundwater samples collected from the wells are considerably lower than the PCE concentrations in the discrete groundwater samples collected from the same borings and depths.

A comparison of the pre- and post-BARCAD installation analytical results indicated that reductive dechlorination may be proceeding beyond c-1, 2-DCE. However, VC has not been detected in the groundwater samples. Though reductive dechlorination indicator data were not collected from the BARCAD wells, the presence of elevated manganese and iron concentrations in the samples collected from the wells indicated that anaerobic biological activity is occurring (Section 3.2.1.1).

Other indicators demonstrate that reductive dechlorination is not occurring on an area-wide scale. The groundwater is aerobic, the available total organic carbon is not biologically appealing, nitrate and sulfate concentrations remain constant throughout the area, and nitrite and sulfide have not been detected. Minor concentrations of ethene, ethane, and methane have been detected in groundwater samples. However, the concentrations are considered too low to be indicative of reductive dechlorination. The data presented in Table 9 does indicate higher than expected DH concentrations, possibly high enough to promote reductive dechlorination.

7.0 REVISED CONCEPTUAL MODEL

In the Final Remedial Investigation Compilation and Conceptual Site Model (CSM) Report for the South Mesa WQARF Registry Site, Mesa Arizona, AMEC presented an initial CSM that was based on data provided by investigations that were performed prior to July 2000. Based on the investigations performed by AMEC between July 2000 and December 2006, the following provides a revised conceptual site model for the areas of contamination (AOCs):

- The vadose zone soils below the former AMI facility did not contain VOCs, arsenic, chromium (total and hexavalent), copper, cyanide, nickel, and zinc above the Residential Soil Remediation Levels (RSRLs) and/or Groundwater Protection Levels (GPLs). These compounds and metals were not considered COPCs in the soil. The ingestion, inhalation, and dermal contact pathways associated with soil contact were incomplete.
- The vadose zone soils below the former AMI facility contained vapor phase concentrations of PCE (Table 6). None of the soil gas COPCs were detected in the soil samples (Table 4). PCE was detected in soil gas in boring LB-1 down to 110 feet bgs, essentially to the water table at approximately 115 feet bgs. The vapor phase PCE represented a continuing source of groundwater contamination. The groundwater pathway remained complete.
- The SVE system was successful in reducing PCE and TCE concentrations in the vadose zone at the former AMI facility to below concentrations that represented a vapor intrusion to indoor air risk that exceeded the *de minimis* CILCR of 1E-06. IAQ sampling conducted at the former AMI facility in November 2007 indicated that the combined CILCR for PCE and TCE was 4E-08, which was below the *de minimis* CILCR of 1E-06. Therefore, no further action was required. The pathway may still be complete but it is insignificant and does not warrant further action or concern.
- PCE and TCE have been detected in the groundwater above the AWQSSs. PCE and TCE are considered COPCs in the groundwater. Though the vertical extent of groundwater impact at the AMI facility has been defined, the groundwater exposure pathways remain potentially complete for the following reasons:
 - The impact to the MAU has not been defined. Drinking water in the area is obtained primarily from the MAU.
 - The two SRP wells impacted with PCE, 28E-0N and 28.5E-1N, are screened across the UAU/MAU contact and represent a vertical migration pathway to the regional drinking water supply aquifer.
 - City of Mesa Well No. 14 is screened entirely in the MAU. The screened intervals of the SRP wells intersect the screened interval of Mesa Well No. 14. Mesa Well No. 14 is screened from 350-954 feet bgs and SRP Wells 28E-0N and 28.5E-1N are screened from 120 to 373 feet bgs and from 190 to 549 feet bgs. Additional investigation is required to evaluate if contaminants are present in Mesa Well No. 14.
 - ADEQ has asked the City of Mesa (COM) to grant access to monitor well No. 14 for sampling purposes. To date, no access has been granted.

- There are no ecological concerns for this site. The AMI facility has been developed for years as an industrial facility. Much of the area is paved or covered by the building. No ecologically sensitive species or habitats are present in the area.

The methodologies of EPA and ASTM have been used to revise the CSM as a flow chart of source, pathways and receptors (EPA, 1988, 1989, 1996; ASTM, 1995, 2000). The revised CSM is presented as Figure 42.

8.0 INDOOR AIR QUALITY PRELIMINARY SCREENING

The purpose of this section is to evaluate the indoor air quality data collected to date in such a way that the levels of contaminants can be compared to readily available and appropriate numerical criteria. This comparison allows for the determination of which chemicals warrant further evaluation, and what data gaps may need to be filled to provide meaningful evaluation. This comparative process is called a preliminary screening. It requires the use of:

- a revised conceptual site model (CSM),
- fate and transport of that contamination,
- the pathways of migration to receptors,
- the identification of receptors, and
- the exposure routes in which the receptors come into contact with contamination.

The CSM depicts the exposure scenarios for which the preliminary screening will be conducted.

8.1 Screening Criteria

The readily-available and applicable numerical screening criteria include the risk-based criteria for indoor air quality. These screening criteria are the:

- Region 9 Ambient Air Preliminary Remediation Goals (PRGs) and the
- Commercial Incidental Lifetime Cancer Risk (CILCR).

The EPA Region 9 PRG for ambient air and the CILCR have been used to screen concentrations of VOCs in indoor air in the former AMI building. The numerical screening values for each chemical are shown in Table 8 (indoor air).

8.2 Indoor Air Quality Assessment

The maximum concentration of each COPC is used for the evaluation to ensure that the results are conservative to protect human health. All of the data, as presented in Table 8, were screened.

On June 27, 2002 and on December 17, 2002, indoor air quality (IAQ) samples were collected inside the 1545 North McQueen Road building as part of the Remedial Investigation (RI) of the SMWRS. The IAQ assessment was intended to evaluate intrusion of vapor phase PCE and TCE into the 1545 North McQueen Road Building and to evaluate potential risks to persons working in the building. The IAQ assessment indicated that PCE and TCE vapors were present in the building. The maximum concentrations of PCE and TCE exceeded the *de minimis* commercial exposure standard of one-in-one million (1E-06) Incidental Lifetime Cancer Risk

(ILCR). The maximum concentrations and cumulative concentrations did not exceed the acceptable standard of one-in-ten thousand (1E-04). According to the National Contingency Plan (NCP), remedial actions are recommended to reduce exposure when the ILCR falls between 1E-04 and 1 E-06. The results of the IAQ assessment are summarized in Table 8.

Based on the findings of the investigation, ADEQ requested that an ERA be performed to minimize vapor-phase PCE and TCE concentrations. Removal of the vapor-phase PCE and TCE would minimize contaminants in the indoor air as well as removing a continuing source of groundwater contamination.

The ERA included the installation of additional vapor wells (VWs) and re-starting an existing SVE system. ADEQ also requested that bi-annual groundwater monitoring be performed to evaluate the influence of the SVE system on groundwater contaminant levels. Pre- and post-ERA groundwater VOC analytical data are summarized in Table 2.

The SVE system was started on September 13, 2004 and was in operation until October 12, 2007. Analytical data for vapor samples collected while the SVE system was operating are summarized in Table 14. With the verbal approval of ADEQ, the SVE system was shut down following collection of vapor samples on October 12, 2007. Following receipt of the analytical results on November 7, 2007, ADEQ requested that an indoor air quality (IAQ) sample be collected from Suite 1 of the 1545 N. McQueen Road Building in accordance with the *ERA Work Plan* dated May 3, 2004. The IAQ sample was collected on November 21, 2007. The results of the October 12, 2007 vapor samples and November 21, 2007 IAQ sample are included in Tables 14 and 8, respectively.

In a letter dated February 5, 2008, ADEQ requested that the remediation system be decommissioned. The system decommissioning was completed in May 2008. The SVE system was removed from the site at that time.

8.2.1 Current and Reasonably Foreseeable Receptors

The Land and Water Use Study (see Section 4.5 and Appendix A) identified reasonably foreseeable receptors based on land use. In the case of the SMWRS, the land use in the immediate area of the former AMI facility is commercial. The current zoning and surrounding land use have made it very likely that the land use will continue as commercial for the next 100 years. Commercial land use includes adult receptors only (EPA, 1991b). This applies to current and future soil and soil gas pathways.

The land use in the downgradient area is mixed land use, including both residential and commercial land use. Residential land use is the most stringent exposure scenario for protection of the general public. Residential land use includes current and future adult and child receptors.

8.2.2 Current and Reasonably Foreseeable Exposure Routes

The AOCs identified in Section 7 include the exposure pathways of both workers, and potentially construction workers, to soil vapors that accumulated in the former AMI building and users of the groundwater contaminated by PCE downgradient of the former AMI facility.

The exposure routes associated with these AOCs are as follows:

- Inhalation for the soil/groundwater vapor-intrusion-to-indoor-air pathway,
- Leaching from soil to groundwater, and
- Ingestion, inhalation, and dermal contact for exposure to the groundwater pathway.

8.2.3 Current and Reasonably Foreseeable Impacts to Aquatic and Terrestrial Biota

As cited in Section 7.0, there are no ecological concerns for the SMWRS.

- The area has been developed for years as a commercial/industrial facility.
- Most of the area is paved.
- There is no surface water associated with the site which would support aquatic biota.
- Terrestrial biota that traverses the site would not spend enough time on the site to constitute an exposure scenario.
- COPCs have not been detected in the surface soil, root or burrowing zones (0 to 5 feet bgs).
- COPCs have been detected in soil gas samples (Section 5.2.2.1). However, the potential for soil gas exposure is to workers inside a building where soil gas contaminants may accumulate, not to outdoor terrestrial biota.
- The potential for groundwater exposure is subsurface or during water use in developed residential areas.
- It is unlikely that groundwater might be brought to the surface by artesian effects where it could discharge into surface washes or protected habitat.

These conditions are not expected to change in the foreseeable future.

8.2.4 Soil-Vapor-Intrusion-To-Indoor-Air Pathway

Indoor air quality samples were collected at the 1545 North McQueen Road building on June 27, 2002, December 17, 2002, and November 21, 2007 (Suite 1 office only). The PCE and TCE analytical results for all three sampling events are shown on Table 8.

As shown on Table 8, the IAQ sample results indicated the PCE ambient air concentrations in the Suite 1 office have been reduced from the high of 180 ppbv on December 17, 2002 to 0.85 ppbv on November 21, 2007. The CILCR for this concentration is 4E-08, which is below the *de minimis* CILCR of 1E-06.

The IAQ sample results indicated that the TCE ambient air concentrations in the Suite 1 office were reduced from the high of 4.0 ppbv on December 17, 2002 to <0.50 ppbv on November 21, 2007 (Table 8). The TCE concentrations in the December 17, 2002 sample increased the cumulative CILCR to 2E-05. TCE was not detected in the November 21, 2007 sample. Therefore, the cumulative CILCR for PCE and TCE was 4E-08, which is below the *de minimis* CILCR of 1E-06.

The CILCRs are cumulative for VOCs. For the December 17, 2002 sample, PCE was not the primary site-specific COC present. The TCE concentration in the December 17, 2002 sample increased the cumulative CILCR to 2E-05. TCE was not detected in the November 21, 2007

sample. The cumulative CILCR for PCE and TCE is 4E-08, which is below the *de minimis* CILCR of 1E-06.

9.0 SUMMARY AND CONCLUSIONS

VOCs, particularly PCE, have been detected above AWQs in groundwater samples collected from wells at the SMWRS. A source of the VOCs to the groundwater has been identified as the former AMI Inc. (AMI) facility, located at 1545 North McQueen Road in Gilbert, Arizona. AMI plated chromium, copper, nickel, tin, and zinc on electronic components. PCE was utilized in an on-site steam degreaser to clean/degrease the parts prior to plating. The on-site source was initially identified as an on-site drywell that was used for disposal of process wastes. AMEC was retained to characterize the nature and extent of soil and groundwater impact at the former AMI facility and characterize the nature and extent of groundwater impact at the SMWRS.

From 1983 through 1999, investigations and remedial actions were performed by others at the SMWRS. However, because of changes in sampling methods and technologies and the prior performance of remedial actions, the data collected by AMEC from July 2000 through the present is utilized in the decision-making process and to describe the nature and extent of contamination. Where data gaps still exist, particularly related to the Middle Alluvial Unit (MAU), available data collected prior to July 2000 was used in the decision-making process and to describe the nature and extent of contamination. Data collected by others from 1983 through 1999 is provided for reference purposes.

The following subsections summarize the findings and conclusions of the Remedial Investigation of the SMWRS:

9.1 Metals And Cyanide In Soil and Groundwater

AMI plated metals on electronic parts and utilized cyanide in the process. Metals and cyanide were initially considered COPCs in the soil and groundwater. The findings and conclusions related to metals in soil and groundwater are summarized as follows:

Metals were not detected in soil samples collected at the AMI facility above the RSRLs or GPLs. Therefore, metals were eliminated for further consideration as COCs. No further assessment or remedial actions were required for metals in soil.

- Groundwater samples collected from the SMWRS wells were analyzed for the following metals; aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, hexavalent chromium, total chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, nickel, selenium, silver, sodium, strontium, vanadium and zinc.
- The only metals detected above background concentrations and AWQs were arsenic, chromium, manganese, and nickel. Arsenic, chromium, and nickel have only been detected above their respective AWQs in MW-AM-8S. The elevated concentrations of arsenic, chromium, and nickel were limited to MW-AM-8S. Arsenic, chromium, and nickel were eliminated from further consideration as COCs. No further monitoring or remedial actions were required for these metals in groundwater.
- Manganese exceeded the AWQS of 4.9 mg/L in BARCAD sampling points MW-9-130, MW-9-175, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170,

MW-11-200, and MW-11-240. The elevated concentrations of manganese in these sampling points was limited to the immediate vicinity of the wells.

- Manganese is considered a COI. However, due to its limited extent, manganese was not considered further as a COC and no further remedial actions for manganese were required.

9.2 Vadose Zone VOC Investigation

Investigation of VOCs in the vadose zone sediments was limited to the former AMI facility. The objectives of the investigation were as follows: identify additional sources of VOCs to the subsurface; identify sources of groundwater impact in the vadose zone and confirm the effectiveness of previous soil vapor extraction (SVE) activities. The findings and conclusions related to VOCs in the vadose zone sediments are summarized as follows:

- According to MCDHS records, a 1,250 gallon septic tank of concrete construction and associated seepage pit were located on the site. A surface geophysical survey was performed to locate the septic tank and seepage pit. The septic tank was located approximately 10 feet northeast of the location shown by MCDHS records and the seepage pit was located immediately north of the septic tank.
- A passive soil vapor gas survey was performed to identify possible subsurface sources of PCE impact to the groundwater and to confirm previous operation of the SVE system. PCE, TCE, and c-1, 2-DCE were detected at the highest concentrations and identified as COI's and COPCs.
- The septic tank and former process equipment area were identified as potential sources of VOCs. The southwest corner of the AMI facility was also identified as a collection area for PCE discharged from the former dry well, septic tank and process equipment area. The area appeared to be a continuing source of VOC impact to the 1545 North McQueen Road building and groundwater below the former AMI facility.
- The highest PCE concentrations were detected in the southwest corner of the former AMI facility and a large vapor plume was believed to extend beneath the site structure in this area.
- The lowest PCE concentrations were detected in the samples collected from the area of previous SVE activities.
- Six soil borings were drilled to confirm the results of the passive soil vapor survey. During drilling of the borings, soil samples were collected and analyzed for VOCs. VOCs, particularly PCE, were not detected in the soil samples.
- The analytical methods used to quantify VOCs in soil samples detected only residual NAPL or dissolved-phase VOCs in the soil. Residual NAPL of dissolved-phase VOCs was not present in the soil samples collected by AMEC.
- Active soil gas samples were also collected during drilling of the six borings. With the exception of c-1, 2-DCE in one sample, PCE was the only VOC detected in the active soil gas samples. The highest vapor-phase PCE concentrations were detected in boring LB-1, located in the southwest corner of the site and in boring LB-6, located at the former process equipment area.
- The highest vapor-phase PCE concentrations were detected between 20 and 60 feet bgs in the borings, which were characterized as predominantly sandy sediments.

- Based on the soil gas results for boring LB-1, the vapor-phase PCE extended to the water table and was apparently a continuing source of dissolved-phase PCE to the groundwater.
- Though TCE and c-1,2-DCE were not detected in the active soil gas samples, the presence of TCE and c-1,2-DCE in the passive soil gas samples indicated that vapor-phase TCE and c-1,2-DCE were present in the vadose zone at concentrations less than the PQL of 1.0 mg/m³.
- Minimal concentrations of vapor-phase PCE were detected in the active soil gas samples collected from boring LB-3, which was drilled near the former drywell. This data, combined with the passive soil gas sample data, confirmed that SVE system operation in the vicinity of the drywell was effective in removing VOCs from the area.
- The presence of elevated PCE concentrations in the soil gas below the 1545 North McQueen Road building prompted performance of an indoor air quality assessment. PCE and TCE were detected in the samples. PCE and TCE vapors were migrating into the 1545 North McQueen Road building. The PCE and TCE concentrations detected in the samples were below the *de maximus* CILCR of 1E-04. Based on this, remedial actions were not immediately required as long as commercial activities continued in the 1545 North McQueen Road building.
- However, the *de minimus* CILCR of 1E-06 was exceeded, which indicated that remedial actions may be considered to minimize exposure. The concentrations did exceed the *de maximus* RILCR of 1E-04. Therefore, remedial actions would be required if the 1545 North McQueen Road property was considered for residential uses.
- Based on the results of the vadose zone VOC investigation, PCE and TCE were listed as COPCs requiring further assessment and possible remedial actions.
- Based on the results of the indoor air quality assessment, ADEQ requested that SVE be implemented in January 2004 as an Early Response Action to mitigate the source of vapor intrusion into the 1545 North McQueen Road building.
- SVE was re-started in September 2004 and was in operation through October 2007. As of November 2007, more than 168 pounds of PCE had been removed from underneath the building. Table 14 provides a summary of the analytical results.
- The SVE system successfully reduced PCE and TCE concentrations in the vadose zone at the former AMI facility to concentrations that no longer presented a vapor intrusion to indoor air risk.
- The SVE system was shut down in October 2007 and was decommissioned in May 2008.

9.3 Groundwater VOC Investigation

The SMWRS well network currently consists of 30 wells as follows:

- 10 conventional groundwater monitoring wells identified as MW-1S, MW-1D, MW-2D, MW-3S, MW-4S, MW-5S, MW-5D, MW-6D, MW-7D, and MW-AM-8S;
- 18 BARCAD multi-completion groundwater monitoring wells identified as MW-9-130, MW-9-170, MW-9-205, MW-9-235, MW-10-130, MW-10-170, MW-10-235, MW-11-170, MW-11-200, MW-11-240, MW-12-159, MW-12-183, MW-12-217, MW-12-238, MW-14-130, MW-14-163, MW-14-186, and MW-14-215;

- A former private production well, known as the Lewis Well, that has been converted to a monitoring well, identified as MW-LW; and
- A currently inactive Salt River Project (SRP) production well, identified as SRP Well 28E-0N.

Additionally, discreet groundwater analytical data were collected by AMEC during drilling of borings LB-1 through LB-3. Data collected by SRP from SRP Wells 28.5E-1N and 29E-1N was also used to evaluate the nature and extent of the VOC impact at the SMWRS. The findings and conclusions related to VOCs in groundwater are summarized below:

- Depth to groundwater within the boundaries of the SMWRS has been variable over time. Groundwater levels rose approximately 70 feet from the early 1980's to 2000. However, groundwater levels declined more than 15 feet between 2000 and 2004, at which time the lowest groundwater elevations since 1990 were measured.
- Groundwater elevations have been rising within the SMWRS since 2004 and as of December 2008, groundwater elevations were at all-time highs.
- Depth to groundwater within the SMWRS currently ranges from approximately 104 feet bgs to approximately 116 feet bgs, with water levels typically higher in the northern portions of the SMWRS.
- Groundwater within the SMWRS historically flowed in a northeasterly direction. However, since December 2004, groundwater flowed in a southerly direction. Depth to water and groundwater flow direction were dependent on the rates of local and regional groundwater pumping and recharge and the changes in groundwater elevations and flow direction were attributed to changes in these conditions.
- PCE and TCE were the only VOCs that exceeded Arizona groundwater cleanup levels since July 2000. Therefore, PCE and TCE were listed as COPCs requiring further assessment.
- C-1, 2-DCE was also detected at concentrations below the AWQS of 70 µg/L. C-1, 2-DCE is a reductive dechlorination daughter product of PCE and TCE and was considered a COI.
- There are two aquifers of concern at the SMWRS, the UAU, which is utilized as an irrigation water supply aquifer and is not utilized as a drinking water supply aquifer, and the MAU, which is utilized both as an irrigation and drinking water supply aquifer. The UAU is further subdivided into seven hydrologic units referred to, from shallowest to deepest, as follows; Zone UAU1, Zone AQ1, Zone UAU2, Zone AQ2, Zone UAU3, Zone AQ3, and Zone UAU4. Zones UAU1 through UAU4 are water bearing zones that yield usable quantities of water.
- Zones AQ1, AQ2, and AQ3 are clay layers (or aquitards) that are saturated. However, they yield considerably lower quantities of water compared to Zones UAU1 through UAU4.
- All seven hydrologic zones are apparently in communication with each other and vertical gradients were apparent. Groundwater samples collected from Zones UAU1 through UAU4 contained the highest VOC concentrations.
- Groundwater samples collected from Zones AQ1 through AQ3 contained lower to often non-detectable concentrations of VOCs.
- Due to hydraulic conductivity considerations, the VOC plumes in Zones UAU1 through UAU4 are more extensive than the VOC plumes in Zones AQ1 through AQ3.

- Groundwater generally flows in a southerly direction.
- PCE has been detected at the highest concentrations and has the greatest extent of impact at the SMWRS. The highest PCE concentrations are present in the Zone UAU2 and UAU3 sampling points, though PCE concentrations above the AWQS of 5.0 µg/L have been detected in Zone UAU1 and UAU4 sampling points. The areal extent of the groundwater PCE impact is shown on Figure 1. The detected PCE concentrations range from less than 100 µg/L at the former AMI facility to approximately 10 µg/L at SRP Well 28.5E-1N.
- Considering the minimal usage of the UAU in the area as a water supply aquifer and that the PCE plume is apparently stable, further investigation does not appear to be warranted at this time.
- TCE has been detected at relatively low concentrations and was limited in extent to the AMI facility and the portion of the SMWRS between SRP Well 28.5E-1N and MW-12. The highest TCE concentrations have been detected at the former AMI facility. TCE is a reductive dechlorination daughter product of PCE.
- The nature and extent of VOC impact in the MAU remains unknown. Based on the hydrogeology and chemical properties of PCE, it is unlikely that the PCE released at the AMI facility would have naturally migrated to the MAU. However, based on vertical contaminant profile sampling in SRP Well 28E-0N, PCE is apparently migrating to the MAU via SRP Wells 28E-0N and 28.5E-1N.
- Mesa Well No. 14 is the only known active production well in the immediate vicinity of SRP Well 28.5E-1N that obtains water from the MAU. Mesa Well No. 14 is not equipped with a sampling port and has not been recently sampled for VOCs. Mesa Well No. 14 is a municipal drinking water supply well and vertical contaminant profile sampling has been proposed. If PCE is not detected in the well, the exposure pathway for Mesa Well No. 14 will be considered incomplete. If PCE is detected in the well, the exposure will be considered complete and additional assessment will be required.

9.4 Natural Attenuation Investigation

Groundwater samples collected during the July 2000, September 2000, December 2000, and March 2001 groundwater sampling events were analyzed for natural attenuation indicators. Additionally, selected samples collected during the September 2001 and December 2001 sampling events were analyzed for iron and manganese. The findings and conclusions related to natural attenuation of VOCs are summarized as follows:

- The primary conditions required for natural attenuation of chlorinated solvents were
 - anaerobic conditions,
 - presence of biologically appealing organic carbon (electron donor or hydrogen supply), and
 - presence of initial electron acceptors (Fe^{+3} , Mn^{+4} , sulfate, etc.).

The electron acceptors, most notably Fe^{+3} , Mn^{+4} , and sulfate, were present in the groundwater.

- However, the groundwater, on a regional scale, was aerobic and there was little to no biologically appealing organic carbon in the groundwater. Therefore, natural attenuation

of PCE and TCE via reductive dechlorination was not occurring on a regional basis and was not a significant factor in contaminant fate and transport.

- The presence of TCE and c-1,2-DCE in soil gas and groundwater samples indicated that natural attenuation of PCE and TCE via reductive dechlorination was occurring on a localized scale in the soil and groundwater.
- Possible electron donor sources were the septic tank leachate at the former AMI facility and oil and grease in the area.
- Based on the observation of localized reductive dechlorination of PCE to c-1,2-DCE, enhanced reductive dechlorination was a possible remedial option for groundwater at the SMWRS.

9.5 Revised Conceptual Site Model and Preliminary Screening

Components of the RI included revision of the conceptual site model and performance of preliminary screening. The findings and conclusions related to the revised conceptual model and preliminary screening are summarized below:

- Because PCE and TCE concentrations in the indoor air quality samples collected in the 1545 North McQueen Road building were below the CILCR of 1E-06, no further action was required. The soil vapor intrusion to indoor air pathway was considered incomplete.
- The maximum PCE and TCE concentrations exceeded the *de minimus* risk level of 1E-06 CILCR. However, the concentrations did not exceed the *de maximus* risk level of 1E-04 CILCR.
- Additional monitoring and remedial actions were recommended to minimize exposure. The *de maximum* risk level of 1E-04 RILCR was exceeded, which required remedial actions if the 1545 North McQueen Road property was considered for residential development.
- Due to potential pumping of groundwater from SRP Wells 28E-0N and 28.5E-1N and the unknown impact to Mesa Well No. 14, the groundwater pathway was considered potentially complete.
- This pathway will be changed to incomplete if the SRP wells are not pumped and the sampling of Mesa Well No. 14 indicates that the well is not impacted

10.0 RECOMMENDATIONS

Based on the findings and conclusions of the RI, the following recommendations are provided:

- Sampling of Mesa Well No. 14 is required to change the current potentially complete exposure pathway to incomplete. It is unknown whether PCE is entering the well. A sampling port must be installed on the well discharge for sampling to be possible.
- Remedial actions may not be necessary for the UAU groundwater because UAU groundwater is not currently used for drinking water.
- The MAU groundwater exposure pathway remains potentially complete. Remedial alternatives for the MAU groundwater will be evaluated during the FS.

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TABLES

Table 1. South Mesa WQARF Registry Site Monitoring Well Information

Well I.D	Well Type	Casing Size and Material	Measuring Point	Measuring Point Elevation (ft. AMSL)	Well Depth (ft.)	Screened Interval Depth (ft.)	Screened Interval Elevation (ft. AMSL)	Sampling Depth from Measuring Point (ft.)	Sampling Pump Elevation (ft. AMSL)	Zone
MW-1S	Monitor	4.5" PVC	Top of well cap	1,212.67	175	120-170	1,092-1,042	160	1,053	UAU2
MW-1D	Monitor	4.5" PVC	Top of well cap	1,212.81	260	235-255	977-957	245	968	UAU4
MW-2D	Monitor	4.5" PVC	Top of well cap	1,226.36	260	165-255	1061-971	195	1,031	UAU3
MW-3S	Monitor	4.5" PVC	Top of well cap	1,221.92	232	177-227	1045-995	202	1,020	UAU3
MW-4S	Monitor	4.5" PVC	Top of well cap	1,221.55	194	129-189	1093-1033	160	1,062	UAU2
MW-5S	Monitor	4.5" PVC	Top of well cap	1,216.27	180	125-175	1091-1041	160	1,056	UAU2
MW-5D	Monitor	4.5" PVC	Top of well cap	1,216.25	239	204-234	1012-982	208	1,008	UAU3
MW-6D	Monitor	4.5" PVC	Top of well cap	1,210.91	300	265-295	946-916	272	939	MAU
MW-7D ¹	Monitor	4.5" PVC	Top of well casing	Not measured	225	190-220	1025-995	192	1,023	UAU3
MW-AM-8S	Monitor	4.5" Steel	Top of well cap	1,211.16	172	127-167	1086-1046	157	1,053	UAU2
MW-9-130	BARCAD	1" PVC	Top of well casing	1,211.05	133	130-133	1081-1078	130	1081	UAU1
MW-9-175	BARCAD	1" PVC	Top of well casing	1,211.09	176	173-176	1038-1035	175	1036	UAU2
MW-9-205	BARCAD	1" PVC	Top of well casing	1,211.12	208	205-208	1006-1003	205	1006	UAU3
MW-9-235	BARCAD	1" PVC	Top of well casing	1,211.11	236	233-236	978-975	235	976	UAU4
MW-10-130	BARCAD	1" PVC	Top of well casing	1,211.31	131	128-131	1083-1080	130	1081	UAU1

Table 1. South Mesa WQARF Registry Site Monitoring Well Information

Well I.D	Well Type	Casing Size and Material	Measuring Point	Measuring Point Elevation (ft. AMSL)	Well Depth (ft.)	Screened Interval Depth (ft.)	Screened Interval Elevation (ft. AMSL)	Sampling Depth from Measuring Point (ft.)	Sampling Pump Elevation (ft. AMSL)	Zone
MW-10-170	BARCAD	1" PVC	Top of well casing	1,211.27	171	168-171	1043-1040	170	1041	UAU2
MW-10-235	BARCAD	1" PVC	Top of well casing	1,211.3	238	235-238	976-973	235	976	UAU4
MW-11-170	BARCAD	1" PVC	Top of well casing	1,211.32	168	165-168	1049-1046	168	1043	UAU2
MW-11-200	BARCAD	1" PVC	Top of well casing	1,211.24	200	197-200	1014-1011	200	1011	UAU3
MW-11-240	BARCAD	1" PVC	Top of well casing	1,211.4	240	237-240	974-971	240	971	UAU4
MW-12-159	BARCAD	1" PVC	Top of well casing	1,225.46	159	156-159	1069-1066	159	1066	UAU1
MW-12-183	BARCAD	1" PVC	Top of well casing	1,225.66	183	180-183	1046-1043	183	1048	UAU2
MW-12-217	BARCAD	1" PVC	Top of well casing	1,225.64	217	214-217	1012-1009	217	1009	UAU3
MW-12-237	BARCAD	1" PVC	Top of well casing	1,225.68	237	234-237	992-995	237	995	UAU4
MW-14-130	BARCAD	1" PVC	Top of well casing	1,213.02	130	127-130	1086-1083	130	1083	UAU1
MW-14-163	BARCAD	1" PVC	Top of well casing	1,213.13	163	160-163	1053-1050	163	1050	UAU2
MW-14-186	BARCAD	1" PVC	Top of well casing	1,212.72	186	183-186	1030-1027	186	1027	UAU3
MW-14-215	BARCAD	1" PVC	Top of well casing	1,212.94	215	212-215	1001 – 998	215	998	UAU4
MW-LW (Lewis)	Monitor	8" Steel	Top of well cap	1,212.34	186	157-186	1055-1026	NA	NA	UAU2
SRP Well 28E-0N	Production	10" Steel	Not measured	NA	394	120-373		NA	NA	

Checked by: JNC

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																				
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³					
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni	
MW-1S	UAU2	5/22/1991	0.3	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		10/30/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	<0.020	<0.010	NA	
		2/20/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.04	<0.010	NA	
		5/22/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.04	<0.010	NA	
		8/14/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		11/19/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		2/18/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		5/13/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		1/27/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		9/12/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	0.8	<0.50	NA	NA	NA	NA	NA	
		1/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/11/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		7/6/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		10/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		2/21/1996	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/26/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/13/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		7/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/21/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/20/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		10/27/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.050	0.015	<0.50	<0.050	<0.050	
		7/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.005	0.067	0.92	0.025	<0.050	
		9/19/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0037	0.024	0.13	<0.020	<0.050	
		12/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<0.0030	0.0098	0.36	<0.020	<0.050	
		3/6/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0037	0.012	0.15	<0.020	<0.050	
		9/5/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
5/18/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
MW-1S-130 DBS	UAU1	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
MW-1S-170 DBS	UAU2	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
MW-1D	UAU4	5/22/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		10/30/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.022	<0.010	NA	
		2/20/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.043	<0.010	NA	
		5/22/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.036	<0.010	NA	
		8/14/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		11/19/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		2/18/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		5/13/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		1/12/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		9/12/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/11/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		7/6/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		10/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		2/21/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																					
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³						
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni		
MW-1D	UAU4	9/26/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/27/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	1.7	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/21/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/20/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/27/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.050	<0.010	0.81	<0.050	<0.050
		7/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0053	0.013	2.2	0.044	<0.050
		9/19/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0035	0.063	0.91	<0.020	<0.050
		12/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0033	0.0097	0.45	<0.020	<0.050
		3/6/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0031	0.0089	<0.10	<0.020	<0.050
		9/5/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/18/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-2D	UAU3	5/22/1991	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
		10/30/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.05	<0.010	NA	
		2/20/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.057	<0.010	NA	
		5/22/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.062	<0.010	NA	
		8/14/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		11/19/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		2/18/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		5/13/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		1/27/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	17	<0.50	<0.50	NA	NA	NA	NA	NA	
		9/14/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/11/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		7/6/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		10/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		2/21/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		9/24/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/27/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		7/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/21/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/20/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		10/27/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.050	<0.010	1.0	<0.050	<0.050	
		7/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0033	0.0081	0.18	<0.020	<0.050	
		9/20/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0035	0.10	0.68	<0.020	<0.050	
		12/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0041	0.051	0.47	<0.020	<0.050	
		3/7/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.0033	0.035	<0.10	<0.020	<0.050	
		9/5/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.050	<0.010	<0.20	<0.020	<0.050	
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																			
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³				
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni
MW-2D	UAU3	12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/17/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-2D-180 DBS	UAU2	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-2D-210 DBS	UAU3	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-2D-240 DBS	UAU4	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-3S	UAU3	5/22/1991	1.2	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		10/30/1991	1.3	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.043	<0.010	NA
		2/20/1992	1.5	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.059	<0.010	NA
		5/22/1992	1.9	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.024	<0.010	NA
		8/14/1992	1	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		11/19/1992	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		2/18/1993	1.2	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		5/13/1993	0.7	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		1/27/1994	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		9/14/1994	0.8	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50/1.7D	<0.50	<0.50	NA	NA	NA	NA	NA
		4/11/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/6/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		2/21/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		9/24/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/13/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/14/1997	0.7	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/21/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/20/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/28/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.050	<0.010	1.2	<0.050	<0.050
		7/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0036	0.04	0.47	0.022	<0.050
		9/20/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0033	0.031	0.19	<0.020	<0.050
		12/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0041	0.093	0.42	<0.020	<0.050
		3/7/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0039	0.019	0.35	<0.020	<0.050
		9/5/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<0.050	<0.010	<0.20	<0.020	<0.050
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/17/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3S-225 DBS	UAU4	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-4S	UAU2	5/22/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	0.5/0.5D	<0.20	<0.20	NA	NA	NA	NA	NA
		10/30/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.064	<0.010	NA
		2/20/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.063	<0.010	NA
		5/22/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.064	<0.010	NA

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																					
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³						
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni		
MW-4S	UAU2	8/14/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA	
		11/19/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		2/18/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		5/13/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		1/11/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		9/12/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/11/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/6/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		2/21/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		9/24/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/21/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/20/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/28/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0051	0.098	2.3	0.11	<0.050
		9/20/2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0043	0.048	0.77	0.022	<0.050
		3/6/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0032	0.015	0.57	<0.020	<0.050
		9/5/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/17/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4S-135 DBS	UAU1	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA		
MW-4S-175 DBS	UAU2	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA		
MW-5S	UAU2	5/22/1991	0.7	<0.20	0.6	<0.20	7.5	<0.20	NA	NA	33	3.6	<0.20	1.5	NA	NA	NA	NA	NA		
		10/30/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	27	<0.50	<0.20	1	NA	NA	0.118	<0.010	NA		
		2/20/1992	0.5	<0.20	0.6	0.2	5.9	<0.20	NA	NA	25	<0.50	<0.20	1.3	NA	NA	0.033	<0.010	NA		
		5/22/1992	0.7	<0.20	0.5	<0.20	4.8	<0.20	NA	NA	20.3	<0.50	<0.20	0.9	NA	NA	0.052	0.176	NA		
		8/14/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	1.9	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA		
		11/19/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	0.7	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA		
		2/18/1993	0.4	<0.20	<0.20	<0.20	0.4	<0.20	NA	NA	2.9	<0.50	0.3	0.2	NA	NA	NA	NA	NA		
		5/13/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	1.5	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA		
		1/11/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	7.8	1.4	<0.50	<0.50	NA	NA	NA	NA	NA		
		9/14/1994	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
		1/5/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	7.8	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		
		4/12/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	2.2	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		
		7/7/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	4.1	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		
		10/5/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	1.0	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		
		2/22/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	3.9	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		
		9/24/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	0.6	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		
		1/13/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	0.97	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		
		4/30/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	13	<0.50	<0.50	NA	NA	NA	NA	NA		
		7/15/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	0.57	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA		

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																				
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³					
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni	
MW-5S	UAU2	1/21/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	0.65	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/20/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	0.78	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/28/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.050	0.013	1.6	<0.050	<0.050
		7/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.004	0.0072	0.16	<0.020	<0.050	
		9/19/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0035	0.028	0.18	<0.020	<0.050	
		12/5/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.003	0.044	0.39	<0.020	<0.050	
		3/7/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0037	0.011	0.2	<0.020	<0.050	
		9/5/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/17/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
MW-5S-130 DBS	UAU1	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
MW-5S-170 DBS	UAU2	1/9/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
MW-5D	UAU3	5/22/1991	<0.20	<0.20	0.6	1.5	9.9	<0.20	NA	NA	64	17	0.5	2.9	NA	NA	NA	NA	NA	
		10/30/1991	<0.20	<0.20	0.2	0.8	<0.2	<0.20	NA	NA	53	5.5	<0.20	1.8	NA	NA	0.116	<0.010	NA	
		2/20/1992	0.4	<0.20	0.6	1.0	6.6	<0.20	NA	NA	46	7.9	<0.20	1.9	NA	NA	0.061	<0.010	NA	
		5/22/1992	<0.20	<0.20	0.5	0.7	6.7	<0.20	NA	NA	35.9	1.4	<0.20	1.3	NA	NA	<0.020	<0.010	NA	
		8/14/1992	<0.20	0.3	<0.20	<0.20	3.3	<0.20	NA	NA	23.6	<0.50	<0.20	0.8	NA	NA	NA	NA	NA	
		11/19/1992	0.4	<0.20	0.3	0.4	2.9	<0.20	NA	NA	14.1	<0.50	<0.20	0.9	NA	NA	NA	NA	NA	
		2/18/1993	<0.20	<0.20	0.5	0.7	6.2	<0.20	NA	NA	41	<0.50	<0.20	1.5	NA	NA	NA	NA	NA	
		5/13/1993	<0.20	<0.20	<0.20	0.4/0.3D	3.9/3.6D	<0.20	NA	NA	44/39D	<0.50	<0.20	1.0/1.1D	NA	NA	NA	NA	NA	
		1/11/1994	<2.5	<2.5	<2.5	<2.5	8.2	<2.5	NA	NA	48	<2.5	<2.5	<2.5	NA	NA	NA	NA	NA	
		9/14/1994	<0.50	<0.50	0.8	1	4.3	<0.50	NA	NA	40	<0.50	<0.50	1.6	NA	NA	NA	NA	NA	
		1/5/1995	<0.50	<0.50	<0.50	0.8	<0.50	<0.50	NA	NA	46	<0.50	<0.50	1.2	NA	NA	NA	NA	NA	
		4/12/1995	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
		7/7/1995	<0.50	<0.50	<0.50	0.6	4.2	<0.50	NA	NA	34	5.3	<0.50	1.3	NA	NA	NA	NA	NA	
		10/5/1995	<0.50	<0.50	<0.50	0.6	4.6	<0.50	NA	NA	36	61	<0.50	1.3	NA	NA	NA	NA	NA	
		2/22/1996	<0.50	<0.50	<0.50	0.7	3.3	<0.50	NA	NA	23	2.8	<0.50	1.7	<0.10	<0.05	<0.05	<0.05	<0.05	
		9/24/1996	<0.50	<0.50	<0.50	0.6	4.6	<0.50	NA	NA	36	61	<0.50	1.6	<1.0	<0.10	<1.0	<0.10	<0.10	
		1/13/1997	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	NA	NA	13	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/15/1997	<0.50	<0.50	<0.50	<0.50	1.6	<0.50	NA	NA	12	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		7/15/1997	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	NA	NA	13	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		1/21/1998	<0.50	<0.50	<0.50	<0.50	1.0/1.1D	<0.50	NA	NA	10/10D	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		4/20/1998	<0.50	<0.50	<0.50	<0.50	0.87/0.84D	<0.50	NA	NA	7.5/7.1D	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
		10/28/1998	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	NA	NA	6.7	<0.50	<0.50	<0.50	<0.050	<0.010	<0.50	<0.050	<0.050	
		7/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	7.4/7.3D	<2.0	<2.0	<2.0	0.0062	0.032	1.1	<0.020	<0.050	
		9/19/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	6.6	<2.0	<2.0	<2.0	<0.0030	0.019	0.3	<0.020	<0.050	
		12/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	8.4	<2.0	<2.0	<2.0	0.0049	0.039	1.7	0.059	<0.050	
		3/6/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	6.4	<2.0	<2.0	<2.0	0.0044	0.014	0.55	<0.020	<0.050	
		9/5/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	9.2	<2.0	<2.0	<2.0	<0.050	<0.010	<0.20	<0.020	<0.050	
		12/20/2001	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.4	<2.0	<1.0	<1.0	<0.050	<0.010	<0.20	<0.020	<0.050	
		7/2/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
		6/11/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.6	<2.0	<1.0	1.4	NA	NA	NA	NA	NA	
		12/13/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	2.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		6/1/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	2.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																			
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³				
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni
MW-5D	UAU3	12/13/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	7.8/8.7D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/31/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	7.9	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/1/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	11	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/17/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	6.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/3/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	3.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/5/2008	<2.0	<2.0	<2.0	<2.0	0.53	<2.0	<10	<5.0	3.5	<2.0	<2.0	1.4	NA	NA	NA	NA	NA
		9/8/2008	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.8	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-6D	MAU	5/22/1991	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		10/30/1991	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	<0.020	<0.010	NA
		2/20/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.023	<0.010	NA
		5/22/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.021	<0.010	NA
		8/14/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		11/19/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	0.3	NA	NA	NA	NA	NA
		2/18/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		5/13/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		1/11/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		9/14/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/5/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/12/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/7/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/5/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		2/22/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.10	<0.05	0.12	<0.05	<0.05
		9/24/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<1.0	<0.10	<1.0	<0.10	<0.10
		1/13/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/15/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/15/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/21/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/20/1998	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		10/28/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.050	<0.010	<0.50	<0.050	<0.050
		7/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<0.0030	0.0074	0.14	<0.020	<0.050
		9/19/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<0.0030	0.021	0.25	<0.020	<0.050
		12/5/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<0.0030	0.0091	0.15	<0.020	<0.050
		3/6/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0031	<0.0040	0.12	<0.020	<0.050
		9/5/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/17/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-7D	UAU3	5/22/1991	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		10/30/1991	<0.20/0.4D	<0.20	<0.2/0.2D	<0.2/0.3D	<0.2/7.4D	<0.20	NA	NA	32/34D	6.3/4.8D	<0.20	1.4/1.5D	NA	NA	<0.020	0.021	NA
		2/20/1992	<0.20	<0.20	0.3	0.4	8.4	<0.20	NA	NA	32	<0.5	<0.20	1.6	NA	NA	0.054	0.014	NA
		5/22/1992	<0.20	<0.20	0.3	0.3	8.5	<0.20	NA	NA	37.6	1.1	<0.20	1.6	NA	NA	0.055	<0.010	NA
		8/14/1992	<0.20	<0.20	0.3	0.3	7.5	<0.20	NA	NA	38.4	<0.50	<0.20	1.6	NA	NA	NA	NA	NA
		11/19/1992	<0.20	<0.20	0.6	0.8	8.6	<0.20	NA	NA	48.1	<0.50	<0.20	2.2	NA	NA	NA	NA	NA
		2/18/1993	<0.20	<0.20	0.4	0.7	6.6	<0.20	NA	NA	43	<0.50	<0.20	1.8	NA	NA	NA	NA	NA
		5/13/1993	<0.20	<0.20	<0.20	<0.20	0.4	<0.20	NA	NA	44	<0.50	<0.20	1.1	NA	NA	NA	NA	NA
		1/11/1994	<0.50	<0.50	<0.50	1.2	3.8	<0.50	NA	NA	35	<0.50	<0.50	2.1	NA	NA	NA	NA	NA
		9/14/1994	<0.50	<0.50	<0.50	<0.50	2.9	<0.50	NA	NA	22	<0.50	<0.50	1.0	NA	NA	NA	NA	NA
		1/5/1995	<0.50	<0.50	<0.50	0.6	3.1	<0.50	NA	NA	32	<0.50	<0.50	1.0	NA	NA	NA	NA	NA

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																				
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³					
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni	
MW-7D	UAU3	4/12/1995	<0.50	<0.50	<0.50	<0.50	3.1	<0.50	NA	NA	29	<0.50	<0.50	1.3	NA	NA	NA	NA	NA	
		7/7/1995	<0.50	<0.50	<0.50	<0.50	2.6	<0.50	NA	NA	26	<0.50	<0.50	1.0	NA	NA	NA	NA	NA	
		10/5/1995	<0.50	<0.50	<0.50	0.6	2.5	<0.50	NA	NA	23	<0.50	<0.50	1.7	NA	NA	NA	NA	NA	
		2/21/1996	<0.50	<0.50	<0.50	0.8	1.9	<0.50	NA	NA	21	<0.50	<0.50	1.6	<0.10	<0.05	<0.05	<0.05	<0.05	
		9/25/1996	<0.50	<0.50	<0.50	<0.50	0.84/<0.5D	<0.50	NA	NA	11/12D	<0.50	<0.50	<0.50	<1.0	<0.10	<1.0	<0.10	<0.10	
		1/13/1997	<0.50	<0.50	<0.50	<0.50	1.5/1.4D	<0.50	NA	NA	16/15D	<0.50	<0.50	0.51/<0.5D	NA	NA	NA	NA	NA	
		4/15/1997	<0.50	<0.50	<0.50	<0.50	1.8	<0.50	NA	NA	22	<0.50	<0.50	0.73	NA	NA	NA	NA	NA	
		7/14/1997	<1.3	<1.3	<1.3	<1.3	2.3/2.3D	<1.3	NA	NA	28/27D	<0.50	<0.50	<1.3	NA	NA	NA	NA	NA	
		1/21/1998	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	NA	NA	36	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		4/21/1998	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	NA	NA	35	<2.5	<2.5	<2.5	NA	NA	NA	NA	NA	
		10/28/1998	<0.50	<0.50	<0.50	0.63	1.4	<0.50	NA	NA	30	<0.50	<0.50	<0.50	<0.050	<0.010	<0.50	<0.050	<0.050	
		7/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	30	<2.0	<2.0	<2.0	0.0034	0.0068	1.4	0.036	<0.050	
		9/20/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	29/29D	<2.0	<2.0	<2.0	<0.0030	0.013	0.4	0.021	<0.050	
		12/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	41/42D	<2.0	<2.0	<2.0	<0.0030	0.017	0.98	0.027	0.11	
		3/7/2001	<2.0	<2.0	<2.0	<2.0	2.0/2.3D	<2.0	<10	<5.0	34/35D	<2.0	<2.0	<2.0	0.003	0.0093	0.19	<0.020	<0.050	
		9/5/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	40	<2.0	<2.0	<2.0	<0.050	<0.010	0.22	<0.020	<0.050	
		12/20/2001	<1.0	<1.0	<1.0	<2.0	2.0/1.8D	<1.0	<10	<5.0	31/32D	<2.0	<1.0	<1.0	<0.050	<0.010	0.72	<0.020	<0.050	
		7/2/2002	<1.0	<1.0	<1.0	<2.0	1.9/1.9D	<1.0	<10	<5.0	30/31D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
		6/11/2004	<1.0	<1.0	<1.0	<2.0	1.2	<1.0	<10	<5.0	12	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		12/13/2004	<1.0	<1.0	<1.0	<2.0	1.2	<1.0	<10	<5.0	9.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		6/1/2005	<1.0/<1.0D	<1.0/<1.0D	<1.0/<1.0D	<2.0/<2.0D	<1.0/<1.0D	<1.0/<1.0D	<10/<10D	<5.0/<5.0D	9.2/12D	<2.0/<2.0D	<1.0/<1.0D	<1.0/<1.0D	NA	NA	NA	NA	NA	
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	<1.0	<1.0	<1.0	<2.0	1.3	<1.0	<10	<5.0	15	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		12/1/2006	<1.0	<1.0	<1.0	<2.0	1.1	<1.0	<10	<5.0	18	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		5/17/2007	<1.0	<1.0	<1.0	<2.0	1.0	<1.0	<10	<5.0	13	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		12/3/2007	<1.0	<1.0	<1.0	<2.0	1.0	<1.0	<10	<5.0	6.9	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		5/5/2008	<2.0	<2.0	<2.0	<2.0	0.7	<2.0	<10	<5.0	6.8	<2.0	<2.0	1.4	NA	NA	NA	NA	NA	
		9/8/2008	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
		MW-AM-8S	UAU2	5/22/1991	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10/30/1991	NS			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
2/20/1992	0.4/0.6D			<0.20	<0.20	0.8/0.7D	5.2/11D	0.8/0.8D	NA	NA	87/120D	0.7/<0.50D	0.3/0.2D	2.4/3.0D	NA	NA	204	3.84	NA	
5/22/1992	<0.40			<0.40	<0.40	0.4/0.5D	2.6/20.8D	0.9/0.9D	NA	NA	180/97D	<0.50	<0.20	6.7/5.6D	NA	NA	5.83	0.176	NA	
8/14/1992	0.8/0.8D			<0.20	<0.20	<0.20/0.2D	16.9/16.3D	0.7/0.6D	NA	NA	98/120D	<0.50	<0.20	5.1/4.8D	NA	NA	NA	NA	NA	
11/19/1992	<0.20			<0.20	<0.2	<1.0/1.0D	32/32D	1.6/2.1D	NA	NA	110/120D	<0.50	<1.0/0.4D	9/11D	NA	NA	NA	NA	NA	
2/18/1993	<0.20			<0.20	<0.20	1	48	2.2	NA	NA	230	<0.50	0.5	17	NA	NA	NA	NA	NA	
5/13/1993	0.6			<0.20	<0.20	0.3	16	<0.20	NA	NA	160	<0.50	<0.20	5.8	NA	NA	NA	NA	NA	
1/11/1994	<5.0			<5.0	<5.0	23/<5.0D	16/22D	<5.0	NA	NA	300/290D	<5.0	<5.0	<5.0/16D	NA	NA	NA	NA	NA	
9/14/1994	0.7/0.7D			<0.50	<0.50	0.8/0.9D	19/18D	1.3/1.3D	NA	NA	160/160D	<0.50	<0.50	7.1/6.7D	NA	NA	NA	NA	NA	
1/5/1995	<0.50			<0.50	<0.50	0.7/0.7D	10/9.9D	1.3/1.3D	NA	NA	140/150D	<0.50	<0.50	3.8/4.2D	NA	NA	NA	NA	NA	
4/12/1995	0.6/0.7D			<0.50	<0.50	<0.50	15/15D	0.9/1.1D	NA	NA	100/110D	<0.50	<0.50	4.3/5.0D	NA	NA	NA	NA	NA	
7/7/1995	<0.50			<0.50	<0.50	<0.50	13/13D	<0.50	NA	NA	87/79D	<0.50	<0.50	3.0/3.1D	NA	NA	NA	NA	NA	
10/5/1995	<0.50			<0.50	<0.50	<0.50	8.0/7.8D	<0.50	NA	NA	50/50D	<0.50	<0.50	2.6/2.5D	NA	NA	NA	NA	NA	
2/22/1996	<0.50			<0.50	<0.50	<0.50	5.5/6.0D	<0.50	NA	NA	38/42D	<0.50	<0.50	2.2/2.2D	<0.10	0.07	1.3	<0.05	<0.05	
9/25/1996	<0.50			<0.50	<0.50	<0.50	2.4/2.3D	<0.50	NA	NA	17/17D	<0.50	<0.50	<0.50/0.6D	<1.0	0.2	1.7	<0.10	<0.10	
1/14/1997	<0.50			<0.50	<0.50	<0.50	2.7/2.6D	<0.50	NA	NA	19/19D	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	
4/15/1997	<0.50			<0.50	<0.50	<0.50	1.7/1.9D	<0.50	NA	NA	11/12D	<0.50	<0.50	0.52/0.57D	NA	NA	NA	NA	NA	
7/15/1997	<0.50			<0.50	<0.50	<0.50	1.9/2.0D	<0.50	NA	NA	16/16D	<0.50	<0.50	0.66/0.69D	<1.0	0.55	16	0.59	0.22	
1/21/1998	NS			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
4/20/1998	NS			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
10/27/1998	<0.50			<0.50	<0.50	<0.50	1.7/1.8D	<0.50	NA	NA	16/20D	<0.50	<0.50	<0.50	<0.050	0.013	0.7	<0.050	<0.050	
7/5/2000	<2.0			4.9/4.8D	<2.0	<2.0	2.9/2.9D	<2.0	<10	<5.0	33/31D	<2.0	<2.0	<2.0	0.014	0.077	2.9	0.21	<0.050	
9/19/2000	<2.0	<2.0	<2.0	<2.0	3.3/3.7D	<2.0	<10	<5.0	24/24D	<2.0	<2.0	<2.0	0.023	0.31	4.9	0.13	<0.050			
12/6/2000	<2.0	<2.0	<2.0	<2.0	6.2/6.5D	<2.0	<10	<5.0	64/63D	<2.0	<2.0	2.9/2.7D	0.12	2.3	20	0.59	0.12			
3/6/2001	<2.0	<2.0	<2.0	<2.0	14	<2.0	<10	<5.0	110	<2.0	<2.0	5.8	0.03	0.42	10	0.5	0.087			
9/5/2001	<2.0	<2.0	<2.0	<2.0	9.5	<2.0	<10	<5.0	79	<2.0	<2.0	3.4	<0.050	0.22	3.9	0.43	0.057			

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																			
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³				
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni
MW-AM-8S	UAU2	12/20/2001	<1.0	<1.0	<1.0	<2.0	4.5	<1.0	<10	<5.0	40	<2.0	<1.0	1.5	<0.050	0.46	4	0.41	0.052
		7/2/2002	<1.0	<1.0	<1.0	<2.0	7.4	<1.0	<10	<5.0	50	<2.0	<1.0	2.9	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	<1.0	<1.0	<1.0	<2.0	1.5	<1.0	<10	<5.0	11	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/10/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	10/9.8D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/31/2005	<1.0	<1.0	<1.0	<2.0	1.2	<1.0	<10	<5.0	8.3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/13/2005	<1.0	<1.0	<1.0	<2.0	1.3	<1.0	<10	<5.0	18	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/31/2006	<1.0	<1.0	<1.0	<2.0	2.2/2.0(D)	<1.0	<10	<5.0	16/15(D)	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/1/2006	<1.0	<1.0	<1.0	<2.0	1.5/1.0(D)	<1.0	<10	<5.0	14/13(D)	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	1.1/1.2(D)	<1.0	<10	<5.0	17/17(D)	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/3/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/5/2008	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	5.6/6.7D	<2.0	<2.0	1.1/0.96D	NA	NA	NA	NA	NA
		9/8/2008	<1.0	<1.0	<1.0	<2.0	2.0/2.0(D)	<1.0	<10	<5.0	11/10(D)	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-LW	UAU2	5/22/1991	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		10/30/1991	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		2/20/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	16.1	0.233	NA
		5/22/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	0.58	0.013	NA
		8/14/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	2.1	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		11/19/1992	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	0.3	NA	NA	NA	NA	NA
		2/18/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		5/13/1993	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.50	<0.20	<0.20	NA	NA	NA	NA	NA
		1/12/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		9/12/1994	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/5/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/11/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/6/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		10/4/1995	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		2/21/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		9/26/1996	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/27/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	1.7	<0.50	<0.50	NA	NA	NA	NA	NA
		4/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		7/14/1997	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		1/22/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
		4/20/1998	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		10/28/1998	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50	<0.50	<0.050	<0.010	<0.50	<0.050	<0.050
		7/7/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0036	0.026	6.5	0.099	<0.050
		9/19/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0041	0.12	1.1	<0.020	<0.050
		12/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	0.0039	0.074	3.9	0.061	<0.050
		3/6/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/5/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/20/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/11/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/1/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/31/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/17/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/3/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/5/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/8/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																			
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³				
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni
MW-9-130	UAU1	9/26/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	38	<5.0	<2.0	<2.0	<2.0	<2.0	<0.050	<0.010	0.35	0.7	0.079
		12/21/2001	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	<0.050	<0.010	2.9	3.9	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	3.1	<1.0	<10	<5.0	1.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/15/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/14/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/2/2005	1.2	<1.0	<1.0	<2.0	1.9	<1.0	<10	<5.0	14	<2.0	<1.0	1.1	NA	NA	NA	NA	NA
		12/15/2005	2/<1.0D	<1.0	<1.0	<2.0	4.5/<1.0D	<1.0	<10	<5.0	15/15D	<2.0/2.7D	<1.0	1.4<1.0D	NA	NA	NA	NA	NA
		6/2/2006	1.4	<1.0	<1.0	<2.0	5.9	<1.0	<10	<5.0	13	<2.0	<1.0	1.2	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	4.9	<1.0	<10	<5.0	12	<2.0	<1.0	1.1	NA	NA	NA	NA	NA
		5/23/2007	<10	<10	<10	<20	<10	<10	<100	<50	12	<20	<10	<10	NA	NA	NA	NA	NA
		12/6/2007	<1.0	<1.0	<1.0	<2.0	3.1	<1.0	<10	<5.0	9.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	2.7	<2.0	<2.0	<5.0	9.3	<2.0	<2.0	0.68	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	2.7	<1.0	<10	<5.0	12	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-9-175	UAU2	9/26/2001	17	<2.0	<2.0	<2.0	<2.0	<2.0	560	<5.0	<2.0	<2.0	<2.0	<2.0	<0.050	0.042	2.2	1.4	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	2.9	<1.0	<10	<5.0	1.5	<2.0	<1.0	<1.0	<0.050	<0.010	6.8	4.8	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	3.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	8.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	1.1	<1.0	<10	<5.0	5.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	5.8	<1.0	<10	<5.0	5	3.8	<1.0	2.1	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	8.8	<1.0	<10	<5.0	6.9	<2.0	<1.0	4.5	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	9.8	<1.0	<10	<5.0	6.0	<2.0	<1.0	4.8	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	3.3	<1.0	<10	<5.0	5.2	<2.0	<1.0	3.3	NA	NA	NA	NA	NA
		12/5/2007	<1.0	<1.0	<1.0	<2.0	3.7	<1.0	<10	<5.0	9.2	<2.0	<1.0	2.5	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	3.4	<2.0	560	<5.0	8.4	<2.0	<2.0	2.3	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	8.2	<1.0	<10	<5.0	10.0	<2.0	<1.0	5.7	NA	NA	NA	NA	NA
MW-9-205	UAU3	9/26/2001	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<0.050	<0.010	2.4	3.3	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	<0.050	<0.010	5.3	7.6	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	22	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	2.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.3	52	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	0.99	<2.0	<2.0	<2.0	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	1.6	<1.0	<10	<5.0	1.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-9-235	UAU4	9/26/2001	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0	<2.0	<0.050	<0.010	1.4	2.5	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.0	<2.0	<1.0	<1.0	<0.050	<0.010	<0.20	0.031	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	22	<5.0	7.3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	15	2.5	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	18/15D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	7.1/13D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	3.1/3.0D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	8.0/5.4D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	9.8/5.4D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.6/5.2D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																			
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³				
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni
MW-9-235	UAU4	5/7/2008	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	11/14D	<2.0	<2.0	<2.0	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	7.6/6.0D	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-10-130	UAU1	9/20/2001	<1000	<1000	<1000	<2500	<1000	<1000	<5000	<2500	<1000	<1000	<1000	<1000	<0.050	0.039	5.6	4.5	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	1.1	<1.0	54	<5.0	<1.0	<2.0	<1.0	<1.0	<0.050	<0.010	3.7	5.5	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	1.8	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/16/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/14/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/2/2005	<1.0	<1.0	<1.0	<2.0	1.5	<1.0	<10	<5.0	3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	34	<1.0	<10	<5.0	9.6	<2.0	<1.0	2.4	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	35	<1.0	<10	<5.0	8.9	<2.0	<1.0	3.2	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	25	<1.0	<10	<5.0	8.6	<2.0	<1.0	3.7	NA	NA	NA	NA	NA
		5/23/2007	<10	<10	<10	<20	26	<100	<10	<50	<10	<20	<10	<10	NA	NA	NA	NA	NA
		12/6/2007	<1.0	<1.0	<1.0	<2.0	19/20D	<1.0	<10	<5.0	5.3/5.3D	<2.0	<1.0	3.0/3.0D	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	19	<2.0	<10	<5.0	6.6	<2.0	<2.0	4.7	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	15	<1.0	<10	<5.0	6.4	<2.0	<1.0	4.7	NA	NA	NA	NA	NA
MW-10-170	UAU2	9/20/2001	<1000	<1000	<1000	<2500	<1000	<1000	<5000	<2500	<1000	<1000	<1000	<1000	<0.050	<0.010	2.2	4.6	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	4.2	<1.0	19	<5.0	3.4	<2.0	<1.0	<1.0	<0.050	<0.010	3.7	5.6	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	39	<1.0	290	<5.0	1.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/16/2004	<1.0	<1.0	<1.0	<2.0	24	<1.0	<10	<5.0	6.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	53	<1.0	<10	<5.0	3.8	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	44	<1.0	<10	<5.0	2.9	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	36	<1.0	<10	<5.0	8.3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	42	<1.0	<10	<5.0	2.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	33	<1.0	<10	<5.0	4.5	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/23/2007	<10	<10	<10	<20	36	<10	<100	<50	<10	<20	<10	<10	NA	NA	NA	NA	NA
		12/6/2007	<1.0	<1.0	<1.0	<2.0	43	<1.0	<10	<5.0	1.8	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	21	<2.0	<10	<5.0	3.0	<2.0	<2.0	0.66	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	2.9	<1.0	<10	<5.0	3.8	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-10-235	UAU4	9/20/2001	<1000	<1000	<1000	<2500	<1000	<1000	<5000	<2500	<1000	<1000	<1000	<1000	<0.050	<0.010	1.3	2.5	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	<0.050	<0.010	<0.20	2.8	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/6/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	2.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	1.2	<2.0	<2.0	<2.0	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-11-170	UAU2	9/20/2001	<1000	<1000	<1000	<2500	<1000	<1000	<5000	<2500	<1000	<1000	<1000	<1000	<0.050	<0.010	<0.20	2.3	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	1.6	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	<0.050	<0.010	4.2	5	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	5.1	<1.0	<10	<5.0	1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/15/2004	<1.0	<1.0	<1.0	<2.0	1.1	<1.0	<10	<5.0	2	2.4	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.9	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	3.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	3.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																			
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³				
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni
MW-11-170	UAU2	6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	3.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	1.8	<1.0	<10	<5.0	3.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	1.6	<1.0	<10	<5.0	3.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.8	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	2.4	<2.0	<10	<5.0	4.3	<2.0	<2.0	0.54	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	2.9	<1.0	<10	<5.0	4.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-11-200	UAU3	9/20/2001	<1000	<1000	<1000	<2500	<1000	<1000	<5000	<2500	<1000	<1000	<1000	<1000	<0.050	<0.010	0.7	1.8	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	2.9	<1.0	<10	<5.0	2.0	<2.0	<1.0	<1.0	<0.050	<0.010	7	6.7	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	1.1	<1.0	<10	19	1.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/15/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	2.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	7.5	<1.0	<10	<5.0	1.8	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	5.9	<1.0	<10	<5.0	2.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	6.8	<1.0	<10	<5.0	3.1	<2.0	<1.0	2.4	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	3.8	<1.0	<10	<5.0	4.3	<2.0	<1.0	2.1	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	1.2	<1.0	<10	<5.0	3.1	2.5	<1.0	1.1	NA	NA	NA	NA	NA
		12/5/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	2.9	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	5.3	<2.0	<10	<5.0	6.2	<2.0	<2.0	1.9	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	3.4	<1.0	<10	<5.0	6.1	<2.0	<1.0	1.7	NA	NA	NA	NA	NA
MW-11-240	UAU4	9/20/2001	<400	<400	<400	<1000	<400	<400	<2000	<1000	<400	<400	<400	<400	<0.050	<0.010	0.22	2.7	<0.050
		12/21/2001	<1.0	<1.0	<1.0	<2.0	3.0	<1.0	<10	<5.0	2.0	<2.0	<1.0	<1.0	<0.050	<0.010	3.4	8.9	<0.050
		7/2/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/15/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	2.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.9	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/23/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2007	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		5/7/2008	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	1.4	<2.0	<2.0	<2.0	NA	NA	NA	NA	NA
		9/10/2008	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-12-159	UAU1	7/2/2002	5.0	<1.0	<1.0	<2.0	<1.0	<1.0	25	9.2	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		8/13/2002	2.6	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		6/3/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	9.6	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/23/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/5/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-12-183	UAU2	5/7/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/10/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		7/2/2002	11.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	1.9	NA	NA	NA	NA	NA
		8/13/2002	5.8	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/3/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	5.3	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/23/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/5/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																			
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³				
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni
MW-12-183	UAU2	5/7/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/10/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-12-217	UAU3	7/2/2002	3.1	<1.0	<1.0	<2.0	<1.0	<1.0	620	130	<1.0	<2.0	<1.0	2.6	NA	NA	NA	NA	NA
		8/13/2002	6.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	42	<1.0	<2.0	<1.0	1.1	NA	NA	NA	NA	NA
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/3/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.5	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/23/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/5/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/7/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/10/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-12-238	UAU4	7/2/2002	20.0	<1.0	<1.0	<2.0	<1.0	<1.0	150	<5.0	<1.0	<2.0	<1.0	2.9	NA	NA	NA	NA	NA
		8/13/2002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0	<1.0	2.6	<1.0	<1.0	NA	NA	NA	NA	NA
		6/16/2004	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/14/2004 ⁴	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/3/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/15/2005	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	1.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		6/2/2006	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
		12/5/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/23/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/5/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		5/7/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/10/2008	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-14-130	UAU1	11/15/2008	3.4	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-14-163	UAU2	11/15/2008	11	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-14-186	UAU3	11/15/2008	7.1	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
MW-14-215	UAU4	11/15/2008	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	<1.0	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA
SRP 28E-0N	UAU-MAU	8/24/1983	NR	NR	NR	NR	NR	NR	NR	NR	1.8	NR	NR	10.8	NR	NR	NR	NR	NR
		5/11/1984	NR	NR	NR	NR	NR	NR	NR	NR	160	NR	NR	3.7	NR	NR	NR	NR	NR
		7/9/1984	NR	NR	NR	NR	NR	NR	NR	NR	57.7	NR	NR	4.3	NR	NR	NR	NR	NR
		8/6/1984	NR	NR	NR	NR	NR	NR	NR	NR	160	NR	NR	11.6	NR	NR	NR	NR	NR
		9/23/1985	NR	NR	NR	NR	NR	NR	NR	NR	745.8	NR	NR	34.7	NR	NR	NR	NR	NR
		8/18/1987	NR	NR	NR	NR	NR	NR	NR	NR	280.58	NR	NR	13.75	NR	NR	NR	NR	NR
		9/14/1987	NR	NR	NR	NR	NR	NR	NR	NR	100	NR	NR	6.3	NR	NR	NR	NR	NR
		9/14/1987	NR	NR	NR	NR	NR	NR	NR	NR	187	NR	NR	8.3	NR	NR	NR	NR	NR
		9/15/1987	NR	NR	NR	NR	NR	NR	NR	NR	161	NR	NR	7.2	NR	NR	NR	NR	NR
		9/16/1987	NR	NR	NR	NR	NR	NR	NR	NR	86	NR	NR	6.7	NR	NR	NR	NR	NR
		9/16/1987	NR	NR	NR	NR	NR	NR	NR	NR	142	NR	NR	NR	NR	NR	NR	NR	NR
		9/16/1987	NR	NR	NR	NR	NR	NR	NR	NR	89	NR	NR	5	NR	NR	NR	NR	NR
		9/18/1987	NR	NR	NR	NR	NR	NR	NR	NR	54	NR	NR	4.6	NR	NR	NR	NR	NR
		9/18/1987	NR	NR	NR	NR	NR	NR	NR	NR	129	NR	NR	6.2	NR	NR	NR	NR	NR
		6/21/1988	NR	NR	NR	9.6	NR	NR	NR	NR	260	NR	NR	13.1	NR	NR	NR	NR	NR
		1/29/1990	NR	NR	6.6	10.1	NR	NR	NR	NR	280	NR	NR	9.3	NR	NR	NR	NR	NR
		1/29/1990	NR	NR	7	8	NR	NR	NR	NR	250	NR	NR	8	NR	NR	NR	NR	NR
		5/21/1992	NR	NR	<0.20	0.6	NR	NR	NR	NR	32	NR	NR	1.4	NR	NR	NR	NR	NR
		8/17/1992	NR	NR	<0.20	0.5	NR	NR	NR	NR	32.9	NR	NR	1.3	NR	NR	NR	NR	NR
		11/18/1992	NR	NR	<0.20	0.4	NR	NR	NR	NR	37.9	NR	NR	1.4	NR	NR	NR	NR	NR
		7/6/1995	NR	NR	NR	NR	NR	NR	NR	NR	34	NR	NR	0.9	NR	NR	NR	NR	NR

TABLE 2. SUMMARY OF ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																				
Well Name	Zone Sampled	Sample Date	VOCs (ug/L) ²												Metals (mg/L) ³					
			Chloroform	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	1,2-DCP	MEK	MTBE	PCE	Toluene	1,1,1-TCA	TCE	As	Cr	Fe	Mn	Ni	
SRP 28E-0N	UAU-MAU	10/5/1995	NR	NR	NR	NR	NR	NR	NR	NR	NR	28	NR	NR	0.7	NR	NR	NR	NR	NR
		7/6/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	6.5	<2.0	<2.0	<2.0	0.004	<0.0040	<0.10	<0.020	<0.050	
		9/19/2000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10	<5.0	7	<2.0	<2.0	<2.0	0.0064	<0.0040	1.4	<0.020	<0.050	
		11/27/2001	BRL	BRL	BRL	BRL	BRL	BRL	BRL	BRL	5	BRL	BRL	BRL	NR	NR	NR	NR	NR	
		8/28/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NR	<5.0	2.5	<0.5	<0.5	<0.5	<0.005	<0.010	0.044	<0.010	<0.010	
		9/28/2004	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NR	<5.0	0.5	<0.5	<0.5	<0.5	<0.005	<0.010	0.073	<0.010	<0.010	
		10/26/2005	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NR	NR	1.2	<0.5	<0.5	<0.5	<0.005	<0.010	0.105	0.026	<0.010	
SRP 28E-0N-132	UAU1	January 1990	<0.5	<0.5	3	7	<0.5	<0.5	NR	NR	110	<0.5	9	9	NA	NA	NA	NA	NA	
SRP 28E-0N-140	UAU1	January 1990	1.3	<0.5	9.1	15.3	<0.5	0.7	NR	NR	645	0.5	14.5	10.7	NA	NA	NA	NA	NA	
SRP 28E-0N-195	UAU3	January 1990	0.9	<0.5	5.1	8.5	<0.5	1	NR	NR	220	<0.5	7.4	7.4	NA	NA	NA	NA	NA	
SRP 28E-0N-225	UAU4	January 1990	0.5	<0.5	4.6	9.7	<0.5	0.8	NR	NR	270	<0.5	7.1	6.5	NA	NA	NA	NA	NA	
SRP 28E-0N-280	MAU	January 1990	<0.5	<0.5	5.1	9.7	<0.5	0.9	NR	NR	500	<0.5	7.4	6.6	NA	NA	NA	NA	NA	
SRP 28E-0N-310	MAU	January 1990	<0.5	<0.5	5.8	11.1	<0.5	1.1	NR	NR	430	<0.5	7.7	7.8	NA	NA	NA	NA	NA	
SRP 28E-0N-345	MAU	January 1990	<0.5	<0.5	7	9	<0.5	<0.5	NR	NR	250	<0.5	13	8	NA	NA	NA	NA	NA	
SRP 28E-0N-360	MAU	January 1990	<0.5	<0.5	7	13	<0.5	<0.5	NR	NR	390	<0.5	14	11	NA	NA	NA	NA	NA	
SRP 28E-0N-1 130	UAU1	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	8.3	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-2 170	UAU2	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.7	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-3 200	UAU3	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.2	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-4 240	UAU4	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-5 270	MAU	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.6	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-6 290	MAU	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-7 310	MAU	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.9	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-8 330	MAU	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5.4	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-9 350	MAU	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	5	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28E-0N-10 370	MAU	7/10/2002	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<10	<5.0	4.1	<2.0	<1.0	<1.0	NA	NA	NA	NA	NA	
SRP 28.5E-1N	UAU-MAU	1/18/1983	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.8	NR	NR	0.3	NR	NR	NR	NR	NR
		9/7/1983	NR	NR	NR	NR	NR	NR	NR	NR	NR	BRL	NR	NR	BRL	NR	NR	NR	NR	NR
		7/9/1984	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1.5	NR	NR	NR	NR	NR
		6/27/1985	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2.7	NR	NR	NR	NR	NR
		7/23/1986	NR	NR	NR	NR	NR	NR	NR	NR	NR	BRL	NR	NR	BRL	NR	NR	NR	NR	NR
		9/14/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	24	NR	NR	NR	NR	NR	NR	NR	NR
		9/14/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	28.7	NR	NR	NR	NR	NR	NR	NR	NR
		9/15/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	26.6	NR	NR	NR	NR	NR	NR	NR	NR
		9/15/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	22.3	NR	NR	2.89	NR	NR	NR	NR	NR
		9/16/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	22	NR	NR	NR	NR	NR	NR	NR	NR
		9/16/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	33.1	NR	NR	NR	NR	NR	NR	NR	NR
		9/18/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	22	NR	NR	NR	NR	NR	NR	NR	NR
		9/18/1987	NR	NR	NR	NR	NR	NR	NR	NR	NR	31.7	NR	NR	NR	NR	NR	NR	NR	NR
		7/1/1988	NR	NR	NR	NR	NR	NR	NR	NR	NR	23	NR	NR	NR	NR	NR	NR	NR	NR
		5/21/1992	NR	NR	NR	NR	NR	NR	NR	NR	NR	32	NR	NR	1.4	NR	NR	NR	NR	NR
		8/27/1992	NR	NR	NR	NR	NR	NR	NR	NR	NR	32.9	NR	NR	1.3	NR	NR	NR	NR	NR
		11/18/1992	NR	NR	NR	NR	NR	NR	NR	NR	NR	37.9	NR	NR	1.4	NR	NR	NR	NR	NR
		11/19/1999	BRL	BRL	BRL	BRL	1.5	BRL	BRL	BRL	13	BRL	BRL	BRL	BRL	NR	NR	NR	NR	NR
		9/24/2002	BRL	BRL	BRL	BRL	0.8	BRL	BRL	BRL	9.9	BRL	BRL	BRL	BRL	NR	NR	NR	NR	NR
		11/13/2003	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	NR	<5.0	6.1	<0.5	<0.5	<0.5	<0.5	<0.005	<0.010	0.29	<0.010	<0.010
		10/26/2005	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	NR	NR	9.8	<0.5	<0.5	<0.5	<0.5	0.008	0.011	1.78	0.033	0.01
Aquifer Water Quality Standard or Tier 1 Level			100	NE	5.0	7.0	70	5.0	NE	20	5.0	1000	200	5.0	0.05	0.10	NE	4.9	0.10	
EPA Preliminary Remediation Goal			6.2	810	0.12	340	61	0.16	1900	13	0.66	720	3200	0.028	0.045	NE	11000	880	730.00	

Notes:

- Summary of VOC and metals analytical results. NA - not analyzed, NS - not sampled, NR - not reported, BRL - below reporting limit, "<" - less than reporting limit. **Bold** indicates compound exceeded the AWQS, **BOLD** indicates AWQS does not exist and compound exceeded PRG. 1991 samples collected by Kleinfelder, 1992-1993 samples collected by Malcolm Pirnie, 1994-1998 samples collected by ADEQ, 2000-present samples collected by MACTEC (LAW). With the exception of 7/6/2000 and 9/19/2000 samples from SRP Well 28E-0N and the 7/10/2002 diffusive bag samples collected from SRP Well 28E-0N, which were collected by MACTEC, SRP collected samples from wells 28E-0N and 28.5E-1N.
- VOC concentrations reported in micrograms per liter (ug/L). DCA - dichloroethane, DCE - dichloroethene, DCP - dichloropropane, MEK - methyl-ethyl-ketone, MTBE - methyl-tertiary-butyl-ether, PCE - tetrachlorethene or perchloroethene, TCA - 1,1,1- trichloroethane, TCE - trichloroethene.
- Metals reported in milligrams per liter (mg/L). As - Arsenic, Cr - Total Chromium, Fe - Total Iron, Mn - Manganese, Ni - Nickel.

Checked by: JNC

**TABLE 3. Summary of 1991 and 1995 Soil Sample Analytical Results
Applied Metalics Site**

Boring designation: MW-AM-8S (1991 WRA Samples)			
Sample depth (feet)	Analyte	Conc. (mg/kg)	Soil type
10	ND	<0.025	Clay
20	ND	<0.025	Silt
25	PCE	0.05	Sand
30	PCE	0.06	Clay
35	PCE	0.09	Clay
40	PCE	0.08	Clay
50	PCE	0.28	Silt
60	PCE	0.04	Clay
> 65	No sample	NA	SGC
Total borehole depth = 172 feet			
Boring designation: VW-1 (1995 Earth Tech Samples)			
0-10	No sample	NA	Clay
10-20	No sample	NA	Silt
21	ND	<0.050	Silt
25-30	No sample	NA	Silt
31	ND	<0.050	Silt
41	ND	<0.050	Clay
51	PCE	0.24	Clay
61	ND	<0.050	Silt
> 65	No sample	NA	SGC (presumed)
Total borehole depth = 61 feet			
Boring designation: VW-3 (1995 Earth Tech Samples)			
0-10	No sample	NA	Clay
11	ND	<0.050	Silt
21	ND	<0.050	Silt
25-30	No sample	NA	Silt
31-40	No sample	NA	Silt/sand
41	PCE	0.2	Clay
51	PCE	0.11	Clay
61	PCE	0.11	Silt
> 65	No sample	NA	SGC (presumed)
Total borehole depth = 65 feet			

Samples submitted for analysis by EPA method 8010.

ND = No analytes (per EPA Method 8010) detected in concentrations above analytical reporting limits. Only analytes with concentrations above analytical reporting limits are shown.

NA = No analyses performed.

Conc. = Concentration reported in milligram per kilogram (mg/kg).

SGC = Uncohesive, sand, gravel and cobble-sized particles.

Checked by: JNC

TABLE 4. SUMMARY OF SOIL SAMPLE VOC ANALYTICAL RESULTS (AUGUST-SEPTEMBER 2002)						
Sample I.D	Date	Results (mg/kg ¹)				
		PCE	TCE	c-1,2-DCE	t-1,2-DCE	VOCs
LB-1-S-10	8/20/01	<0.10	<0.10	<0.10	<0.10	NA ²
LB-1-S-20	8/20/01	<0.10	<0.10	<0.10	<0.10	NA
LB-1-S-30	8/20/01	<0.10	<0.10	<0.10	<0.10	NA
LB-1-S-30*	8/20/01	<0.10	<0.10	<0.10	<0.10	ND ³
LB-1-S-40	8/20/01	<0.10	<0.10	<0.10	<0.10	NA
LB-1-S-50	8/20/01	<0.10	<0.10	<0.10	<0.10	NA
LB-1-S-50*	8/20/01	<0.10	<0.10	<0.10	<0.10	ND
LB-1-S-60	8/21/01	<0.10	<0.10	<0.10	<0.10	NA
LB-2-S-10	8/25/01	<0.10	<0.10	<0.10	<0.10	NA
LB-2-S-20	8/25/01	<0.10	<0.10	<0.10	<0.10	NA
LB-2-S-30	8/25/01	<0.10	<0.10	<0.10	<0.10	NA
LB-2-S-30*	8/25/01	<0.089	<0.089	<0.089	<0.089	ND
LB-2-S-40	8/25/01	<0.10	<0.10	<0.10	<0.10	NA
LB-2-S-50	8/25/01	<0.10	<0.10	<0.10	<0.10	NA
LB-2-S-50*	8/25/01	<0.089	<0.089	<0.089	<0.089	ND
LB-2-S-60	8/25/01	<0.10	<0.10	<0.10	<0.10	NA
LB-3-S-10	8/28/01	<0.10	<0.10	<0.10	<0.10	NA
LB-3-S-20	8/28/01	<0.10	<0.10	<0.10	<0.10	NA
LB-3-S-30	8/28/01	<0.10	<0.10	<0.10	<0.10	NA
LB-3-S-30*	8/28/01	<0.085	<0.085	<0.085	<0.085	ND
LB-3-S-40	8/28/01	<0.10	<0.10	<0.10	<0.10	NA
LB-3-S-50	8/28/01	<0.10	<0.10	<0.10	<0.10	NA
LB-3-S-50*	8/28/01	<0.089	<0.089	<0.089	<0.089	ND
LB-3-S-60	8/28/01	<0.10	<0.10	<0.10	<0.10	NA
LB-4-S-10	9/11/01	<0.10	<0.10	<0.10	<0.10	NA
LB-4-S-20	9/11/01	<0.10	<0.10	<0.10	<0.10	NA
LB-4-S-30	9/11/01	<0.10	<0.10	<0.10	<0.10	NA
LB-4-S-30*	9/11/01	<0.10	<0.10	<0.10	<0.10	ND
LB-4-S-40	9/11/01	<0.10	<0.10	<0.10	<0.10	NA
LB-4-S-40*	9/11/01	<0.140	<0.140	<0.140	<0.140	ND
LB-4-S-50	9/11/01	<0.10	<0.10	<0.10	<0.10	NA
LB-4-S-60	9/11/01	<0.10	<0.10	<0.10	<0.10	NA
LB-6-S-10	9/13/01	<0.10	<0.10	<0.10	<0.10	NA
LB-6-S-20	9/13/01	<0.10	<0.10	<0.10	<0.10	NA
LB-6-S-30	9/13/01	<0.10	<0.10	<0.10	<0.10	NA
LB-6-S-30*	9/13/01	<0.10	<0.10	<0.10	<0.10	ND
LB-6-S-40	9/13/01	<0.10	<0.10	<0.10	<0.10	NA
LB-6-S-50	9/13/01	<0.10	<0.10	<0.10	<0.10	NA
LB-6-S-50*	9/13/01	<0.10	<0.10	<0.10	<0.10	ND
LB-6-S-60	9/13/01	<0.10	<0.10	<0.10	<0.10	NA
LB-7-S-10	9/12/01	<0.10	<0.10	<0.10	<0.10	NA
LB-7-S-20	9/12/01	<0.10	<0.10	<0.10	<0.10	NA
LB-7-S-30	9/12/01	<0.10	<0.10	<0.10	<0.10	NA
LB-7-S-30*	9/12/01	<0.10	<0.10	<0.10	<0.10	ND
LB-7-S-40	9/12/01	<0.10	<0.10	<0.10	<0.10	NA
LB-7-S-50	9/12/01	<0.10	<0.10	<0.10	<0.10	NA
LB-7-S-50*	9/12/01	<0.091	<0.091	<0.091	<0.091	ND
LB-7-S-60	9/12/01	<0.10	<0.10	<0.10	<0.10	NA
RSRL		170	70	100	270	
GPL		1.3	0.61	4.9	8.4	

- Results are presented in milligrams per kilogram (mg/kg). The EPA Method 8260B analytical results, indicated by a * are reported in micrograms per kilogram (µg/kg) in the Del Mar Analytical report and have been converted to mg/kg for comparison purposes.

2. NA indicates that sample was not analyzed for VOCs by EPA Method 8260B.

3. ND indicates that all other VOCs reported by EPA Method 8260B were non-detect (ND).

Checked by: JNC

TABLE 5. SUMMARY OF SOIL SAMPLE METALS AND CYANIDE ANALYTICAL RESULTS								
Sample I.D	Date	Results (mg/kg ¹)						
		As	Total Cr	CrVI	Cyanide	Cu	Ni	Zn
LB-1-S-10	8/20/01	<5.0	21	<1.0	<0.50	21	20	59
LB-1-S-20	8/20/01	<5.0	15	<1.0	<0.50	14	12	38
LB-1-S-30	8/20/01	<5.0	19	<1.0	<0.50	14	11	34
LB-1-S-40	8/20/01	<5.0	15	<1.0	<0.50	20	15	46
LB-1-S-50	8/20/01	<5.0	27	<1.0	<0.50	18	17	52
LB-1-S-60	8/21/01	<5.0	25	<1.0	<0.50	10	12	30
LB-1-S-80	8/21/01	<5.0	1.6	<1.0	<0.50	2.7	<5.0	9.8
LB-1-S-90	8/21/01	<5.0	11	<1.0	<0.50	6.5	8.8	7.2
LB-2-S-10	8/25/01	<5.0	30	<1.0	<0.50	19	19	62
LB-2-S-20	8/25/01	<5.0	18	<1.0	<0.50	15	15	45
LB-2-S-30	8/25/01	<5.0	18	<1.0	<0.50	11	12	36
LB-2-S-40	8/25/01	<5.0	18	<1.0	<0.50	19	17	48
LB-2-S-50	8/25/01	<5.0	21	<1.0	<0.50	10	11	28
LB-2-S-60	8/25/01	<5.0	19	<1.0	<0.50	7.3	12	23
LB-3-S-10	8/28/01	<5.0	26	<1.0	<0.50	24	24	74
LB-3-S-20	8/28/01	<5.0	20	<1.0	<0.50	16	15	51
LB-3-S-30	8/28/01	<5.0	61	<1.0	<0.50	13	32	38
LB-3-S-40	8/28/01	<5.0	21	<1.0	<0.50	16	33	39
LB-3-S-50	8/28/01	<5.0	150	<1.0	<0.50	9.8	53	30
LB-3-S-60	8/28/01	<5.0	45	<1.0	<0.50	39	51	33
LB-4-S-10	9/11/01	<5.0	25	<1.0	<0.62	19	18	54
LB-4-S-20	9/11/01	<5.0	22	<1.0	<0.62	21	23	66
LB-4-S-30	9/11/01	<5.0	18	<1.0	<0.62	17	14	46
LB-4-S-40	9/11/01	<25	18	<1.0	<0.62	16	14	45
LB-4-S-50	9/11/01	<5.0	15	<1.0	<0.62	14	12	470
LB-4-S-60	9/11/01	<5.0	50	<1.0	<0.50	14	19	58
LB-6-S-10	9/13/01	<10	22	<1.0	<0.50	21	21	66
LB-6-S-20	9/13/01	<10	22	<1.0	<0.50	21	18	56
LB-6-S-30	9/13/01	<5.0	16	<1.0	<0.50	14	12	63
LB-6-S-40	9/13/01	<5.0	23	<1.0	<0.50	16	16	56
LB-6-S-50	9/13/01	<5.0	25	<1.0	<0.50	13	13	46
LB-6-S-60	9/13/01	<5.0	14	<1.0	<0.50	7.5	9.5	26
LB-7-S-10	9/12/01	<5.0	20	<1.0	<0.50	20	19	63
LB-7-S-20	9/12/01	<5.0	27	<1.0	<0.50	17	18	56
LB-7-S-30	9/12/01	<5.0	18	<1.0	<0.50	14	12	41
LB-7-S-40	9/12/01	<5.0	16	<1.0	<0.50	18	15	56
LB-7-S-50	9/12/01	<5.0	14	<1.0	<0.50	12	11	41
LB-7-S-60	9/12/01	<5.0	15	<1.0	<0.50	10	14	35
RSRL		10	2,100	30	1,300	2,800	1,500	23,000
GPL		290	590	NE	NE	NE	NE	NE

1. Results are presented in milligrams per kilogram (mg/kg).

Checked by: JNC

TABLE 6 – DISCREET SOIL GAS SAMPLE ANALYTICAL RESULTS¹

		PCE			TCE			C-1,2-DCE			t-1,2-DCE		
Sample I.D	Date Analyzed	mg/m ³	ppmv	lbs/day	mg/m ³	ppmv	lbs/day	mg/m ³	ppmv	lbs/day	mg/m ³	ppmv	lbs/day
LB-1-SG-10	8/21/01	31	4.57	0.58	<5.0	<0.93	NA ²	<5.0	<1.26	NA	<5.0	<1.26	NA
LB-1-SG-20	8/21/01	89	13.11	1.65	<10	<1.87	NA	<10	<2.52	NA	<10	<2.52	NA
LB-1-SG-30	8/21/01	480	70.7	8.91	<20	<3.73	NA	<20	<5.04	NA	<20	<5.04	NA
LB-1-SG-40	8/21/01	27	3.98	0.50	<5.0	<0.93	NA ²	<5.0	<1.26	NA	<5.0	<1.26	NA
LB-1-SG-50	8/21/01	310	45.66	5.94	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-1-SG-60	8/21/01	11	1.62	0.20	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-1-SG-70	8/21/01	1.2	0.18	0.02	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-1-SG-80	8/21/01	1.5	0.22	0.03	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-1-SG-90	8/21/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-1-SG-100	8/21/01	4.0	0.59	0.07	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-1-SG-110	8/21/01	3.5	0.52	0.07	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-2-SG-10	8/25/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-2-SG-20	8/25/01	1.6	0.24	0.03	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-2-SG-30	8/25/01	18	2.65	0.33	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-2-SG-40	8/25/01	0.89	0.13	0.02	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-2-SG-50	8/25/01	19	2.8	0.35	<1.0	<0.19	NA	1.0	0.25	0.02	<1.0	<0.25	NA
LB-2-SG-60	8/25/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-2-SG-70	8/25/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-2-SG-80	8/25/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-3-SG-10	8/28/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-3-SG-20	8/28/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-3-SG-30	8/28/01	1.0	0.15	0.02	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-3-SG-40	8/28/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-3-SG-50	8/28/01	1.6	0.24	0.03	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-3-SG-60	8/28/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-3-SG-70	8/28/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-4-SG-10	9/11/01	1.7	0.25	0.03	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-4-SG-20	9/11/01	<1.0	<0.15	NA	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-4-SG-30	9/11/01	8.1	1.19	0.15	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-4-SG-40	9/11/01	8.3	1.22	0.15	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-4-SG-50	9/11/01	2.1	0.31	0.04	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA

TABLE 6 – DISCREET SOIL GAS SAMPLE ANALYTICAL RESULTS¹

		PCE			TCE			C-1,2-DCE			t-1,2-DCE		
Sample I.D	Date Analyzed	mg/m ³	ppmv	lbs/day	mg/m ³	ppmv	lbs/day	mg/m ³	ppmv	lbs/day	mg/m ³	ppmv	lbs/day
LB-4-SG-60	9/14/01	1.1	0.16	0.02	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-6-SG-10	9/14/01	1.5	0.22	0.03	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-6-SG-20	9/14/01	37	5.45	0.69	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-6-SG-30	9/14/01	22	3.24	0.41	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-6-SG-40	9/14/01	15	2.21	0.28	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-6-SG-50	9/14/01	65	9.57	1.21	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-6-SG-60	9/14/01	82	12.08	1.52	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-7-SG-10	9/14/01	4.5	0.66	0.08	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-7-SG-20	9/14/01	2.0	0.29	0.04	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-7-SG-30	9/14/01	16	2.36	0.30	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-7-SG-40	9/14/01	3.3	0.49	0.06	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-7-SG-50	9/14/01	19	2.80	0.35	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
LB-7-SG-60	9/14/01	21	3.09	0.39	<1.0	<0.19	NA	<1.0	<0.25	NA	<1.0	<0.25	NA
EPA Region 9 PRG ³		0.00067			0.000017			0.037			0.073		

Notes:

1. Results are reported in milligrams per cubic meter (mg/m³), parts per million of vapor volume (ppmv), and extraction rate in lbs per day (lbs/day) assuming a flow rate of 200 standard cubic feet per minute (scfm).
2. NA indicates sample result was non-detect and calculation of extraction rate in lbs/day is not applicable (NA).
3. The EPA Region 9 Preliminary Remediation Goals (PRGs) are applicable to ambient air only. However, the PRGs are provided for reference purposes.

Checked by: JNC

TABLE 7. SUMMARY OF DISCREET GROUNDWATER SAMPLE VOC ANALYTICAL RESULTS

Sample I.D	Well	Zone	Date	Results ¹ (µg/L)			
				PCE	TCE	c-1,2-DCE	t-1,2-DCE
LB-1-W-130	MW-9	UAU1	8/22/01	59	2.1	10	<1.0
LB-1-W-140	MW-9	AQ1 ²	8/22/01	<1.0	<1.0	<1.0	<1.0
LB-1-W-188	MW-9	UAU2	8/22/01	4.7	<1.0	3.1	<1.0
LB-1-W-205	MW-9	UAU3	8/22/01	4.6	<1.0	3.0	<1.0
LB-1-W-222	MW-9	UAU4	8/22/01	<1.0	<1.0	<1.0	<1.0
LB-1-W-240	MW-9	UAU4	8/22/01	<1.0	<1.0	<1.0	<1.0
LB-2-GW-130	MW-10	UAU1	8/26/01	12	7.3	27	<1.0
LB-2-GW-150	MW-10	AQ1	8/26/01	9.6	<1.0	<1.0	<1.0
LB-2-GW-170	MW-10	UAU2	8/26/01	88	8.5	42	<1.0
LB-2-GW-240	MW-10	UAU4	8/26/01	<1.0	<1.0	<1.0	<1.0
LB-3-W-130	MW-11	UAU1	8/29/01	2.7	<1.0	3.2	<1.0
LB-3-W-150	MW-11	UAU2	8/29/01	11	<1.0	<1.0	<1.0
LB-3-W-170	MW-11	UAU2	8/29/01	23	<1.0	4.4	<1.0
LB-3-W-200	MW-11	UAU3	8/29/01	11	<1.0	4.2	<1.0
LB-3-W-240	MW-11	UAU4	8/29/01	2.3	<1.0	<1.0	<1.0
MW-12-150	MW-12	UAU1	6/13/02	2.4	<2.0	<2.0	2.6
MW-12-170	MW-12	UAU2	6/13/02	3.6	<2.0	<2.0	<2.0
AWQS				5.0	5.0	70	70

1. Results are reported in micrograms per liter (µg/L). **Bold** indicates VOC exceeds the Aquifer Water Quality Standard (AWQS).
2. AQ1 indicates Aquitard Zone 1 between Zones UAU1 and UAU2.

Checked by: JNC

Table 8. Indoor Air Quality PCE and TCE Analytical Results									
Sample Number	Location	Date	PCE ^a			TCE ^b			Combined CILCR ^d
			ppbv	µg/m ³	CILCR ^c	ppbv	µg/m ³	CILCR ^c	
1	Suite 1 – Floor	6/27/02	20	135.6	9E-07	0.97	5.21	1E-06	2E-06
		12/17/02	13	88.14	6E-07	1.2	6.44	2E-06	3E-06
2 IAQ-1	Suite 1 – Office	6/27/02	57	386	3E-06	0.94	5.05	1E-06	4E-06
		12/17/02	180	1220.4	9E-06	4.0	21.48	6E-06	2E-05
		11/21/07	0.85	5.9	4E-08	<0.5	<2.8	NA	4E-08 ^e
3	Suite 1 – Mezzanine	6/27/02	16	108.48	8E-07	0.81	4.35	1E-06	2E-06
		12/17/02	17	115.26	8E-07	0.78	4.19	1E-06	2E-06
4	Suite 4 – Floor	6/27/02	<0.50	<3.39	NA	<0.50	<2.69	NA	NA
		12/17/02	NS	NS	NS	NS	NS	NS	NS
5	Suite 5 – Floor	6/27/02	2.0	13.56	9E-08	<0.50	<2.69	NA	9E-08
		12/17/02	NS	NS	NS	NS	NS	NS	NS
6	Suite 3 – Floor	6/27/02	5.5	37.29	3E-07	0.76	4.08	1E-06	1E-06
		12/17/02	7.0	47.46	3E-07	0.61	3.28	9E-07	1E-06
7	Outside	6/27/02	<0.50	<3.39	NA	<0.50	<2.69	NA	NA
		12/17/02	<0.50	<3.39	NA	0.67	3.60	1E-06	1E-06
EPA Region 9 PRG ^f			0.099	0.32	NA	0.003	0.017	NA	NA
Commercial PRG			21.09	143	NA	0.667	3.58	NA	NA
ILCR Acceptable Exposure Standard ^g			NA	NA	1E-04	NA	NA	1E-04	1E-04
ILCR <i>de minimus</i> Exposure Standard			NA	NA	1E-06	NA	NA	1E-06	1E-06

- PCE results reported in parts per billion of vapor volume (ppbv) and micrograms per cubic meter (µg/m³). Results in µg/m³ are calculated by multiplying concentration in ppbv by a conversion factor of 6.78 µg/m³/ppbv. NS – not sampled.
- TCE results reported in parts per billion of vapor volume (ppbv) and micrograms per cubic meter (µg/m³). Results in µg/m³ are calculated by multiplying concentration in ppbv by a conversion factor of 5.37 µg/m³/ppbv. NS – not sampled.
- CILCR – Commercial Incidental Lifetime Cancer Risk. NA indicates not applicable due to laboratory non-detect concentrations.
- Combined CILCR = PCE CILCR + TCE CILCR.
- The combined CILCR for sample IAQ-1 collected on 11/21/07 does not exceed 1E-06. Therefore, according to the National Contingency Plan (NCP) no further action is required.
- Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goal (PRG) for ambient air (EPA 2004).
- Incremental Lifetime Cancer Risk (ILCR) acceptable exposure standard per the NCP.

Checked by: JNC

TABLE 9. SUMMARY OF GENERAL WATER CHEMISTRY ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ⁴																				
Well Name	Zone Sampled	Sample Date	Alkalinity mg/L	NH4 as N mg/L	BOD mg/L	CO2 mg/L	COD mg/L	Cl mg/L	Ethane ng/L	Ethene ng/L	H2 nm	Methane ug/L	Nitrate ² as N mg/L	Nitrite ² as N mg/L	DO mg/L	Sulfate mg/L	Sulfide mg/L	TOC mg/L	TDS mg/L	P mg/L
MW-1S	UAU2	10/30/1991	515	NA	NA	NA	NA	570	NA	NA	NA	NA	16	NA	NA	240	NA	NA	1800	NA
		2/20/1992	514	NA	NA	NA	NA	540	NA	NA	NA	NA	15.8	NA	NA	240	NA	NA	1700	NA
		5/22/1992	513	NA	NA	NA	NA	510	NA	NA	NA	NA	17	NA	NA	220	NA	NA	1700	NA
		8/14/1992	507	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1800	NA
		7/6/2000	470	5.3	<3.0	57.1	3.1	530	22	32	328	0.603	10	<0.002	9.28	220	<2.0	14	NA	0.23
		9/19/2000	480	<1.0	<3.0	62.95	<5.0	470	6	13	3.61	0.077	10.4	<0.03	12.57	240	<2.0	<2.0	NA	<0.10
		12/6/2000	540	<1.0	<3.0	57	7.4	590	<5.0	<5.0	2.2	0.04	12.2	<0.03	7.5	300	<2.0	<2.0	NA	<0.050
		3/6/2001	480	<1.0	9	68	<5.0	530	<5.0	<5.0	3.6	0.05	11.5	<0.03	7.9	280	<2.0	4	NA	<0.050
MW-1D	UAU4	10/30/1991	426	NA	NA	NA	NA	700	NA	NA	NA	NA	13.4	NA	NA	232	NA	NA	2000	NA
		2/20/1992	427	NA	NA	NA	NA	700	NA	NA	NA	NA	13.9	NA	NA	250	NA	NA	1900	NA
		5/22/1992	429	NA	NA	NA	NA	680	NA	NA	NA	NA	13	NA	NA	240	NA	NA	2000	NA
		8/14/1992	420	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2100	NA
		7/6/2000	400	2	<3.0	47.21	11	670	22	148	2.02	5.734	6.1	<0.002	7.58	230	<2.0	11	NA	0.3
		9/19/2000	400	1.7	<3.0	NA	<5.0	580	29	<5.0	NA	8.973	9.6	<0.03	NA	260	<2.0	<2.0	NA	<0.10
		12/6/2000	460	<1.0	<3.0	49	11	650	<5.0	<5.0	1.7	0.09	10.4	<0.03	7.1	290	<2.0	<2.0	NA	<0.050
		3/6/2001	400	<1.0	<3.0	59	<5.0	680	<5.0	<5.0	0.75	0.12	11.3	<0.03	6.9	310	<2.0	<2.0	NA	<0.050
MW-2D	UAU3	10/30/1991	375	NA	NA	NA	NA	580	NA	NA	NA	NA	12.8	NA	NA	170	NA	NA	1700	NA
		2/20/1992	385	NA	NA	NA	NA	600	NA	NA	NA	NA	13.1	NA	NA	180	NA	NA	1600	NA
		5/22/1992	381	NA	NA	NA	NA	580	NA	NA	NA	NA	13	NA	NA	170	NA	NA	1700	NA
		8/14/1992	381	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1700	NA
		7/6/2000	370	1.3	<3.0	38.43	5	530	<5.0	30	3.05	0.044	6.9	0.003	8.22	160	<2.0	6.9	NA	0.05
		9/20/2000	370	1.1	7.5	46.85	<5.0	460	10	15	31.4	0.103	9.8	<0.03	11.6	180	<2.0	4	NA	<0.10
		12/7/2000	410	<1.0	<3.0	42	8.1	520	<5.0	16	3.5	0.09	10.7	<0.03	8.6	200	<2.0	<2.0	NA	<0.050
		3/7/2001	370	<1.0	<3.0	44	<5.0	540	6	<5.0	2	0.1	14.8	<0.03	8.7	220	<2.0	<2.0	NA	<0.050
MW-3S	UAU3	10/30/1991	405	NA	NA	NA	NA	490	NA	NA	NA	NA	11.1	NA	NA	150	NA	NA	1500	NA
		2/20/1992	411	NA	NA	NA	NA	530	NA	NA	NA	NA	10.8	NA	NA	160	NA	NA	1500	NA
		5/22/1992	409	NA	NA	NA	NA	530	NA	NA	NA	NA	10	NA	NA	150	NA	NA	1600	NA
		8/14/1992	415	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1600	NA
		7/7/2000	390	5.7	<3.0	39.16	2.1	440	<5.0	16	14.9	0.685	9.3	<0.002	8.8	140	<2.0	<5.0	NA	0.35
		9/20/2000	390	2.8	<3.0	43.55	<5.0	450	10	9	5.16	0.201	8.3	<0.03	12	170	<2.0	<2.0	NA	<0.10
		12/7/2000	440	<1.0	<3.0	36	12	430	<5.0	<5.0	1.6	0.04	8.5	<0.03	7.2	180	<2.0	<2.0	NA	<0.050
		3/7/2001	380	1.7	<3.0	42	<5.0	470	<5.0	<5.0	0.9	0.05	9.1	<0.03	6.8	180	<2.0	<2.0	NA	<0.050
MW-4S	UAU2	10/30/1991	389	NA	NA	NA	NA	650	NA	NA	NA	NA	16	NA	NA	180	NA	NA	1900	NA
		2/20/1992	394	NA	NA	NA	NA	680	NA	NA	NA	NA	16.5	NA	NA	190	NA	NA	1700	NA
		5/22/1992	390	NA	NA	NA	NA	660	NA	NA	NA	NA	14	NA	NA	180	NA	NA	1900	NA
		8/14/1992	386	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2000	NA
		7/7/2000	460	2.1	<3.0	53.44	<5.0	380	<5.0	13	174	0.034	9.1	<0.002	6.23	150	<2.0	<5.0	NA	0.24
		9/20/2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS
		12/7/2000	450	<1.0	<3.0	47	7.8	590	<5.0	<5.0	2	0.03	11.7	<0.03	7	270	<2.0	<2.0	NA	<0.050
		3/6/2001	380	<1.0	<3.0	18	5.3	830	<5.0	<5.0	1.6	0.05	13.7	<0.03	8	370	<2.0	<2.0	NA	<0.050
MW-5S	UAU2	10/30/1991	461	NA	NA	NA	NA	550	NA	NA	NA	NA	11.7	NA	NA	170	NA	NA	1600	NA
		2/20/1992	488	NA	NA	NA	NA	480	NA	NA	NA	NA	10.3	NA	NA	170	NA	NA	1500	NA
		5/22/1992	482	NA	NA	NA	NA	480	NA	NA	NA	NA	10	NA	NA	150	NA	NA	1500	NA
		8/14/1992	492	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1200	NA
		7/6/2000	450	1.7	<3.0	46.85	7.6	440	<5.0	17	4.11	0.022	10	<0.002	6.89	180	<2.0	12	NA	0.35
		9/19/2000	450	1.4	<30	50.14	<5.0	400	8	22	4.17	0.082	10.9	<0.03	12.54	200	<2.0	<2.0	NA	<0.10
		12/5/2000	470	<1.0	<3.0	42	11	480	<5.0	<5.0	1.8	<0.02	4.6	<0.002	6.7	260	<2.0	4	NA	<0.050
		3/7/2001	440	<1.0	<3.0	54	<5.0	490	<5.0	<5.0	1.4	0.04	12.6	<0.03	7.9	240	<2.0	<2.0	NA	<0.050
MW-5D	UAU3	10/30/1991	410	NA	NA	NA	NA	680	NA	NA	NA	NA	12.6	NA	NA	240	NA	NA	2100	NA
		2/20/1992	416	NA	NA	NA	NA	770	NA	NA	NA	NA	12.8	NA	NA	240	NA	NA	2000	NA
		5/22/1992	408	NA	NA	NA	NA	680	NA	NA	NA	NA	12	NA	NA	220	NA	NA	2000	NA
		8/14/1992	403	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2100	NA

TABLE 9. SUMMARY OF GENERAL WATER CHEMISTRY ANALYTICAL RESULTS, SOUTH MESA WQARF REGISTRY SITE WELLS ¹																				
Well Name	Zone Sampled	Sample Date	Alkalinity mg/L	NH4 as N mg/L	BOD mg/L	CO2 mg/L	COD mg/L	Cl mg/L	Ethane ng/L	Ethene ng/L	H2 nm	Methane ug/L	Nitrate ² as N mg/L	Nitrite ² as N mg/L	DO mg/L	Sulfate mg/L	Sulfide mg/L	TOC mg/L	TDS mg/L	P mg/L
MW-5D	UAU3	7/6/2000	390	1.4	<3.0	47.58	8.3	780	<5.0	36	2.11	0.041	12	<0.002	5.76	260	<2.0	10	NA	0.48
		9/19/2000	380	1.1	<3.0	56.36	<5.0	720	6	21	3.17	0.078	11.3	<0.03	12.18	280	<2.0	<2.0	NA	<0.10
		12/6/2000	400	<1.0	<3.0	48	5.8	940	6	14	1.7	0.04	69	<0.03	6.9	680	<2.0	<2.0	NA	<0.050
		3/6/2001	380	<1.0	<3.0	52	11	860	<5.0	8	0.77	0.06	13	<0.03	7.6	350	<2.0	<2.0	NA	<0.050
MW-6D	MAU	10/30/1991	375	NA	NA	NA	NA	650	NA	NA	NA	NA	12.4	NA	NA	260	NA	NA	2100	NA
		2/20/1992	385	NA	NA	NA	NA	740	NA	NA	NA	NA	12.4	NA	NA	260	NA	NA	1900	NA
		5/22/1992	381	NA	NA	NA	NA	690	NA	NA	NA	NA	12	NA	NA	240	NA	NA	2000	NA
		8/14/1992	382	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2100	NA
		7/7/2000	360	1.4	<3.0	48.31	<5.0	900	<5.0	26	6.14	0.037	18	<0.002	8.69	330	0.8	12	NA	0.09
		9/19/2000	350	1.4	<3.0	47.95	<5.0	750	<5.0	18	2.51	0.054	12.6	<0.03	11.66	340	<2.0	<2.0	NA	<0.10
		12/5/2000	330	<1.0	<3.0	43	13	860	<5.0	22	1.2	0.05	2.8	<0.002	6.9	450	<2.0	<2.0	NA	<0.050
		3/6/2001	360	<1.0	<3.0	48	<5.0	920	<5.0	17	0.36	0.3	15	<0.03	6.4	420	<2.0	<2.0	NA	<0.050
MW-7D	UAU3	10/30/1991	389	NA	NA	NA	NA	590	NA	NA	NA	NA	10.8	NA	NA	180	NA	NA	1700	NA
		2/20/1992	402	NA	NA	NA	NA	610	NA	NA	NA	NA	11.1	NA	NA	180	NA	NA	1600	NA
		5/22/1992	399	NA	NA	NA	NA	580	NA	NA	NA	NA	12	NA	NA	180	NA	NA	1700	NA
		8/14/1992	397	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1800	NA
		7/7/2000	370	2.9	<3.0	43.19	4.7	620	14	85	9.52	1.372	9.5	<0.002	8.19	210	<2.0	<5.0	NA	0.13
		9/20/2000	370	2.7	<3.0	49.78	<5.0	620	23	119	3.08	4.418	10	<0.03	13.2	240	<2.0	5.7	NA	<0.10
		12/6/2000	390	<1.0	<3.0	41	10	650	8	7	1.2	0.15	10.7	<0.03	6.5	270	<2.0	<2.0	NA	<0.050
		3/7/2001	380	<1.0	<3.0	46	<5.0	650	<5.0	9	1.2	0.47	11.3	<0.03	6.1	280	<2.0	<2.0	NA	<0.050
MW-AM-8S	UAU2	2/20/1992	453	NA	NA	NA	NA	720	NA	NA	NA	NA	12.2	NA	NA	230	NA	NA	1800	NA
		5/22/1992	443	NA	NA	NA	NA	680	NA	NA	NA	NA	13	NA	NA	230	NA	NA	2000	NA
		8/14/1992	443	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2000	NA
		7/5/2000	410	2	<3.0	60.5	<5.0	700	206	23	<0.03	0.249	24	<0.002	6.14	250	0.8	9.6	NA	0.86
		9/19/2000	410	1.4	<3.0	NA	<5.0	650	53	<5.0	NA	4.604	18.7	<0.03	NA	290	<2.0	<2.0	NA	<0.10
		12/6/2000	810	<1.0	<3.0	60	13	770	290	<5.0	NA	0.44	18.3	<0.03	3	340	<2.0	7	NA	0.95
		3/6/2001	400	2.5	<3.0	86	<5.0	690	57	<5.0	NA	8.8	23.9	<0.03	4	320	<2.0	<2.0	NA	<0.050
MW-LW	UAU2	2/20/1992	418	NA	NA	NA	NA	650	NA	NA	NA	NA	9.9	NA	NA	200	NA	NA	1700	NA
		5/22/1992	414	NA	NA	NA	NA	640	NA	NA	NA	NA	11	NA	NA	210	NA	NA	1900	NA
		8/14/1992	411	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1900	NA
		7/7/2000	370	3.4	60	36.48	7	770	280	79	<0.03	2230	7.2	<0.002	6.41	260	<2.0	<5.0	NA	0.07
		9/19/2000	390	2	<3.0	NA	<5.0	640	<5.0	<5.0	NA	8.073	9.3	<0.03	NA	300	<2.0	<2.0	NA	<0.10
		12/6/2000	460	<1.0	<3.0	40	10	900	19	<5.0	NA	17	11.7	<0.03	8.6	420	<2.0	27	NA	<0.050
SRP 28E-0N	UAU-MAU	5/21/1992	365	NA	NA	NA	NA	250	NA	NA	NA	NA	8.2	NA	NA	33	NA	NA	1100	NA
		8/14/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1700	NA
		7/6/2000	420	3.4	<3.0	46.61	9.9	640	<5.0	<5.0	<0.03	0.269	11	<0.002	5.99	220	<2.0	14	NA	0.47
		9/19/2000	420	1.4	<3.0	NA	<5.0	490	41	<5.0	NA	18.44	10.7	<2.0	NA	220	<2.0	3.4	NA	<0.10
Mesa #10	MAU	10/12/1988	149	NA	NA	NA	NA	275	NA	NA	NA	NA	1.48	NA	NA	47	NA	NA	728	NA
Mesa #13	MAU	10/12/1988	124	NA	NA	NA	NA	254	NA	NA	NA	NA	0.54	NA	NA	43	NA	NA	724	NA
Mesa #14	MAU	10/12/1988	129	NA	NA	NA	NA	264	NA	NA	NA	NA	1.04	NA	NA	45	NA	NA	704	NA
Mesa #15	MAU	10/12/1998	129	NA	NA	NA	NA	245	NA	NA	NA	NA	0.64	NA	NA	42	NA	NA	674	NA

- Summary of general water chemistry analytical results. NA - not analyzed and NS - not sampled. Alkalinity, ammonia (NH4), biologic oxygen demand (BOD), carbon dioxide (CO2), chloride (Cl), nitrate, nitrite, dissolved oxygen (DO), sulfate, sulfide, and total organic carbon (TOC) reported in milligrams per liter (mg/L). Ethane and ethene are reported in nanograms per liter (ng/L), and dissolved hydrogen (H2) is reported in nanomolars.
- Nitrate and nitrite are reported as N. Nitrate and nitrite are reported as NO3 and NO2 in the December 2000 and March 2001 Microseeps analytical reports attached as Appendix L. Therefore, the December 2000 and March 2001 nitrate nitrite concentrations are 4.6 times and 3.6 times lower, respectively than the nitrate and nitrite results reported by Microseeps.

Checked by: JNC

TABLE 10. REGISTERED WELLS WITHIN STUDY AREA							
Name	Location (cadastral)	ADWR Number	Use¹	Cased Depth (feet)	Screened Interval	Cased Diameter (inches)	Unit Screened
Betty Hochstetter	A 1 5 26BD	55-644248	DOM	UN	UN	UN	UN
Mesa #14	A 1 5 26BDA	55-629605	MUN	954	350-954	20	MAU
SRP 29E-1N	A 1 5 26DDD	55-607699	IRR	360	UN	24	UAU/MAU
SRP 27.5E-1N	A 1 5 27DCC	55-607679	IRR	685	UN	20	UAU/MAU
SRP 28E-0N	A 1 5 34DDD	55-607676	IRR	394	120-373	24	UAU/MAU
SRP Unnumbered	A 1 5 35ADC	55-618622	IRR	864	UN	20	UAU/MAU
SRP 28.5E-1N	A 1 5 35BAA	55-617845	IRR	549	190-549	20	UAU/MAU
Wolfswinkel Family	A 1 5 35DAD	55-623865	UN	UN	UN	UN	UN
SRP 28E-1S	D 1 5 3DDD	55-806724	IRR	168	UN	18	UAU
SRP 28E-1S	D 1 5 3DDD	55-617095	IRR	750	UN	24	UAU/MAU
Great Western Homes	D 1 5 2ADA	55-085124	UN	484	UN	8	UN
Eldon Cooley	D 1 5 2BAA	55-636810	UN	UN	UN	UN	UN
Eldon Cooley	D 1 5 2DAA	55-636811	UN	UN	UN	UN	UN
C. Nichols	D 1 5 2BB	55-800750	UN	220	UN	6	UN
H. Blau	D 1 5 2BBA	55-634032	UN	UN	UN	UN	UN

1. Use – domestic (DOM), irrigation (IRR), municipal (MUN), unknown (UN)

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TABLE 11. PARTIES HOLDING TYPE I RIGHTS

Name / Company	Location (cadastral)	ADWR Water Rights Number
Saint Lawrence Holdings	D01005002AA	58-103445.0002
SLHC Holdings Inc.	D01005002AA	58-103445.0005
SLHC Holdings Inc.	D01005002AAB	58-103445.0006
Standard Chartered Bank	D01005002AAG	58-103445.0007
Fred H. Hudson Family	D01005002AGG	58-104222.0001
Kaufman & Broad of Arizona	D01005002AGG	58-104222.0003
Eldon W. Cooley	D01005002DDE	58-104470.0001
Dorothy Irene Hancock	D01005002ACE	58-105452.0002
Billings Family LLC	D01005002AGE	58-105452.0003
Cooper Road Partners	D01005002ADE	58-105480.0001
Baseline Industrial	D01005003AF	58-105732.0000
Fuller	D01005002AB	58-106388.0001
Cardon Investments	D01005002C	58-108124.0001
American Sky	D01005002GG	58-108124.0005
Phoenix Fiesta	D01005002C	58-108124.0006
Rudyk	D01005002CH	58-108124.0007
Phoenician Commercial	D01005003AD	58-110664.0002
Brent W. Brown	D01005002DGE	58-111307.0000
Corporation of the Presiding Bishop (LDS)	D01005002DA	58-113096.0000
Farnsworth Construction	D01005003ACF	58-114287.0000
R & K Building Supply	D01005003AF	58-114317.0000
Phoenix Newspaper Inc.	D01005002BBH	58-114977.0001
Quinn E. Johnson	D01005002BBH	58-114977.0002
Junius Merl Farr	D01005002BBH	58-114977.0003
Wayne A. Hills	D01005002BBH	58-114977.0004
Eldon W. Cooley & Stadling	D01005002D	58-115578.0001
Talley Realty Development	D01005002BH	58-115578.0003
Talley Realty Development	D01005002CA	
Eldon W. Cooley & E	D01005002D	58-115581.0001
Stapley-Cardon Company	D01005002D	58-115581.0002
Donald O. Fuller, T.	A01005026DC	58-101699.0001
Corporation of the Presiding Bishop (LDS)	A01005026DC	58-101699.0002
Craig M. Berge	A01005035CE	58-104098.0001
Berge Ford Inc.	A01005035CE	58-104098.0002
Stewart Title & Trust	A01005026DDG	58-106274.0001
Phoenix Newspapers Inc.	A01005034DGG	58-106431.0000
Sequoia School LLC	A01005034BDG	58-109680.0001
Maricopa County	A01005034DGE	58-109793.0000
Emmett Jobe	A01005034DD	58-111182.0000
Berge Ford, Inc.	A01005035CD	58-111498.0001

TABLE 11. PARTIES HOLDING TYPE I RIGHTS		
Name / Company	Location (cadastral)	ADWR Water Rights Number
Buttrum Development	A01005035A	58-113879.0000
State Savings Mortgage	A01005035AD	58-113880.0001
State of Arizona	A01005034	58-114488.0000
State of Arizona	A01005035	
Mt Baldy LTD Partnership	A01005035	58-114800.0001
Theodore Neil Evans	A01005026AAA	58-115003.0000
Title Insurance Company of Minnesota	A01005026	58-115508.0000

Checked by: JNC

TABLE 12. PARTIES HOLDING TYPE II RIGHTS WITHIN PAMA		
Name / Company	Location / Use-AFY (2001)	ADWR Water Rights Number
Lake Pleasant Associates	Floating / None	58-100616.0000
Walter C. Dana & B.J. Goebel	Floating / None	58-101102.0001
Trustee of Lenore U. Pincus	Floating / None	58-104090.0003
Tri City Ready Mix Inc.	Floating / None	58-104537.0001
Kent W. Rohner	Floating / None	58-104608.0002
Desert Mountain Development	Floating / None	58-105098.0003
Charlie B. & Burnelle Nichols	Floating / None	58-106536.0001
Thomas J. Nesbitt	Floating / None	58-106654.0001
State of Arizona	Floating / None	58-107223.0001
State of Arizona	Floating / None	58-107269.0001
State of Arizona	Floating / None	58-107272.0001
State of Arizona	Floating / None	58-107278.0001
William F. Jr. & Pamela K. Raney	Floating / None	58-108265.0002
Bruce G. & Norma Vaughan	Floating / None	58-108426.0001
James F. Wehmueller	Floating / None	58-108771.0002
Daniel J. Gainey & John Wicks	Floating / None	58-109995.0001
City of Phoenix	Floating / None	58-110749.0004
Charles P. Gould	Floating / None	58-111646.0001
Superstition Springs Investors	Floating / None	58-112100.0003
Bruce Patti Pierce	Floating / None	58-113277.0001
Treesweet Products Company	Floating / None	58-113792.0003
John A. & Angelina Vanderwey	Floating / None	58-113850.0003
Santa Lucia Farms GP	Floating / 4.7	58-113970.0003
Douglas Land Company LLC	Floating / None	58-115312.0002
State of Arizona	Floating / None	58-115441.0001
Bureau of Reclamation	Floating / None	58-115442.0001
James F. Wehmueller	Floating / None	58-130567.0002
Donald L. Anglin	Floating / None	58-130597.0001
State of Arizona	Floating / None	58-130816.0001

Checked by: JNC

TABLE 13 - SVE OPERATING PARAMETERS AND COMPOUND OF CONCERN VAPOR ANALYTICAL RESULTS

Sample Information			Operating Parameters					Vapor Analytical Results (Detected COPCs Only) ¹																				
Sample I.D	Date Collected	Sample Source	Flow Rate (scfm)	Vacuum	Inlet Temp. (°F)	Outlet Temp. (°F)	Relative Humidity	PCE			TCE			1,1-DCA			1,1-DCE			c-1,2-DCE			TCA					
								ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²
INF	9/13/2004	VW-7A and VW-5A/B	250	3" Hg	88	120	NM	45,800	310,000	7.216	<20	<108	0.000	<20	<80.8	0.000	<20	<79.2	0.000	<20	<79.2	0.000	<20	<109	0.000			
INT	9/13/2004	Unit A Effluent						1,360	9,250	0.214	<20	<108	0.000	<20	<80.8	0.000	<20	<79.2	0.000	<20	<79.2	0.000	<20	<79.2	0.000	<20	<109	0.000
EFF	9/13/2004	Unit B Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000
INF	10/1/2004	VW-7A and VW-5A/B	425	10" Hg	84	210	NM	5,160	35,000	1.382	53	285	0.011	0.7	3	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000			
INF	10/26/2004	VW-7A and VW-5A/B	400	6" Hg	77	186	NM	1,430	9,710	0.360	<20	<108	0.000	<20	<80.8	0.000	<20	<79.2	0.000	<20	<79.2	0.000	<20	<109	0.000			
INT	10/26/2004	Unit A Effluent						1.1	7.7	0.000	<0.5	<2.7	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000
EFF	10/26/2004	Unit B Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000
INF	12/2/2004	VW-7A	225	3" Hg	62	120	NM	1,590	10,800	0.225	<5.0	<26.9	0.000	9.5	38.5	0.000	20	79.3	0.002	<0.5	<19.8	0.000	<5.0	<27.3	0.000			
INT	12/2/2004	Unit A Effluent						10,800	73,400	1.531	42.40	228.00	0.006	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000
EFF	12/2/2004	Unit B Effluent						1.6	10.7	0.000	<0.5	<2.7	0.000	31.0	126	0.003	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000
INF	1/7/2005	VW-7A	225	7" Hg	50	156	NM	298	2,020	0.042	4.2	22.6	0.001	10.6	43	0.001	17.1	67.9	0.000	<0.5	<2.0	0.000	0.9	4.9	0.000			
INT	1/7/2005	Unit A Effluent						7,500	50,900	1.063	15.9	85.6	0.002	9.9	40.2	0.001	16.8	66.8	0.001	<0.5	<2.0	0.000	1.3	7.3	0.000			
EFF	1/7/2005	Unit B Effluent						8.3	56.2	0.001	<0.5	<2.7	0.000	23.4	94.6	0.002	51.4	204	0.004	<0.5	<2.0	0.000	1.1	6.1	0.000			
INF	1/29/2005	VW-7B and VW-5A/B	225	7" Hg	56	128	NM	188	1,270	0.027	3.9	21.0	0.001	18.1	73.2	0.002	24.5	97.1	0.002	<0.5	<2.0	0.000	1.4	7.9	0.000			
INT	1/29/2005	Unit B Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	9.1	36.9	0.001	17.8	70.8	0.001	<0.5	<2.0	0.000	1.1	6.2	0.000			
EFF	1/29/2005	Unit C Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	<0.5	<2.0	0.00	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000			
INT	2/18/2005	Unit B Effluent	225	6" Hg	62	130	NM	160	1,090	0.023	32.0	172	0.005	21.4	86.5	0.002	33.9	134	0.003	0.5	0.5	0.000	5.2	28.4	0.001			
VW5A/B ³	3/8/2005	VW-5A/B wellhead	225	6" Hg	66	140	NM	223	1,510	0.016	3.6	19.2	0.000	2.4	9.6	0.000	1.0	3.9	0.000	<0.5	<2.0	0.000	<0.5	<2.7	0.000			
VW7B ³	3/8/2005	VW-7B wellhead						394	2,670	0.028	4.7	25.4	0.000	42.9	174	0.002	57.4	228	0.002	<0.5	<2.0	0.000	2.8	15	0.000			
INF	3/8/2005	VW-7B and VW-5A/B						217	1,470	0.031	<10	<53.8	0.000	10.4	42.1	0.001	16.6	65.9	0.001	<10	<39.6	0.000	<10	<54.6	0.000			
INT	3/8/2005	Unit B Effluent						1,590	10,800	0.225	42.8	230	0.005	13.8	55.9	0.001	22.6	89.7	0.002	<10	<39.6	0.000	<10	<54.6	0.000			
EFF	3/8/2005	Unit C Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	33.7	137	0.003	40.2	160	0.003	<0.5	<2.0	0.000	1.3	7.3	0.000			
VW5AB ³	4/7/2005	VW-5A/B wellhead	300	7" Hg	74	140	NM	471	3,190	0.045	26.5	143.0	0.001	<0.5	<2.0	0.000	<0.5	<2.0	0.000	23.0	91.4	0.001	<0.5	<2.7	0.000			
VW7B ³	4/7/2005	VW-7B wellhead						425	2,880	0.040	4.5	24.3	0.000	29	117	0.002	32.2	12.8	0.002	5.2	20.7	0.000	1.2	6.8	0.000			
INF	4/7/2005	VW-7B and VW-5A/B						135	918	0.026	1.4	7.50	0.000	6.8	27.6	0.001	7.5	29.6	0.001	2.4	9.7	0.000	<0.5	<2.7	0.000			
INT	4/7/2005	Unit B Effluent						416	2,820	0.079	5.7	30.7	0.001	5.8	23.4	0.001	3.8	15.2	0.000	5.2	20.4	0.001	<0.5	<2.7	0.000			
EFF	4/7/2005	Unit C Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	<0.5	<2.0	0.000	15.5	61.6	0.002	12.5	49.6	0.001	0.6	3.1	0.000			
VW5AB ³	5/10/2005	VW-5A/B wellhead	325	7" Hg	81	136	NM	261	1,770	0.027	7.6	40.8	0.000	<1.0	<4.1	0.000	<1.0	<4.0	0.000	17.4	69.2	0.001	<0.5	<2.7	0.000			
VW7B ³	5/10/2005	VW-7B wellhead						812	5,500	0.083	7.8	41.8	0.001	32.8	133	0.002	31.5	125	0.002	5.6	22	0.000	1.2	6.8	0.000			
INF	5/10/2005	VW-7B and VW-5A/B						243	1,650	0.050	1.5	8.30	0.000	4.8	9.1	0.001	4.8	19.1	0.001	1.6	6.3	0.000	<0.5	<2.7	0.000			
INT	5/10/2005	Unit B Effluent						137	929	0.028	5.1	27.5	0.001	2.2	19.5	0.000	3.0	11.9	0.000	1.4	5.7	0.000	<0.5	<2.7	0.000			
EFF	5/10/2005	Unit C Effluent						4.5	30.7	0.001	<1.0	<5.4	0.000	4.6	18.8	0.001	9.8	38.7	0.001	11.7	46.5	0.001	0.6	3.1	0.000			
VW5AB ³	6/7/2005	VW-5A/B wellhead	325	7.5" Hg	88	150	NM	212	1,770	0.022	6.5	40.8	0.001	<1.0	<4.1	0.000	<1.0	<4.0	0.000	30.8	122	0.002	<1.0	<5.5	0.000			
VW7B ³	6/7/2005	VW-7B wellhead						844	5,500	0.086	4.3	41.8	0.000	35.7	144	0.002	35.5	141	0.002	4.6	18.4	0.000	1.6	8.9	0.000			
INF	6/7/2005	VW-7B and VW-5A/B						175	1,650	0.036	1.7	8.30	0.000	6.4	26	0.001	6.1	24.2	0.001	2.4	9.5	0.000	<1.0	<5.5	0.000			
INT	6/7/2005	Unit B Effluent						54	929	0.011	1.2	27.5	0.000	1.5	6.2	0.000	4.4	17.5	0.001	1.2	4.8	0.000	<1.0	<5.5	0.000			
EFF	6/7/2005	Unit C Effluent						<1.0	<6.8	0.000	<1.0	<5.4	0.000	3.4	13.7	0.000	6.2	24.6	0.001	10.3	40.9	0.001	<1.0	<5.5	0.000			
VW5AB ³	7/8/2005	VW-5A/B wellhead	350	7" Hg	98	170	NM	225	1,520	0.025	3.6	19.5	0.000	<1.0	<4.0	0.000	<1.0	<4.0	0.000	24.8	98.3	0.002	<1.0	<5.5	0.000			
VW7B ³	7/8/2005	VW-7B wellhead						1600	10,800	0.176	3.4	18.5	0.000	<2.0	<8.1	0.000	<2.0	<7.9	0.000	<2.0	<7.9	0.000	<2.0	<10.9	0.000			
INF	7/8/2005	VW-7B and VW-5A/B						16.4	111	0.004	<1.0	<5.4	0.000	<1.0	<4.0	0.000	<1.0	<4.0	0.000	<1.0	<4.0	0.000	<1.0	<5.5	0.000			
INT	7/8/2005	Unit B Effluent						27.8	189	0.006	<1.0	<5.4	0.000	3.1	12.6	0.000	2.8	11.2	0.000	1.1	4.5	0.000	<1.0	<5.5	0.000			
EFF	7/8/2005	Unit C Effluent						<1.0	<6.8	0.000	1.40	7.30	0.000	<1.0	<4.0	0.000	<1.0	<4.0	0.000	1.9	7.7	0.000	<1.0	<5.5	0.000			
VW5AB ³	8/3/2005	VW-5A/B wellhead	350	7" Hg	98	170	NM	136	921	0.015	4.0	21.3	0.000	<2.0	<8.1	0.000	<2.0	<8.0	0.000	35.5	141	0.002	<2.0	<11.0</				

TABLE 13 - SVE OPERATING PARAMETERS AND COMPOUND OF CONCERN VAPOR ANALYTICAL RESULTS

Sample Information			Operating Parameters					Vapor Analytical Results (Detected COPCs Only) ¹																	
								PCE			TCE			1,1-DCA			1,1-DCE			c-1,2-DCE			TCA		
Sample I.D	Date Collected	Sample Source	Flow Rate (scfm)	Vacuum	Inlet Temp. (°F)	Outlet Temp. (°F)	Relative Humidity	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²
VW5AB ³	10/10/2005	VW-5A/B wellhead	350	4.5" Hg	78	150	NM	80	540	0.009	3.0	16	0.000	0.5	2.2	0.000	<0.5	<2.0	0.000	50	200	0.003	<0.5	<2.8	0.000
VW7B ³	10/10/2005	VW-7B wellhead						840	5,700	0.093	<10	<54	0.000	52	210	0.003	34	140	0.002	<10	<40	0.000	<10	<55	0.000
INF	10/10/2005	VW-7B and VW-5A/B						150	1,000	0.033	0.8	4.2	0.000	5.3	22	0.001	3.8	15	0.000	3.2	13	0.000	<0.5	<2.8	0.000
INT	10/10/2005	Unit B Effluent						31	210	0.007	0.6	3.3	0.000	2.3	9.4	0.000	3.1	12	0.000	1.0	3.9	0.000	<0.5	<2.8	0.000
EFF	10/10/2005	Unit C Effluent						<0.5	<3.4	0.000	12	62	0.002	2.0	8.0	0.000	1.5	5.8	0.000	2.3	9.1	0.000	<0.5	<2.8	0.000
VW5AB ³	11/8/2005	VW-5A/B wellhead	375	7" Hg	62	148	NM	100	700	0.012	9.2	49	0.001	<0.5	<2.0	0.000	<0.5	<2.0	0.000	47	190	0.003	<0.5	<2.8	0.000
VW7B ³	11/8/2005	VW-7B wellhead						960	6,500	0.113	4.5	24.0	0.000	49	200	0.003	33	130	0.002	13	51	0.001	1.3	7.1	0.000
INF	11/8/2005	VW-7B and VW-5A/B						28	190	0.007	0.8	4.4	0.000	5.0	20	0.001	3.6	14	0.000	2.9	11	0.000	<0.5	<2.8	0.000
INT	11/8/2005	Unit B Effluent						75	510	0.018	320	1700	0.060	3.7	15	0.001	2.5	10	0.000	2.5	10	0.000	<0.5	<2.8	0.000
EFF	11/8/2005	Unit C Effluent						0.7	4.7	0.000	200	1100	0.037	2.8	11	0.000	2.8	11	0.000	2.4	9.5	0.000	<0.5	<2.8	0.000
VW5AB	12/13/2005	VW-5A/B wellhead	375	4.5" Hg	56	130	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW7B	12/13/2005	VW-7B wellhead						1000	6,700	0.236	3.2	17	0.001	29	120	0.004	22	87	0.003	12	46	0.002	<2.0	<11	0.000
INF	12/13/2005	VW-7B						130	890	0.031	<1.0	<5.4	0.000	2.2	8.7	0.000	1.8	7.0	0.000	1.0	4.1	0.000	<1.0	<5.5	0.000
INT	12/13/2005	Unit B Effluent						54	360	0.013	<1.0	<5.4	0.000	2.1	8.7	0.000	1.5	6.1	0.000	1.1	4.5	0.000	<1.0	<5.5	0.000
EFF	12/13/2005	Unit C Effluent						<1.0	<6.8	0.000	<1.0	<5.4	0.000	1.2	4.9	0.000	1.0	4.0	0.000	<1.0	<4.0	0.000	<1.0	<5.5	0.000
VW5AB	1/12/2006	VW-5A/B wellhead	375	4" Hg	52	124	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW7B	1/12/2006	VW-7B wellhead						710	4,800	0.168	<20	<110	0.000	<20	<81	0.000	<20	<80	0.000	<20	<80	0.000	<20	<110	0.000
INF	1/12/2006	VW-7B						130	900	0.031	<10	<54	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000
INT	1/12/2006	Unit B Effluent						140	950	0.033	<10	<54	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000
EFF	1/12/2006	Unit C Effluent						<10	<68	0.000	<10	<54	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000
VW5AB	2/17/2006	VW-5A/B wellhead	375	4.5" Hg	56	120	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW7B	2/17/2006	VW-7B wellhead						680	4,600	0.161	3.5	19	0.001	27	110	0.004	27	110	0.004	12	47	0.002	0.8	4.5	0.000
INF	2/17/2006	VW-7B						100	680	0.024	0.6	3.2	0.000	3.1	13	0.000	2.4	9.4	0.000	1.1	4.3	0.000	<0.5	<2.7	0.000
INT	2/17/2006	Unit B Effluent						77	520	0.018	1.2	6.3	0.000	2.5	10	0.000	2.6	10.0	0.000	1.7	6.7	0.000	<0.5	<2.7	0.000
EFF	2/17/2006	Unit C Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	3.7	15.0	0.001	2.8	11.0	0.000	1.0	3.8	0.000	<0.5	<2.7	0.000
VW5AB	3/7/2006 ⁴	VW-5A/B wellhead	375	4.5" Hg	56	120	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW7B	3/7/2006 ⁴	VW-7B wellhead						170	1,200	0.040	18	96	0.003	51.319	205.28	0.007	16	63	0.002	5.2	21	0.001	0.51	2.8	0.000
INF	3/7/2006 ⁴	VW-7B						63	430	0.015	0.84	4.5	0.000	<8.602	<34.41	0.000	1.9	7.5	0.000	0.74	2.9	0.000	<0.20	<1.1	0.000
INT	3/7/2006 ⁴	Unit B Effluent						69	470	0.016	1.4	7.5	0.000	<8.602	<34.41	0.000	1.9	7.5	0.000	1.4	5.5	0.000	<0.20	<1.1	0.000
EFF	3/7/2006 ⁴	Unit C Effluent						<0.20	<1.4	0.000	0.5	2.7	0.000	10.195	41.331	0.001	2.8	11.0	0.000	1.4	5.5	0.000	<0.20	<1.1	0.000
VW5AB	4/13/2006 ⁵	VW-5A/B wellhead	325	5" Hg	80	154	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW7B	4/13/2006 ⁵	VW-7B wellhead						480	3,300	0.098	<10	<55	0.000	28	120	0.003	23	93	0.003	<10	<40	0.000	<10	<55	0.000
INF	4/13/2006 ⁵	VW-7B						160	1,100	0.033	<5.0	<28	0.000	5.7	23	0.000	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
INT	4/13/2006 ⁵	Unit B Effluent						690	4,800	0.141	<50	<280	0.000	<50	<210	0.000	<50	<200	0.000	<50	<200	0.000	<50	<280	0.000
EFF	4/13/2006 ⁵	Unit C Effluent						<1.0	<6.9	0.000	<1.0	<5.5	0.000	<1.0	<4.1	0.000	<1.0	<4.0	0.000	<1.0	<4.0	0.000	<1.0	<5.5	0.000
VW5AB	5/3/2006 ⁵	VW-5A/B wellhead	225	6.5" Hg	90	165	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW7B	5/3/2006 ⁵	VW-7B wellhead						190	1,300	0.027	<5.0	<28	0.000	12	49	0.001	10	40	0.001	<5.0	<20	0.000	<5.0	<28	0.000
INF	5/3/2006 ⁵	VW-7B						220	1,500	0.031	<5.0	<28	0.000	14	58	0.001	12	48	0.001	<5.0	<20	0.000	<5.0	<28	0.000
INT	5/3/2006 ⁵	Unit B Effluent						260	1,800	0.037	<5.0	<28	0.000	11.0	45	0.001	7.2	29	0.001	<5.0	<20	0.000	<5.0	<28	0.000
EFF	5/3/2006 ⁵	Unit C Effluent						<1.0	<6.9	0.000	<1.0	<5.5	0.000	<1.0	<4.1	0.000	<1.0	<4.0	0.000	<1.0	<4.0	0.000	<1.0	<5.5	0.000
VW5AB	6/2/2006 ⁵	VW-5A/B wellhead	235	6.5" Hg	92	168	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW7B	6/2/2006 ^{5,6}	VW-7B wellhead						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
INF	6/2/2006 ⁵	VW-7B						110	760	0.016	<2.5	<14	0.000	6.0	25	0.001	4.8	19	0.000	<2.5	<10	0.000	<2.5	<14	0.000
INT	6/2/2006 ⁵	Unit B Effluent						50	340	0.007	1.1	6.1	0.000	3.6	15	0.000	7.0	28	0.001	<1.0	<4.0	0.000	<1.0	<5.5	0.000
EFF	6/2/2006 ⁵	Unit C Effluent						<1.0	<6.9	0.000	<1.0	<5.5	0.000	<1.0	<4.1	0.000	<1.0	<4.0	0.000	<1.0	<4.0	0.000	<1.0	<5.5	0.000

See Notes on Page 4

TABLE 13 - SVE OPERATING PARAMETERS AND COMPOUND OF CONCERN VAPOR ANALYTICAL RESULTS

Sample Information			Operating Parameters					Vapor Analytical Results (Detected COPCs Only) ¹																	
								PCE			TCE			1,1-DCA			1,1-DCE			c-1,2-DCE			TCA		
Sample I.D	Date Collected	Sample Source	Flow Rate (scfm)	Vacuum	Inlet Temp. (°F)	Outlet Temp. (°F)	Relative Humidity	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²
VW5AB	7/7/2006 ⁵	VW-5A/B wellhead	300	6.25" Hg	96	180	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	7/7/2006 ⁵	VW-7B wellhead						250	1,700	0.047	1.7	9.4	0.000	14	58	0.002	11	44	0.001	2.8	11	0.000	<0.50	<2.8	0.000
INF	7/7/2006 ⁵	VW-7B						240	1,700	0.045	<2.5	<14	0.000	12	49	0.001	9.0	36	0.001	<2.5	<10	0.000	<2.5	<14	0.000
INT	7/7/2006 ⁵	Unit B Effluent						72	500	0.014	3.0	17	0.000	15	62	0.002	12	48	0.001	4.0	16	0.000	<1.0	<5.5	0.000
EFF	7/7/2006 ⁵	Unit C Effluent						<0.5	<3.4	0.000	0.85	4.7	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	8/14/2006 ⁵	VW-5A/B wellhead	300	6.5" Hg	94	170	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	8/14/2006 ⁵	VW-7B wellhead						270	1,900	0.051	1.7	9.4	0.000	13	54	0.001	10	40	0.001	4.5	18	0.000	<0.50	<2.8	0.000
INF	8/14/2006 ⁵	VW-7B						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	8/14/2006 ⁵	Unit B Effluent						97	670	0.018	1.4	7.7	0.000	15	62	0.002	9.7	39	0.001	4.9	20	0.001	<1.0	<5.5	0.000
EFF	8/14/2006 ⁵	Unit C Effluent						<0.5	<3.4	0.000	1.8	10	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	9/19/2006 ⁵	VW-5A/B wellhead	325	6.5" Hg	90	168	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	9/19/2006 ⁵	VW-7B wellhead						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INF	9/19/2006 ⁵	VW-7B						340	2,393	0.070	<5.0	<28	0.000	10	40	0.000	10	40	0.000	<5.0	<20	0.000	<5.0	<28	0.000
INT	9/19/2006 ⁵	Unit B Effluent						96	663	0.020	2.0	30.3	0.000	19	79	0.002	7.6	31	0.001	5.4	22	0.001	<2.0	<11	0.000
EFF	9/19/2006 ⁵	Unit C Effluent						<0.5	<3.4	0.000	<0.5	<2.7	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	10/4/2006 ⁵	VW-5A/B wellhead	325	6.5" Hg	90	172	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	10/4/2006 ⁵	VW-7B wellhead						270	1,900	0.055	<5.0	<28	0.000	11	45	0.001	8.6	35	0.001	<5.0	<20	0.000	<5.0	<28	0.000
INF	10/4/2006 ⁵	VW-7B						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	10/4/2006 ⁵	Unit B Effluent						140	970	0.029	2.2	12.0	0.000	19	78	0.002	11	44	0.001	9.3	37	0.001	<2.0	<11	0.000
EFF	10/4/2006 ⁵	Unit C Effluent						<0.5	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	11/2/2006 ⁵	VW-5A/B wellhead	325	6.5" Hg	90	172	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	11/2/2006 ⁵	VW-7B wellhead						200	1,400	0.041	<5.0	<28	0.000	10	41	0.001	6.5	26	0.001	<5.0	<20	0.000	<5.0	<28	0.000
INF	11/2/2006 ⁵	VW-7B						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	11/2/2006 ⁵	Unit B Effluent						1,900	13,000	0.389	13.0	72.0	0.002	10	41	0.001	7.6	31	0.001	3.2	13	0.000	<2.0	<11	0.000
EFF	11/2/2006 ⁵	Unit C Effluent						<0.5	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	12/8/2006 ⁵	VW-5A/B wellhead	350	6.5" Hg	63	148	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	12/8/2006 ⁵	VW-7B wellhead						150	1,000	0.033	<5.0	<28	0.000	6.7	28	0.001	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
INF	12/8/2006 ⁵	VW-7B						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	12/8/2006 ⁵	Unit B Effluent						2,900	20,000	0.640	<25	<140	0.000	<25	<100	0.000	<25	<100	0.000	<25	<100	0.000	<25	<140	0.000
EFF	12/8/2006 ⁵	Unit C Effluent						0.77	5.3	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	1/05/2007 ⁵	VW-5A/B wellhead	350	6.25" Hg	60	140	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	1/05/2007 ⁵	VW-7B wellhead						170	1,200	0.037	<5.0	<28	0.000	7.5	31	0.001	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
INF	1/05/2007 ⁵	VW-7B						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	1/05/2007 ⁵	Unit B Effluent						1,500	10,000	0.331	<10	<55	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000
EFF	1/05/2007 ⁵	Unit C Effluent						<0.50	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	2/16/2007 ⁵	VW-5A/B wellhead	325	6" Hg	64	146	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	2/16/2007 ⁵	VW-7B wellhead						130	900	0.027	<10	<55	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000
INF	2/16/2007 ⁵	VW-7B						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	2/16/2007 ⁵	Unit B Effluent						2,000	14,000	0.410	<25	<140	0.000	<25	<100	0.000	<25	<100	0.000	<25	<100	0.000	<25	<140	0.000
EFF	2/16/2007 ⁵	Unit C Effluent						<0.50	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	3/10/2007 ⁵	VW-5A/B wellhead	300	5.5" Hg	75	146	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
VW7B	3/10/2007 ⁵	VW-7B wellhead						220	1,500	0.042	<5.0	<28	0.000	7.0	29	0.001	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
INF	3/10/2007 ⁵	VW-7B						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	3/10/2007 ⁵	Unit B Effluent						1,500	10,000	0.284	<25	<140	0.000	<25	<100	0.000	<25	<100	0.000	<25	<100	0.000	<25	<140	0.000
EFF	3/10/2007 ⁵	Unit C Effluent						<0.50	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000

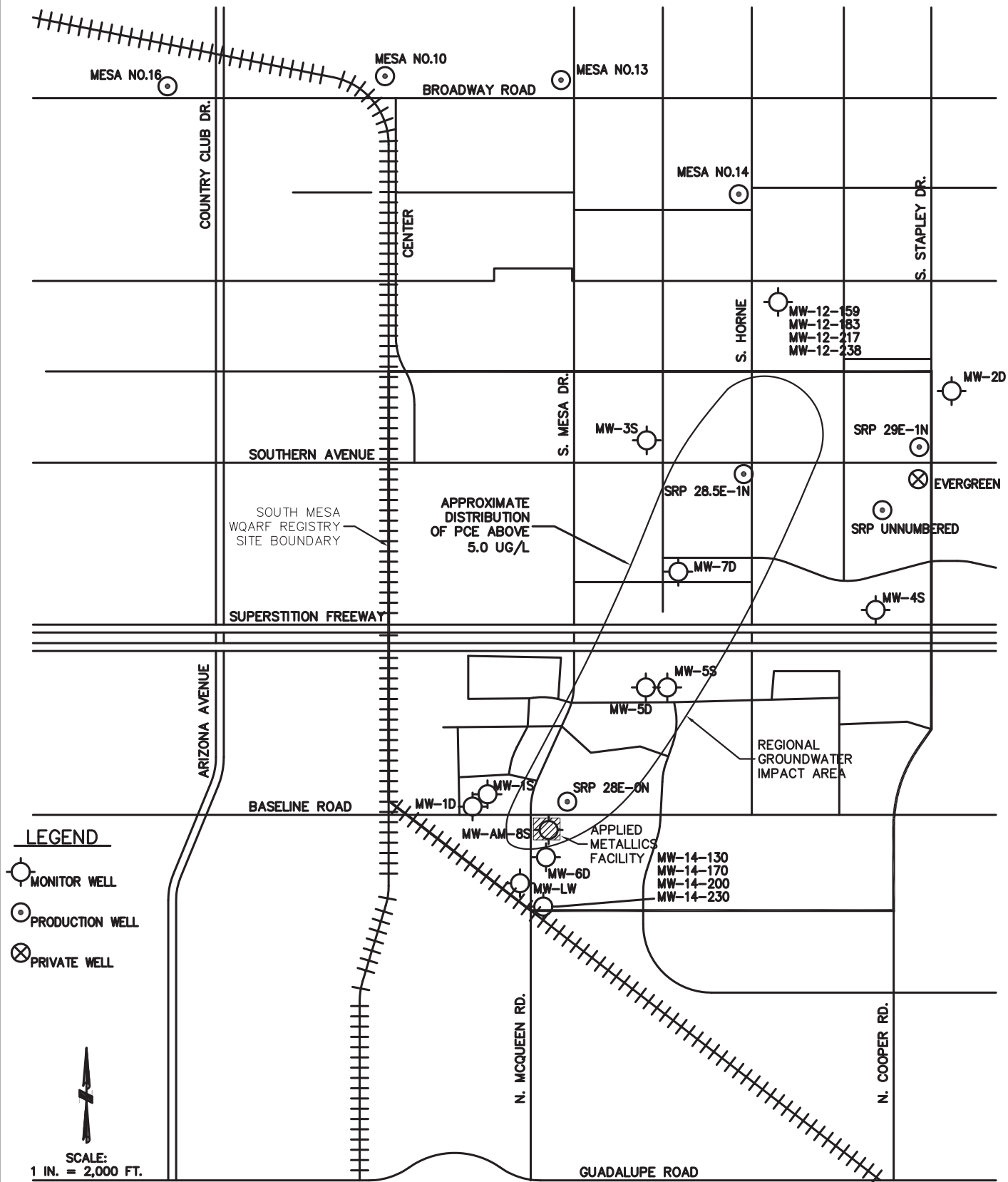
TABLE 13 - SVE OPERATING PARAMETERS AND COMPOUND OF CONCERN VAPOR ANALYTICAL RESULTS

Sample Information			Operating Parameters					Vapor Analytical Results (Detected COPCs Only) ¹																				
								PCE			TCE			1,1-DCA			1,1-DCE			c-1,2-DCE			TCA					
Sample I.D	Date Collected	Sample Source	Flow Rate (scfm)	Vacuum	Inlet Temp. (°F)	Outlet Temp. (°F)	Relative Humidity	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²	ppbv	ug/m ³	lbs/day ²			
VW5AB	4/5/2007 ⁵	VW-5A/B wellhead	175	7.5" Hg	82	160	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
VW7A	4/5/2007 ⁵	VW-7A wellhead						140	970	0.015	<2.5	<14	0.000	4.4	18	0.000	<2.5	<10	0.000	<2.5	<10	0.000	<2.5	<10	0.000	<2.5	<14	0.000
INF	4/5/2007 ⁵	VW-7A						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INT	4/5/2007 ⁵	Unit B Effluent						460	3,200	0.051	<5.0	<28	0.000	<5.0	<21	0.000	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
EFF	4/5/2007 ⁵	Unit C Effluent						<0.50	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	5/8/2007 ⁵	VW-5A/B wellhead	150	7" Hg	92	162	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
VW7A	5/8/2007 ⁵	VW-7A wellhead						110	760	0.010	<2.0	<11	0.000	2.4	9.9	0.000	2.1	8.5	0.000	<2.0	<8.0	0.000	<2.0	<11	0.000			
INF	5/8/2007 ⁵	VW-7A						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
INT	5/8/2007 ⁵	Unit B Effluent						130	900	0.012	<2.0	<11	0.000	<2.0	<8.2	0.000	<2.0	<8.1	0.000	<2.0	<8.0	0.000	<2.0	<11	0.000			
EFF	5/8/2007 ⁵	Unit C Effluent						<0.50	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	6/4/2007 ⁵	VW-5A/B wellhead	175	7" Hg	92	176	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
VW7A	6/4/2007 ⁵	VW-7A wellhead						160	1,100	0.018	<2.5	<14	0.000	5.7	23	0.000	3.3	13	0.000	2.9	12	0.000	<2.5	<14	0.000			
INF	6/4/2007 ⁵	VW-7A						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
INT	6/4/2007 ⁵	Unit B Effluent						78	540	0.009	<5.0	<28	0.000	<5.0	<21	0.000	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
EFF	6/4/2007 ⁵	Unit C Effluent						<0.50	<3.4	0.000	<0.5	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	7/2/2007 ⁵	VW-5A/B wellhead	175	7.5" Hg	108	185	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
VW7A	7/2/2007 ⁵	VW-7A wellhead						140	970	0.015	<2.5	<14	0.000	6.4	26	0.000	2.9	12	0.000	2.8	11	0.000	<2.5	<14	0.000			
INF	7/2/2007 ⁵	VW-7A						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
INT	7/2/2007 ⁵	Unit B Effluent						15	100	0.002	<0.50	<2.8	0.000	<0.50	<2.1	0.000	0.53	2.1	0.000	<0.50	<2.0	0.000	<0.50	<2.8	0.000			
EFF	7/2/2007 ⁵	Unit C Effluent						<0.50	<3.4	0.000	0.85	4.7	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5AB	8/7/2007 ⁵	VW-5A/B wellhead	175	7" Hg	102	176	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
VW7A	8/7/2007 ⁵	VW-7A wellhead						180	1,200	0.020	<5.0	<28	0.000	11	45	0.001	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
INF	8/7/2007 ⁵	VW-7A						NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
INT	8/7/2007 ⁵	Unit B Effluent						170	1,200	0.019	<5.0	<28	0.000	9.4	39	0.001	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<20	0.000	<5.0	<28	0.000
EFF	8/7/2007 ⁵	Unit C Effluent						0.75	5.2	0.000	<0.50	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000
VW5C	8/17/2007 ⁵	VW-5C wellhead	650	5.5" Hg	92	196	NM	880	6,100	0.180	<10	<55	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000			
VW7C	8/17/2007 ⁵	VW-7C wellhead						48	330	0.010	6.2	34.0	0.001	37	150	0.005	10	40	0.001	2.8	11	0.000	<0.5	<2.8	0.000			
VW5C	9/12/2007 ⁵	VW-5C wellhead	625	6.0" Hg	90	196	NM	250	1,700	0.049	<10	<55	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000			
VW7C	9/12/2007 ⁵	VW-7C wellhead						41	280	0.008	0.99	5.5	0.000	13	54	0.003	4.8	19	0.001	<0.5	<2.0	0.000	1.2	6.6	0.000			
INF	9/12/2007 ⁵	VW-5C/VW-7C						22	150	0.009	<0.5	<2.8	0.000	1.8	7.4	0.000	0.91	3.7	0.000	0.54	2.2	0.000	<0.5	<2.8	0.000			
INT	9/12/2007 ⁵	Unit B Effluent						18	120	0.007	<0.5	<2.8	0.000	8.1	33	0.002	2.3	9.3	0.001	2.2	8.8	0.001	<0.5	<28	0.000			
EFF	9/12/2007 ⁵	Unit C Effluent						2.1	14.0	0.001	<0.50	<2.8	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000			
VW5C	10/12/2007 ⁵	VW-5C wellhead	625	6.0" Hg	90	196	NM	360	2,500	0.071	<10	<55	0.000	<10	<41	0.000	<10	<40	0.000	<10	<40	0.000	<10	<55	0.000			
VW7C	10/12/2007 ⁵	VW-7C wellhead						53	370	0.010	4.1	23	0.001	11	45	0.003	3.5	14	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000			
INF	10/12/2007 ⁵	VW-5C/VW-7C						160	1,100	0.063	8.6	48	0.003	7.4	30	0.002	2.6	10	0.000	2.3	9.2	0.000	<1.0	<5.5	0.000			
INT	10/12/2007 ⁵	Unit B Effluent						14	97	0.006	56	<2.8	0.017	3.4	14	0.001	0.53	2.1	0.000	0.84	3.4	0.000	<0.5	<28	0.000			
EFF	10/12/2007 ⁵	Unit C Effluent						<0.5	<3.4	0.000	1.2	6.6	0.000	<0.5	<2.1	0.000	<0.5	<2.0	0.000	<0.5	<2.0	0.000	<0.5	<2.8	0.000			

- Notes:
- Results for detected compounds of potential concern (COPCs) are reported in parts per billion of vapor volume (ppbv) and micrograms per cubic meter (ug/m³). Extraction rate is presented in pounds per day (lbs/day).
 - Extraction rate in lbs/day calculated as follows:
M = (((V)x(C)x(MW))/CF)x1,440 min./day x 1.0E-6/1000
Where:
M = mass removal in lbs/day
V = velocity in scfm
C = concentration in ppbv
MW = molecular weight
PCE = 165.86; TCE = 131.4; 1,1-DCA = 99; 1,1-DCE = 97; c-1,2-DCE = 97; TCA = 133.4
CF = conversion factor of 379 scfm/lbs mole
 - Extraction rate for the wellhead is calculated using half the velocity measured at the blower.
 - Samples analyzed by Environmental Science Corp. (ESC). ESC does not include 1,1-DCA on their TO-15 list; therefore, the 1,1-DCA concentration is estimated as a tentatively identified compound (TIC).
 - Samples analyzed by Aerotech Environmental Laboratory (AEL).
 - Analytical results for sample VW-7B collected on 6/2/06 were anomalously low indicating possible sampling error. Therefore, MACTEC is exculding the data for this evaluation (NE). The analytical data is presented in Table 2.

NS - Not Sampled
Checked by: JNC

FIGURES



SITE AND VICINITY PLAN

FIGURE 1

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-08-2050.3.19
 DATE: 10/06/08 E-FILE: 82050.3.19 FIG 1
 DRAWN BY: JMC CHECKED BY: JNC



Q:\FACE\Drawings\Environmental\70000-79999\72050.3.12\72050.3.12 FIG 2.dwg



LEGEND	
	- SOIL GAS SAMPLE POINT WITH PCE CONCENTRATION IN MICROGRAMS/LITER
	- DRYWELL
	- VAPOR EXTRACTION WELL
	- GROUNDWATER MONITORING WELL

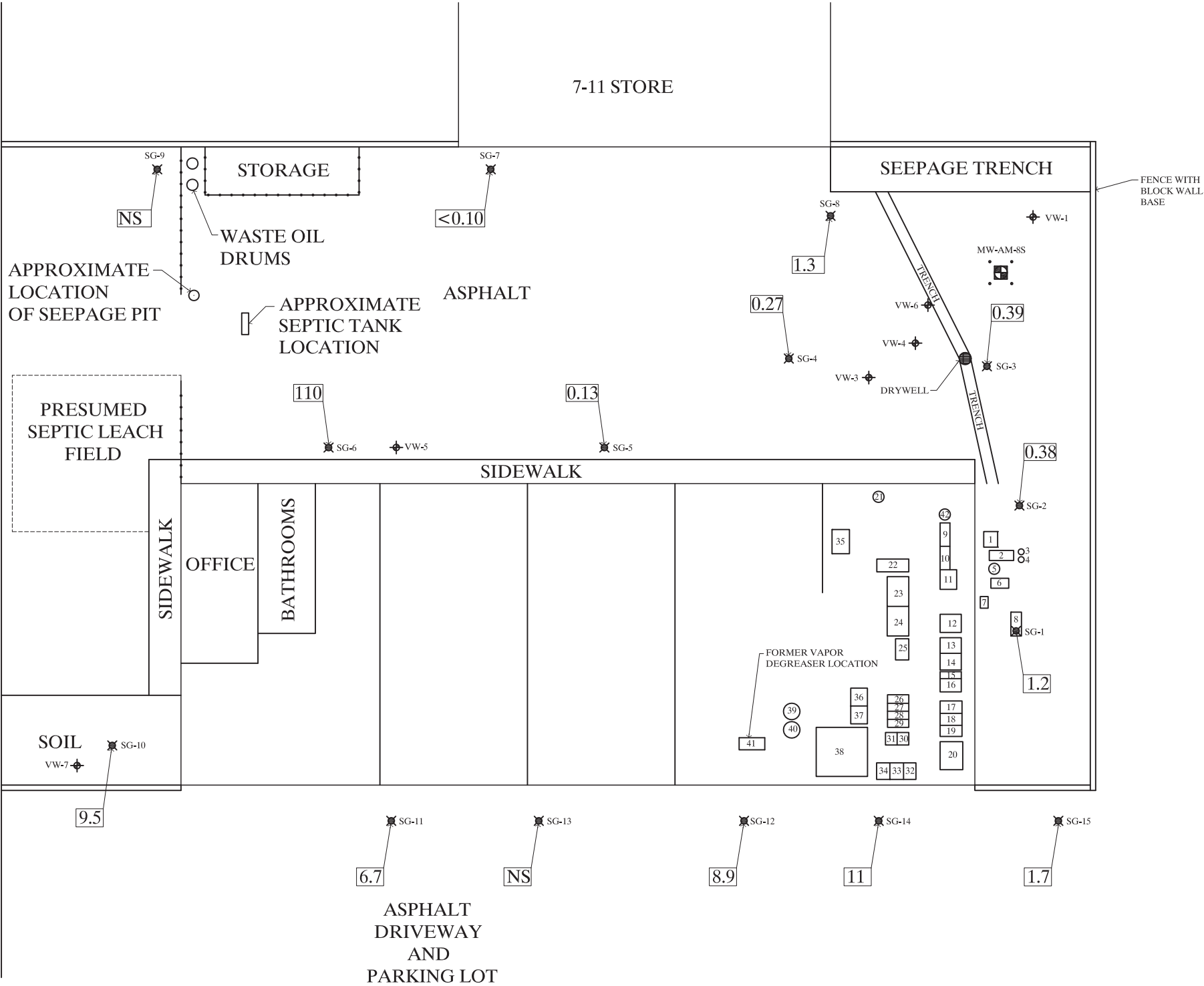


APPLIED METALLICS SITE PLAN AND
SOIL GAS SAMPLE LOCATION MAP

MACTEC PROJECT NAME:	SOUTH MESA WQARF		
MACTEC PROJECT NO:	4972-07-2050.3.12		
DATE:	07/10/07	E-FILE:	72050.3.12 FIG 2
DRAWN BY:		CHECKED BY:	

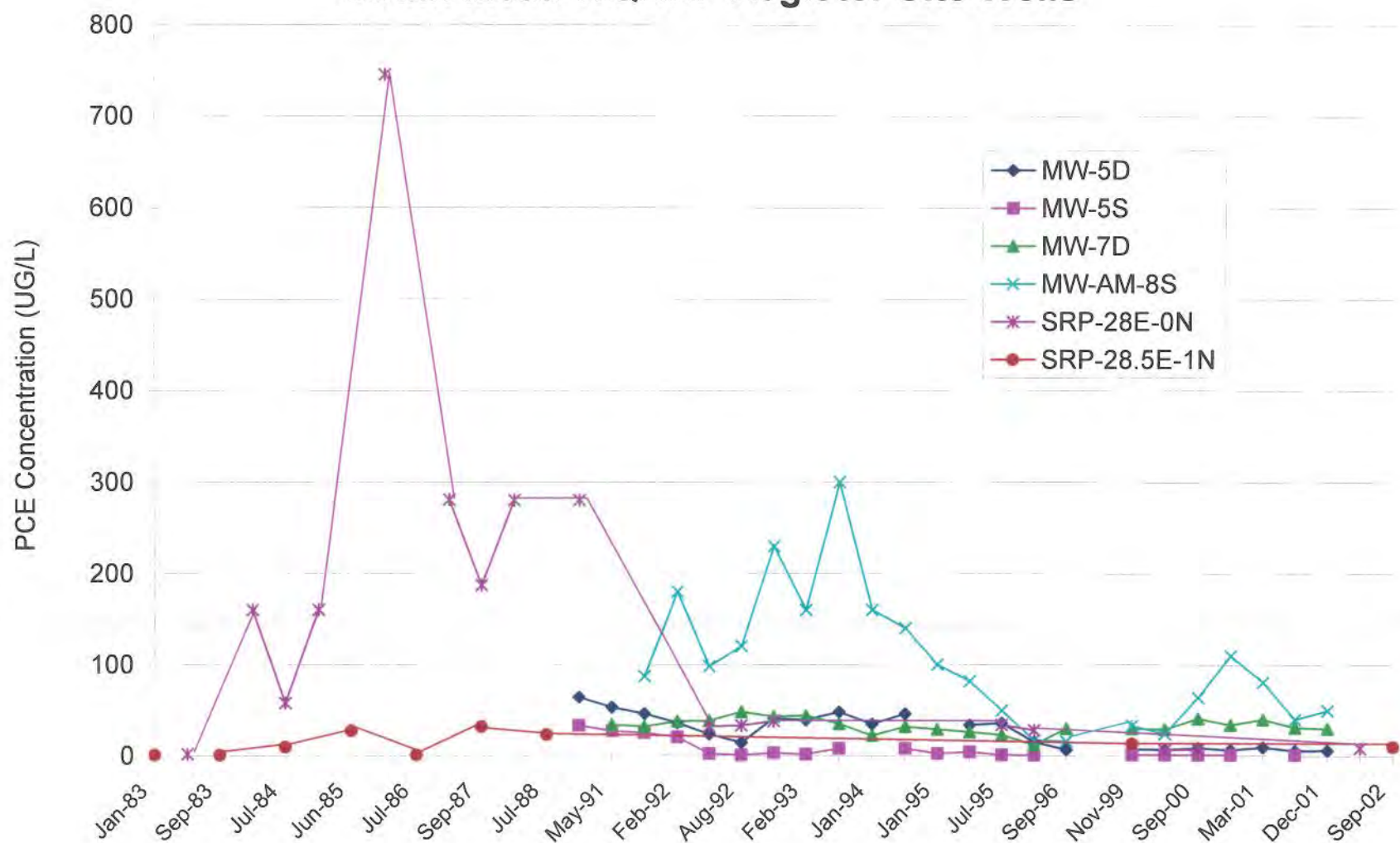
FIGURE 2

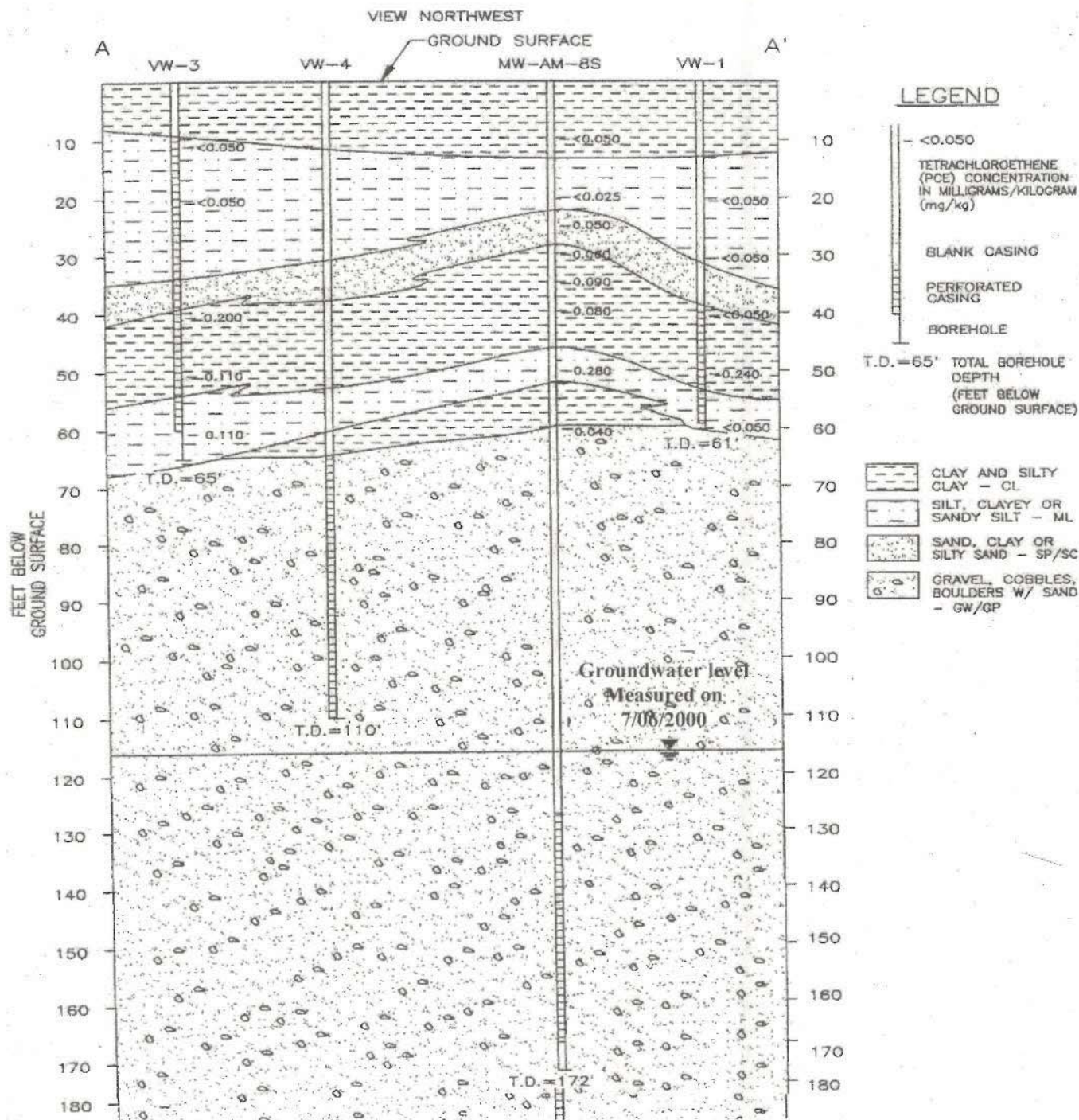
- REFERENCE
- APPLIED METALLICS, INC.
"TANK LOCATION DIAGRAM, FIGURE 2"
WESTERN TECHNOLOGIES, INC., 1989
 - SOIL GAS SAMPLE LOCATIONS
APPLIED METALLICS SOUTH MESA
WQARF PROJECT AREA, GILBERT, AZ
FIGURE 2-1, EARTH TECH, 1995



TANK IDENTIFICATION	
1.	TIN STRIP TANK - USED TO STRIP TIN AND CLEAN PARTS
2.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 1, 3 AND 4.
3.	HYDROCHLORIC ACID (50%) TANK - USED TO CLEAN STEEL PARTS.
4.	SAME AS TANK 3
5.	BRIGHT DIP TANK - MIXTURE OF NITRIC ACID AND PHOSPHORIC ACID, USED TO CLEAN COPPER OR BRASS PARTS.
6.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 5, 7 AND 8.
7.	NICKEL STRIP TANK - PROPANE HEATED SOLUTION USED TO STRIP NICKEL.
8.	NITRIC ACID TANK - USED TO CLEAN OR STRIP PARTS.
9.	TIN/LEAD TANK - USED TO PLATE PARTS (TIN).
10.	TIN PLATE TANK - USED TO PLATE PARTS (TIN).
11.	TIN PLATE TANK - USED TO PLATE PARTS (TIN).
12.	COPPER/CYANIDE TANK - USED TO PLATE PARTS (COPPER).
13.	COPPER/CYANIDE DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
14.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 12, 13, 15 AND 16.
15.	SULFURIC ACID (50%) TANK - USED TO CLEAN PARTS.
16.	SULFURIC ACID TANK - USED TO MAKE-UP AND HOLD RAW SULFURIC ACID SOLUTION.
17.	HYDROCHLORIC (MURIATIC) ACID TANK - USED TO CLEAN STEEL PARTS.
18.	HYDROCHLORIC (MURIATIC) ACID TANK - USED TO CLEAN COPPER AND BRASS PARTS.
19.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 17, 18 AND 20.
20.	OAKITE 90 TANK - USED TO CLEAN PARTS.
21.	CENTRIFUGE - USED TO SPIN DRY PARTS.
22.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 9, 10, 11 AND 23.
23.	FLUOROBORIC TIN TANK - USED TO PLATE PARTS (TIN).
24.	BRIGHT TIN TANK - USED TO PLATE PARTS (BRIGHT TIN).
25.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 24 AND 35.
26.	DEIONIZED WATER TANK - USED TO PRE-RINSE PARTS PRIOR TO TANK 35.
27.	DEIONIZED WATER TANK - USED TO PRE-RINSE PARTS PRIOR TO TANK 35.
28.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 26, 27 AND 29.
29.	ACETIC ACID TANK - USED TO PRE-CLEAN PRIOR TO TANK 35.
30.	NITRIC ACID TANK - USED TO CLEAN ALUMINUM.
31.	ZINCATE TANK - USED TO PRE-CONDITION ALUMINUM.
32.	IRIDITE TANK - USED TO PUT CHROMATE FINISH ON ALUMINUM.
33.	IRIDITE DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
34.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 32 AND 33.
35.	SULFURIC ACID/TIN TANK - USED TO PLATE PARTS (TIN).
36.	OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 37 AND 38.
37.	ELECTROLESS NICKEL DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
38.	ELECTROLESS NICKEL TANK - USED TO PLATE PARTS (NICKEL).
39.	ELECTROLESS NICKEL HOLDING TANK.
40.	ELECTROLESS NICKEL HOLDING TANK.
41.	TETRACHLOROETHYLENE VAPOR DEGREASER - USED TO DEGREASE PARTS TO BE PLATED.
42.	SAME AS TANK 21.

**Figure 3. 1983-2002 PCE Concentration Versus Time
South Mesa WQARF Register Site Wells**





Source: Adapted from "Cross-Section A-A Applied Metallics, South Mesa WQARF Project Area, Gilbert, Arizona",
EARTH TECH, Project No. 95-6147, Figure 3-2, dated June 1995.

**Cross Section of Applied Metallics
Source Area**

FIGURE 4

PROJECT NAME: South Mesa WQARF
PROJECT NO.: 70211-0-0150
DATE: January 18, 2001

amec

MCQUEEN ROAD

SIDEWALK

SIDEWALK

OFFICE

BATHROOMS

SIDEWALK

7-11 STORE

STORAGE

SEEPAGE TRENCH

FENCE WITH
BLOCK WALL
BASE

WASTE OIL
DRUMS

LOCATION OF
SEPTIC TANK

LB-2/MW-10

ASPHALT

MW-AM-8S

VW-6

VW-4

VW-3

LB-3/MW-11

DRYWELL

VW-5

LB-1/MW-9

SOIL

ASPHALT
DRIVEWAY
AND
PARKING LOT

TANK IDENTIFICATION

1. TIN STRIP TANK - USED TO STRIP TIN AND CLEAN PARTS
2. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 1, 3 AND 4.
3. HYDROCHLORIC ACID (50%) TANK - USED TO CLEAN STEEL PARTS.
4. SAME AS TANK 3
5. BRIGHT DIP TANK - MIXTURE OF NITRIC ACID AND PHOSPHORIC ACID, USED TO CLEAN COPPER OR BRASS PARTS.
6. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 5, 7 AND 8.
7. NICKEL STRIP TANK - PROPANE HEATED SOLUTION USED TO STRIP NICKEL.
8. NITRIC ACID TANK - USED TO CLEAN OR STRIP PARTS.
9. TIN/LEAD TANK - USED TO PLATE PARTS (TIN).
10. TIN PLATE TANK - USED TO PLATE PARTS (TIN).
11. TIN PLATE TANK - USED TO PLATE PARTS (TIN).
12. COPPER/CYANIDE TANK - USED TO PLATE PARTS (COPPER).
13. COPPER/CYANIDE DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
14. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 12, 13, 15 AND 16.
15. SULFURIC ACID (50%) TANK - USED TO CLEAN PARTS.
16. SULFURIC ACID TANK - USED TO MAKE-UP AND HOLD RAW SULFURIC ACID SOLUTION.
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20. OAKITE 90 TANK - USED TO CLEAN PARTS.
21. CENTRIFUGE - USED TO SPIN DRY PARTS.
22. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 9, 10, 11 AND 23.
23. FLUOROBORIC TIN TANK - USED TO PLATE PARTS (TIN).
24. BRIGHT TIN TANK - USED TO PLATE PARTS (BRIGHT TIN).
25. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 24 AND 35.
26. DEIONIZED WATER TANK - USED TO PRE-RINSE PARTS PRIOR TO TANK 35.
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31. ZINCATE TANK - USED TO PRE-CONDITION ALUMINUM.
32. IRIDITE TANK - USED TO PUT CHROMATE FINISH ON ALUMINUM.
33. IRIDITE DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
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35. SULFURIC ACID/TIN TANK - USED TO PLATE PARTS (TIN).
36. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 37 AND 38.
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38. ELECTROLESS NICKEL TANK - USED TO PLATE PARTS (NICKEL).
39. ELECTROLESS NICKEL HOLDING TANK.
40. ELECTROLESS NICKEL HOLDING TANK.
41. TETRACHLOROETHYLENE VAPOR DEGREASER - USED TO DEGREASE PARTS TO BE PLATED.
42. SAME AS TANK 21.

LEGEND

- DRYWELL
- ⊕ VAPOR EXTRACTION WELL
- ⊞ GROUNDWATER MONITORING WELL
- ⊙ SOIL BORING

0 10 20 feet

SOIL BORING LOCATIONS

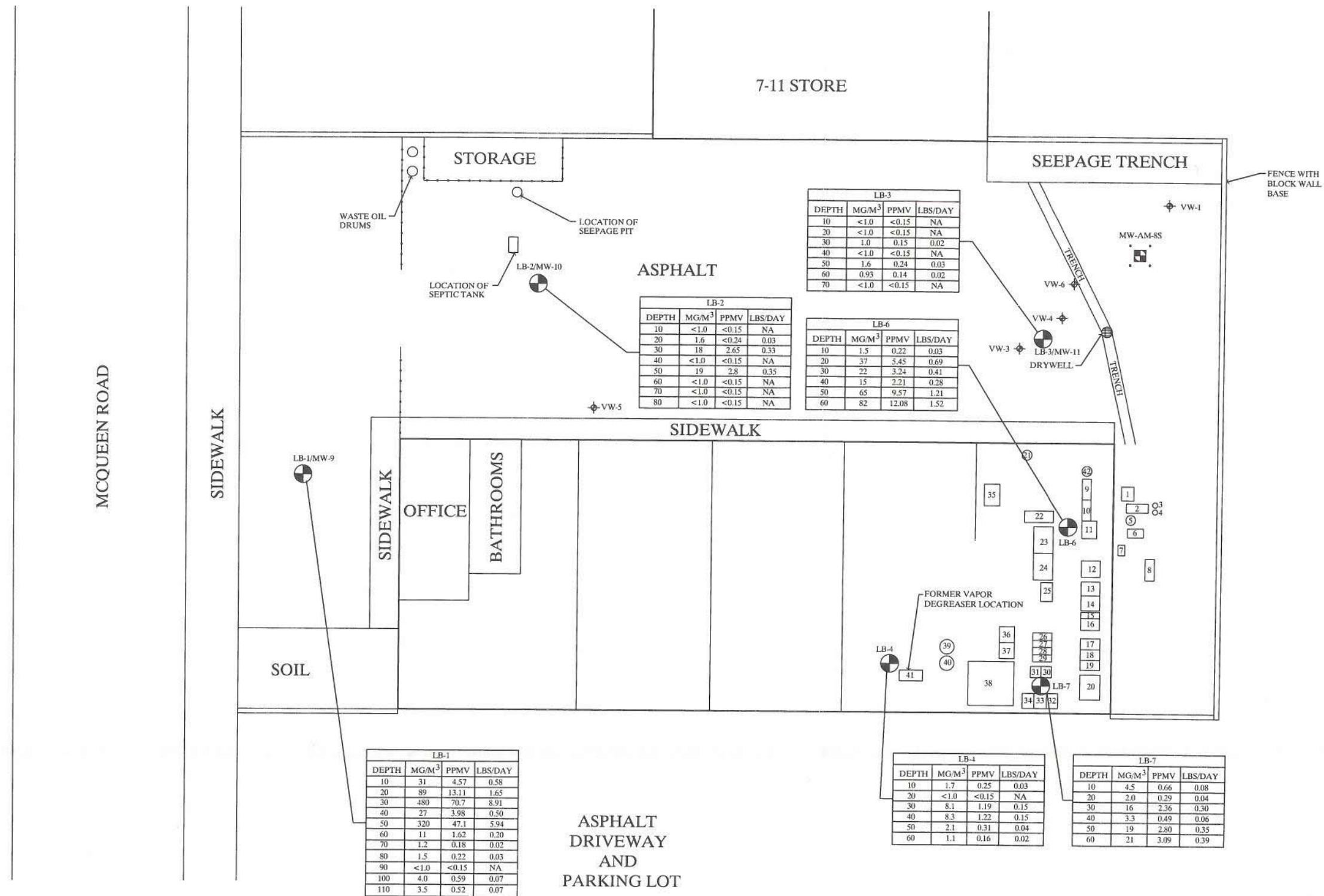
FIGURE 5

MACTEC PROJECT NAME: SOUTH MESA WQARF
MACTEC PROJECT NO: 70211-2-0064.2.2.6.2
DATE: 12/18/02 E-FILE: 20064.2.2.6 FIG 5
DRAWN BY: DAK CHECKED BY: *int*

REFERENCE

- APPLIED METALLICS, INC.
"TANK LOCATION DIAGRAM, FIGURE 2"
WESTERN TECHNOLOGIES, INC., 1989
- SOIL GAS SAMPLE LOCATIONS
APPLIED METALLICS SOUTH MESA
WQARF PROJECT AREA, GILBERT, AZ
FIGURE 2-1, EARTH TECH, 1995

amec



TANK IDENTIFICATION

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- OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 1, 3 AND 4.
- HYDROCHLORIC ACID (50%) TANK - USED TO CLEAN STEEL PARTS.
- SAME AS TANK 3
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- OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 5, 7 AND 8.
- NICKEL STRIP TANK - PROPANE HEATED SOLUTION USED TO STRIP NICKEL.
- NITRIC ACID TANK - USED TO CLEAN OR STRIP PARTS.
- TIN/LEAD TANK - USED TO PLATE PARTS (TIN).
- TIN PLATE TANK - USED TO PLATE PARTS (TIN).
- COPPER/CYANIDE TANK - USED TO PLATE PARTS (COPPER).
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- OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 17, 18 AND 20.
- OAKITE 90 TANK - USED TO CLEAN PARTS.
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- FLUOROBORIC TIN TANK - USED TO PLATE PARTS (TIN).
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APPLIED METALLICS SOUTH MESA
WQARF PROJECT AREA, GILBERT, AZ
FIGURE 2-1, EARTH TECH, 1995

PCE SOIL GAS CONCENTRATIONS

FIGURE 6

MACTEC PROJECT NAME: SOUTH MESA WQARF

MACTEC PROJECT NO: 70211-2-0064.2.2.6.2

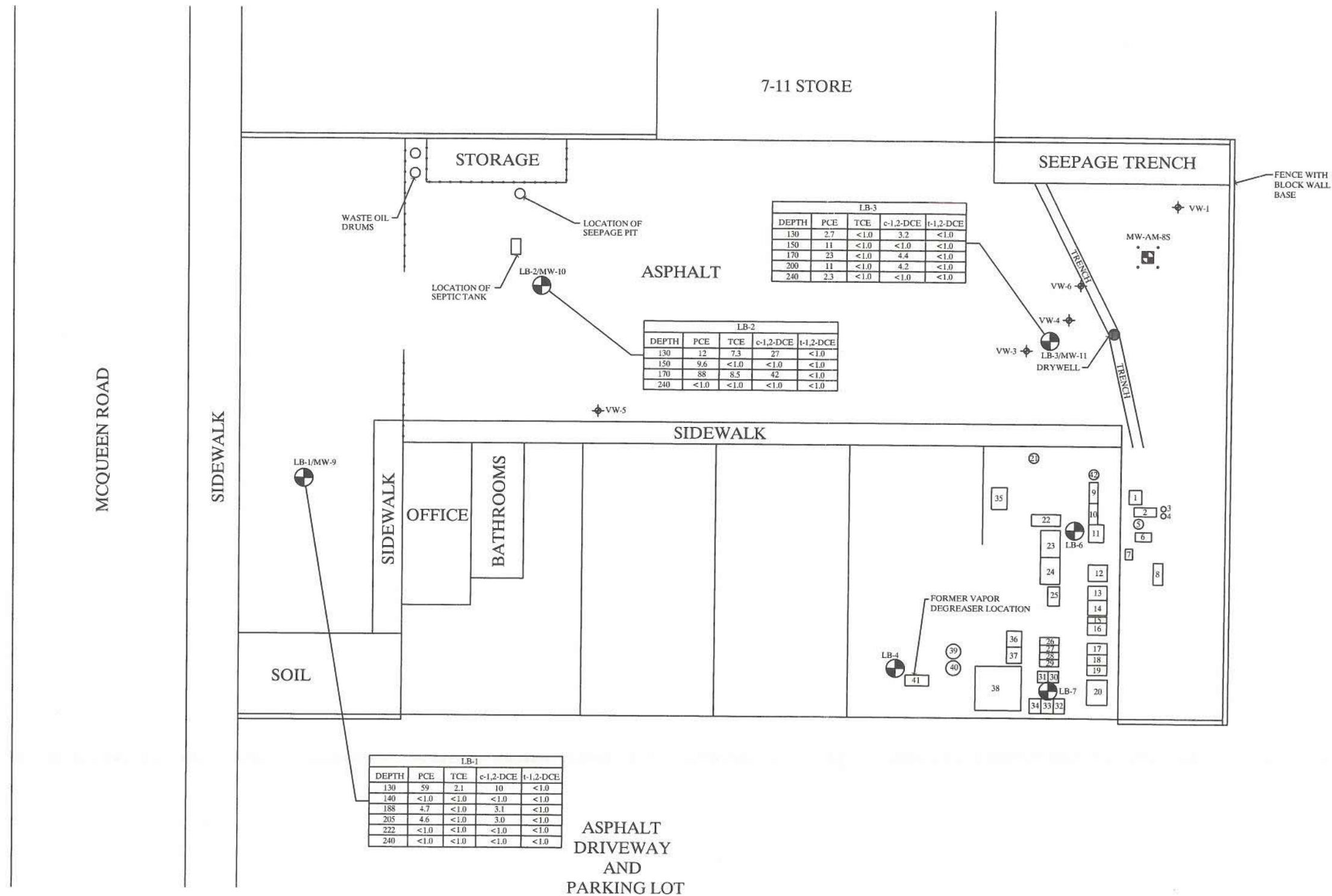
DATE: 12/18/02

E-FILE: 20064.2.2.6 FIG 6

DRAWN BY: DAK

CHECKED BY: *alt*





TANK IDENTIFICATION	
1. TIN STRIP TANK - USED TO STRIP TIN AND CLEAN PARTS	
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27. DEIONIZED WATER TANK - USED TO PRE-RINSE PARTS PRIOR TO TANK 35.	
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30. NITRIC ACID TANK - USED TO CLEAN ALUMINUM.	
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32. IRIDITE TANK - USED TO PUT CHROMATE FINISH ON ALUMINUM.	
33. IRIDITE DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.	
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WQARF PROJECT AREA, GILBERT, AZ
FIGURE 2-1, EARTH TECH, 1995

LEGEND	
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	- VAPOR EXTRACTION WELL
	- GROUNDWATER MONITORING WELL
	- SOIL BORING

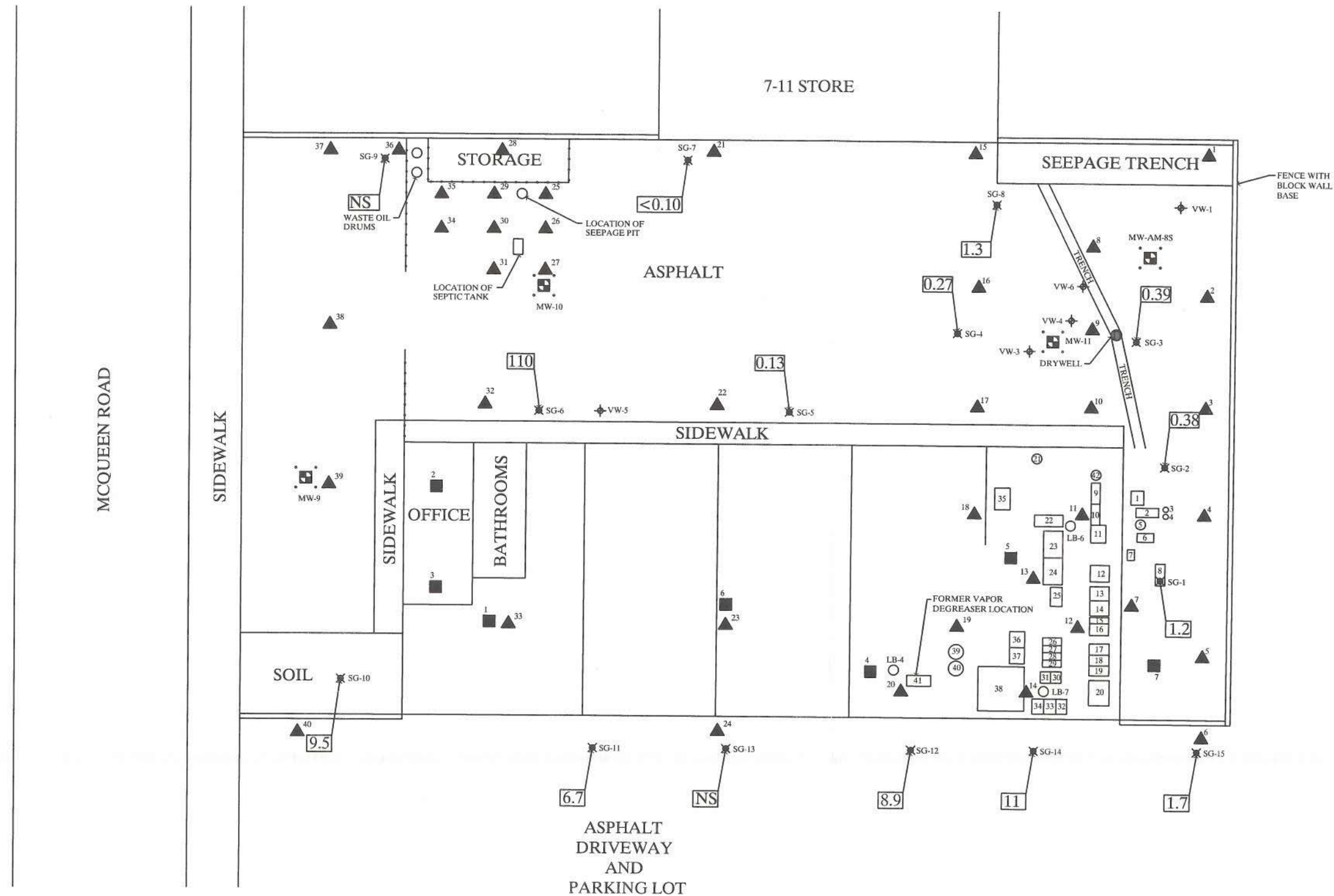
0 10 20 feet

GROUNDWATER PCE, TCE AND DCE CONCENTRATIONS

FIGURE 7

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 70211-2-0064.2.2.6.2
 DATE: 12/18/02 E-FILE: 20064.2.2.6 FIG 7
 DRAWN BY: DAK CHECKED BY: [Signature]

amec



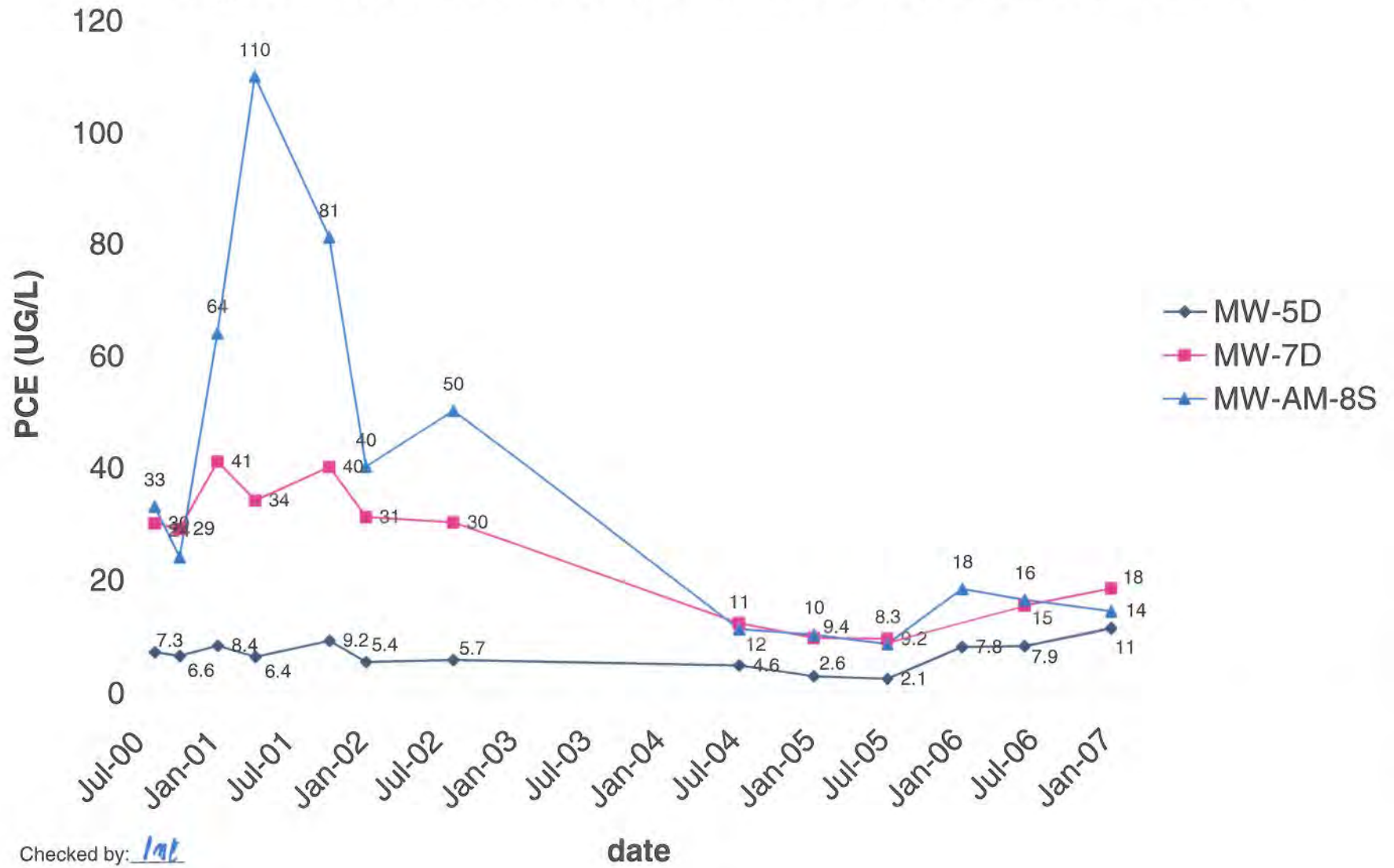
TANK IDENTIFICATION

1. TIN STRIP TANK - USED TO STRIP TIN AND CLEAN PARTS
2. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 1, 3 AND 4.
3. HYDROCHLORIC ACID (50%) TANK - USED TO CLEAN STEEL PARTS.
4. SAME AS TANK 3
5. BRIGHT DIP TANK - MIXTURE OF NITRIC ACID AND PHOSPHORIC ACID, USED TO CLEAN COPPER OR BRASS PARTS.
6. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 5, 7 AND 8.
7. NICKEL STRIP TANK - PROPANE HEATED SOLUTION USED TO STRIP NICKEL.
8. NITRIC ACID TANK - USED TO CLEAN OR STRIP PARTS.
9. TIN/LEAD TANK - USED TO PLATE PARTS (TIN).
10. TIN PLATE TANK - USED TO PLATE PARTS (TIN).
11. TIN PLATE TANK - USED TO PLATE PARTS (TIN).
12. COPPER/CYANIDE TANK - USED TO PLATE PARTS (COPPER).
13. COPPER/CYANIDE DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
14. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 12, 13, 15 AND 16.
15. SULFURIC ACID (50%) TANK - USED TO CLEAN PARTS.
16. SULFURIC ACID TANK - USED TO MAKE-UP AND HOLD RAW SULFURIC ACID SOLUTION.
17. HYDROCHLORIC (MURIATIC) ACID TANK - USED TO CLEAN STEEL PARTS.
18. HYDROCHLORIC (MURIATIC) ACID TANK - USED TO CLEAN COPPER AND BRASS PARTS.
19. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 17, 18 AND 20.
20. OAKITE 90 TANK - USED TO CLEAN PARTS.
21. CENTRIFUGE - USED TO SPIN DRY PARTS.
22. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 9, 10, 11 AND 23.
23. FLUOROBORIC TIN TANK - USED TO PLATE PARTS (TIN).
24. BRIGHT TIN TANK - USED TO PLATE PARTS (BRIGHT TIN).
25. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 24 AND 35.
26. DEIONIZED WATER TANK - USED TO PRE-RINSE PARTS PRIOR TO TANK 35.
27. DEIONIZED WATER TANK - USED TO PRE-RINSE PARTS PRIOR TO TANK 35.
28. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 26, 27 AND 29.
29. ACETIC ACID TANK - USED TO PRE-CLEAN PRIOR TO TANK 35.
30. NITRIC ACID TANK - USED TO CLEAN ALUMINUM.
31. ZINCATE TANK - USED TO PRE-CONDITION ALUMINUM.
32. IRIDITE TANK - USED TO PUT CHIROMATE FINISH ON ALUMINUM.
33. IRIDITE DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
34. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 32 AND 33.
35. SULFURIC ACID/TIN TANK - USED TO PLATE PARTS (TIN).
36. OVERFLOW RINSE TANK - ASSOCIATED WITH PROCESS TANKS 37 AND 38.
37. ELECTROLESS NICKEL DRAGOUT TANK - USED TO PRE-RINSE PARTS PRIOR TO FINAL RINSE.
38. ELECTROLESS NICKEL TANK - USED TO PLATE PARTS (NICKEL).
39. ELECTROLESS NICKEL HOLDING TANK.
40. ELECTROLESS NICKEL HOLDING TANK.
41. TETRACHLOROETHYLENE VAPOR DEGREASER - USED TO DEGREASE PARTS TO BE PLATED.
42. SAME AS TANK 21.

REFERENCE

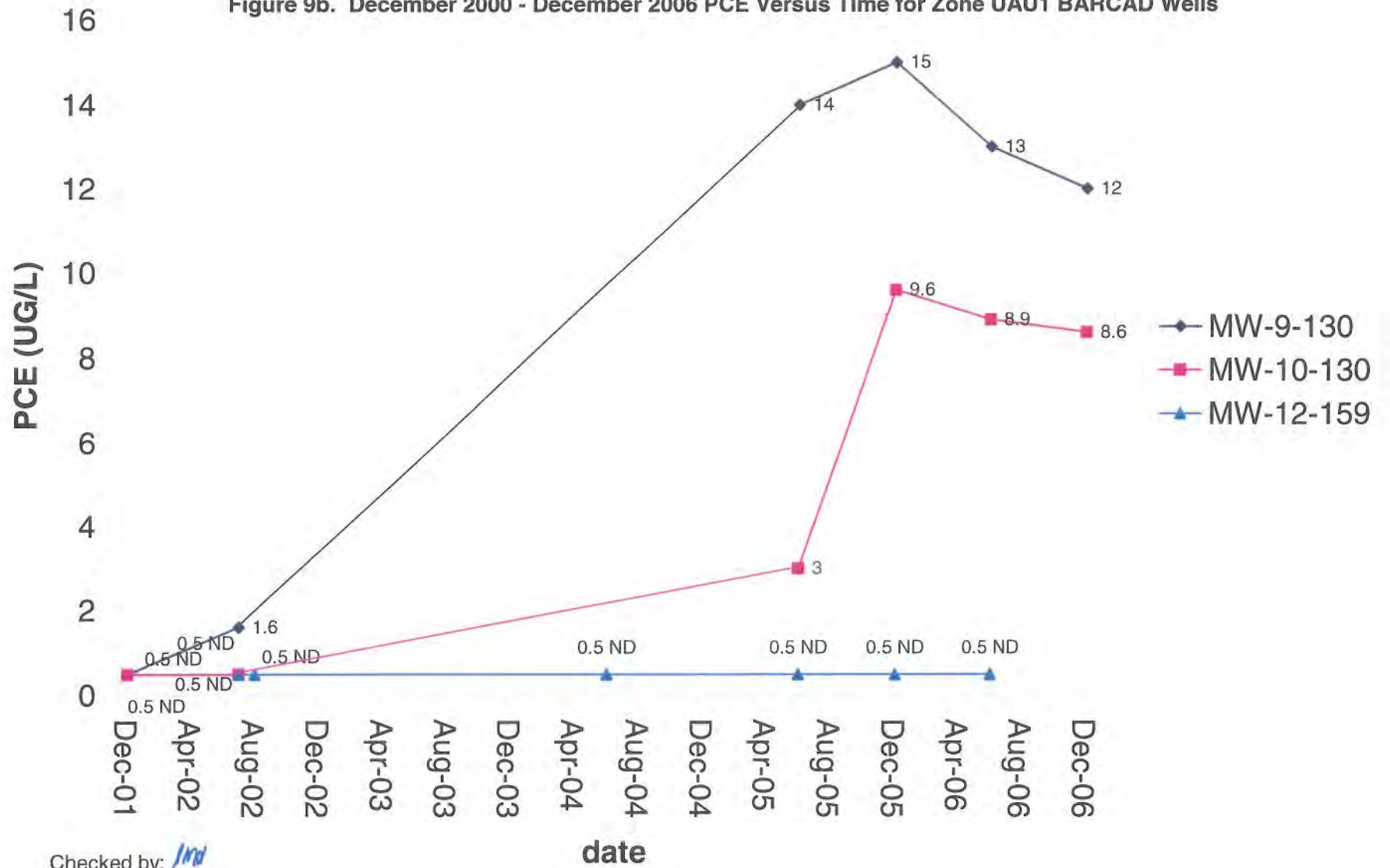
- APPLIED METALLICS, INC.
TANK LOCATION DIAGRAM, FIGURE 2
WESTERN TECHNOLOGIES, INC., 1989
- SOIL GAS SAMPLE LOCATIONS
APPLIED METALLICS SOUTH MESA
WQARF PROJECT AREA, GILBERT, AZ
FIGURE 2-1, EARTH TECH, 1995

Figure 9a. July 2000 - December 2006 PCE Versus Time for MW-5D, MW-7D, MW-AM-8S



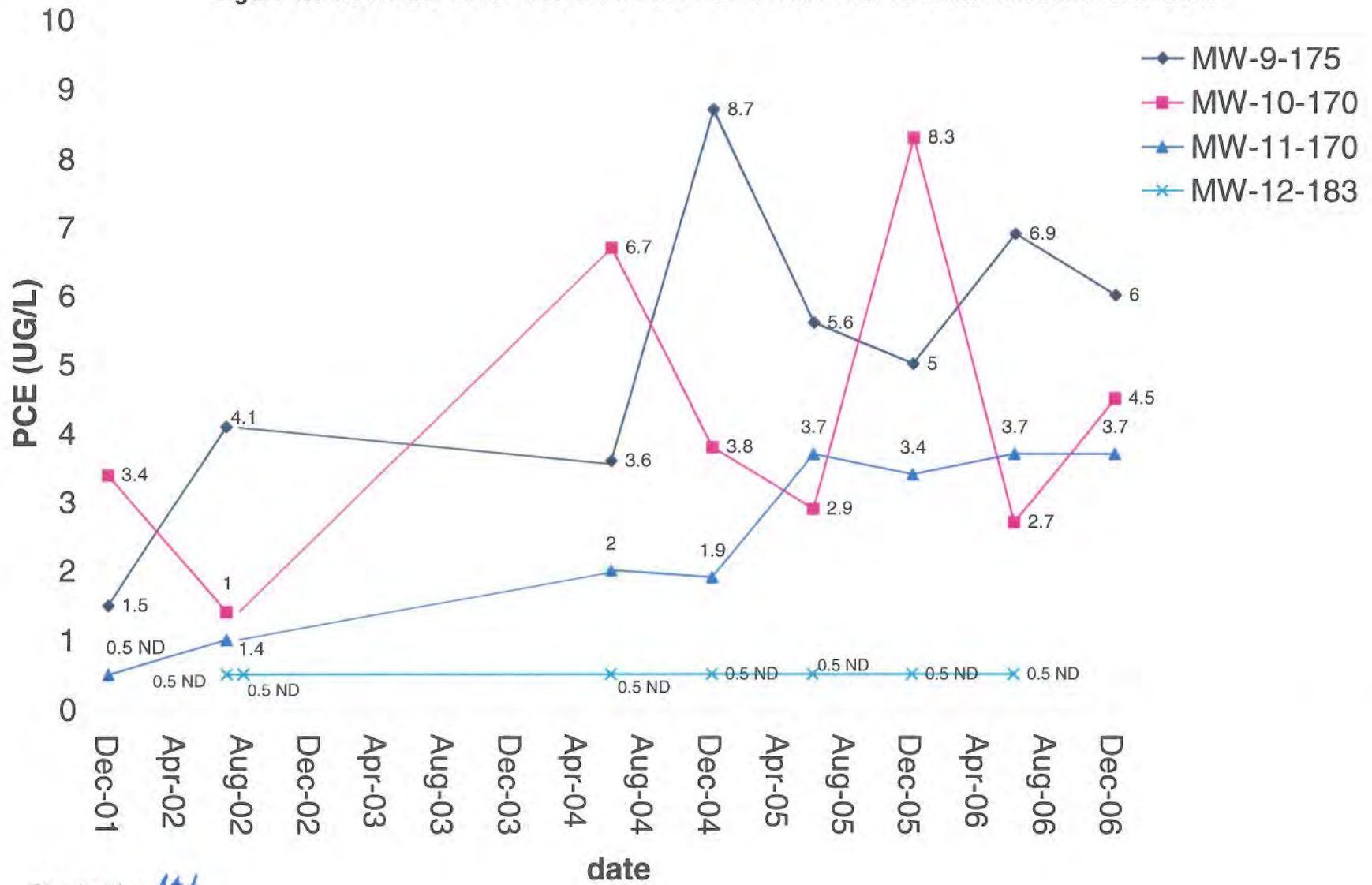
Checked by: lat

Figure 9b. December 2000 - December 2006 PCE Versus Time for Zone UAU1 BARCAD Wells



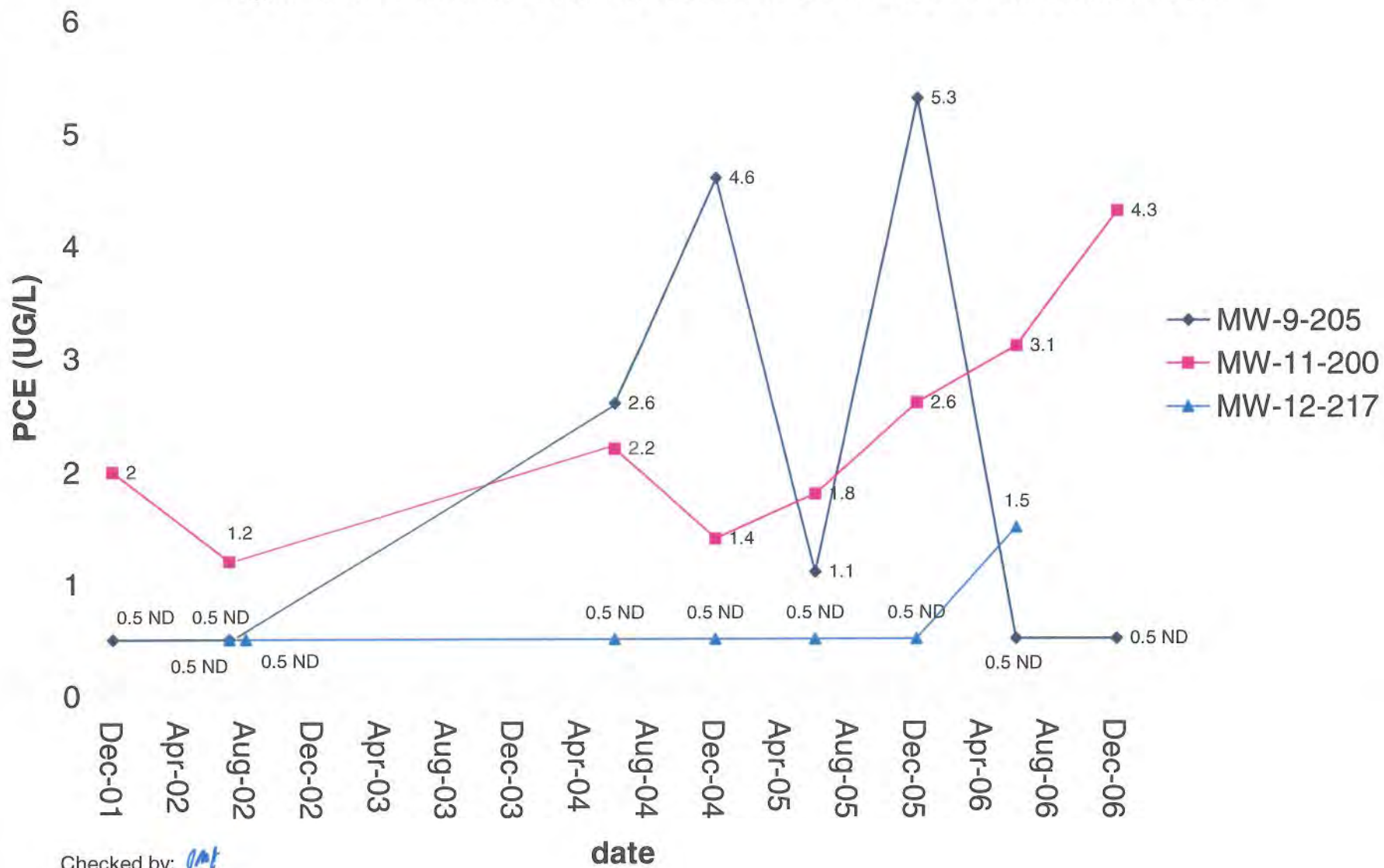
Checked by: Ind

Figure 9c. December 2000 - December 2006 PCE Versus Time for Zone UAU2 BARCAD Wells



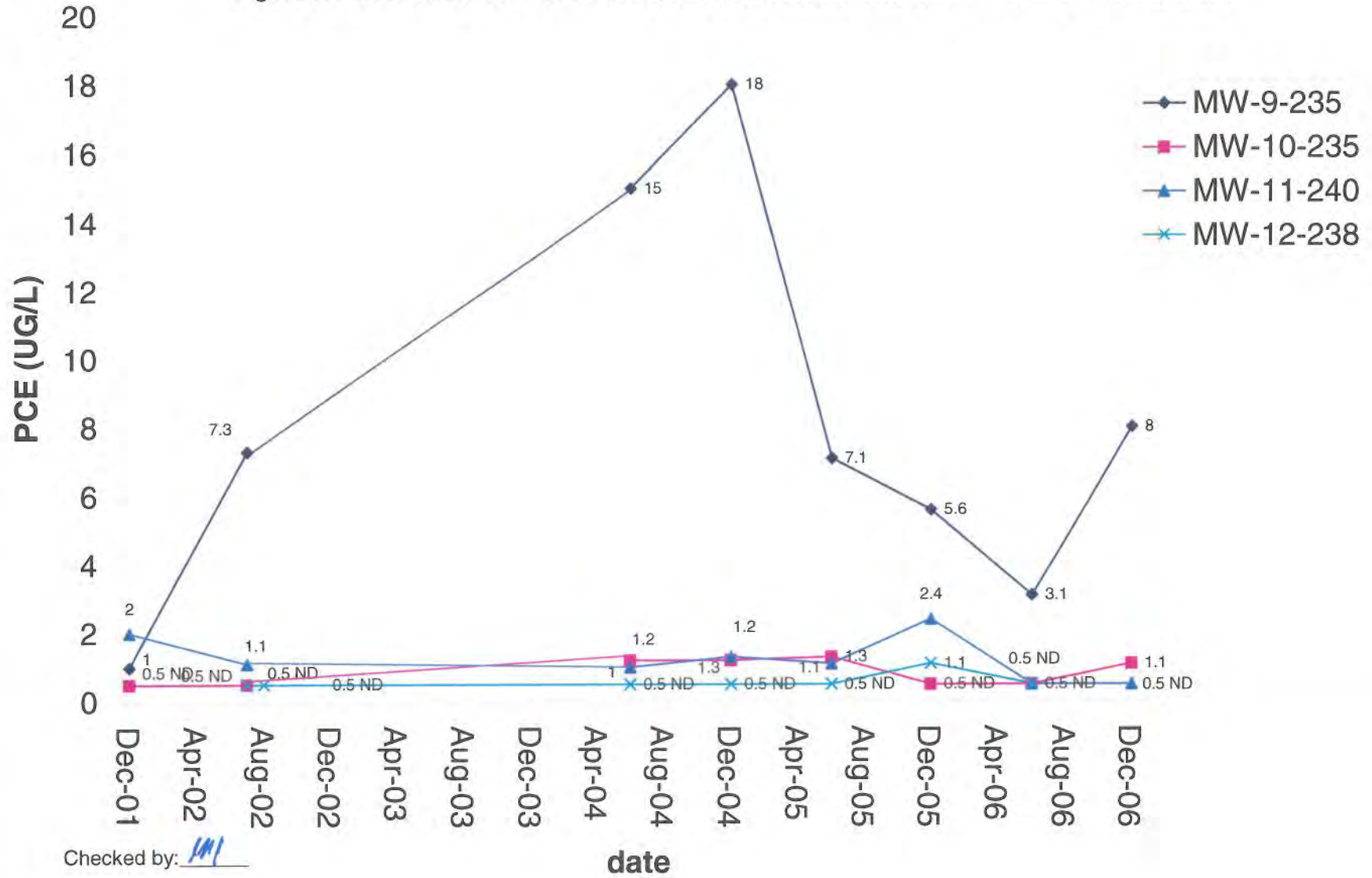
Checked by: lmt

Figure 9d. December 2000 - December 2006 PCE Versus Time for Zone UAU3 BARCAD Wells

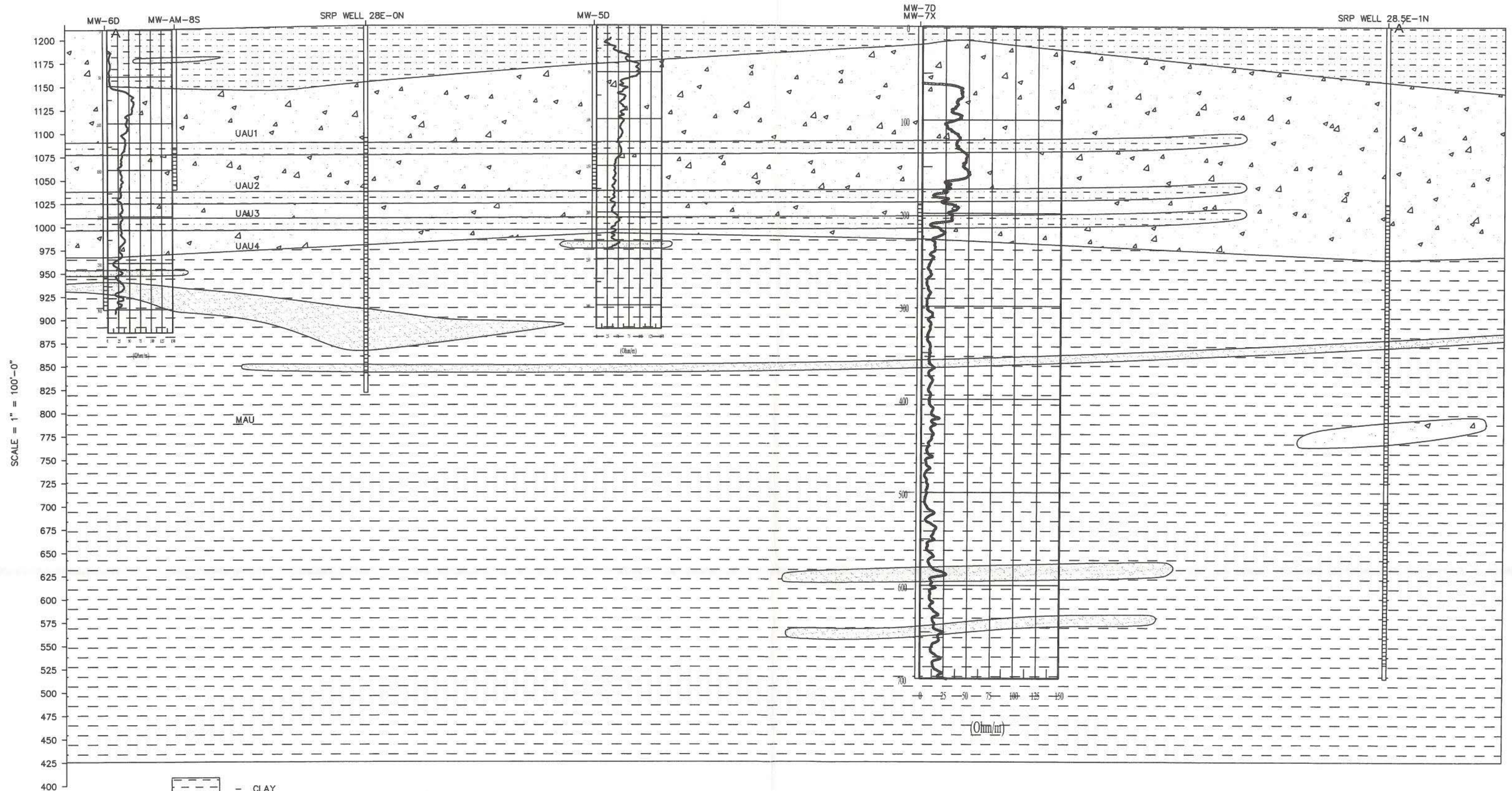


Checked by: gnt

Figure 9e. December 2000 - December 2006 PCE Versus Time for Zone UAU4 BARCAD Wells



SCALE = 1" = 500'-0"



CROSS SECTION A - A'
SOUTH MESA WQARF SITE

FIGURE 10

MACTEC PROJECT NAME: SOUTH MESA WQARF
MACTEC PROJECT NO: 70211-2-0064.2.2.6.2
DATE: 12/18/02 E-FILE: 20064.2.2.6 FIG 10
DRAWN BY: DAK CHECKED BY: JH



Figure 11. Groundwater Elevation Hydrographs for MW-AM-8S and SRP-28E-0N

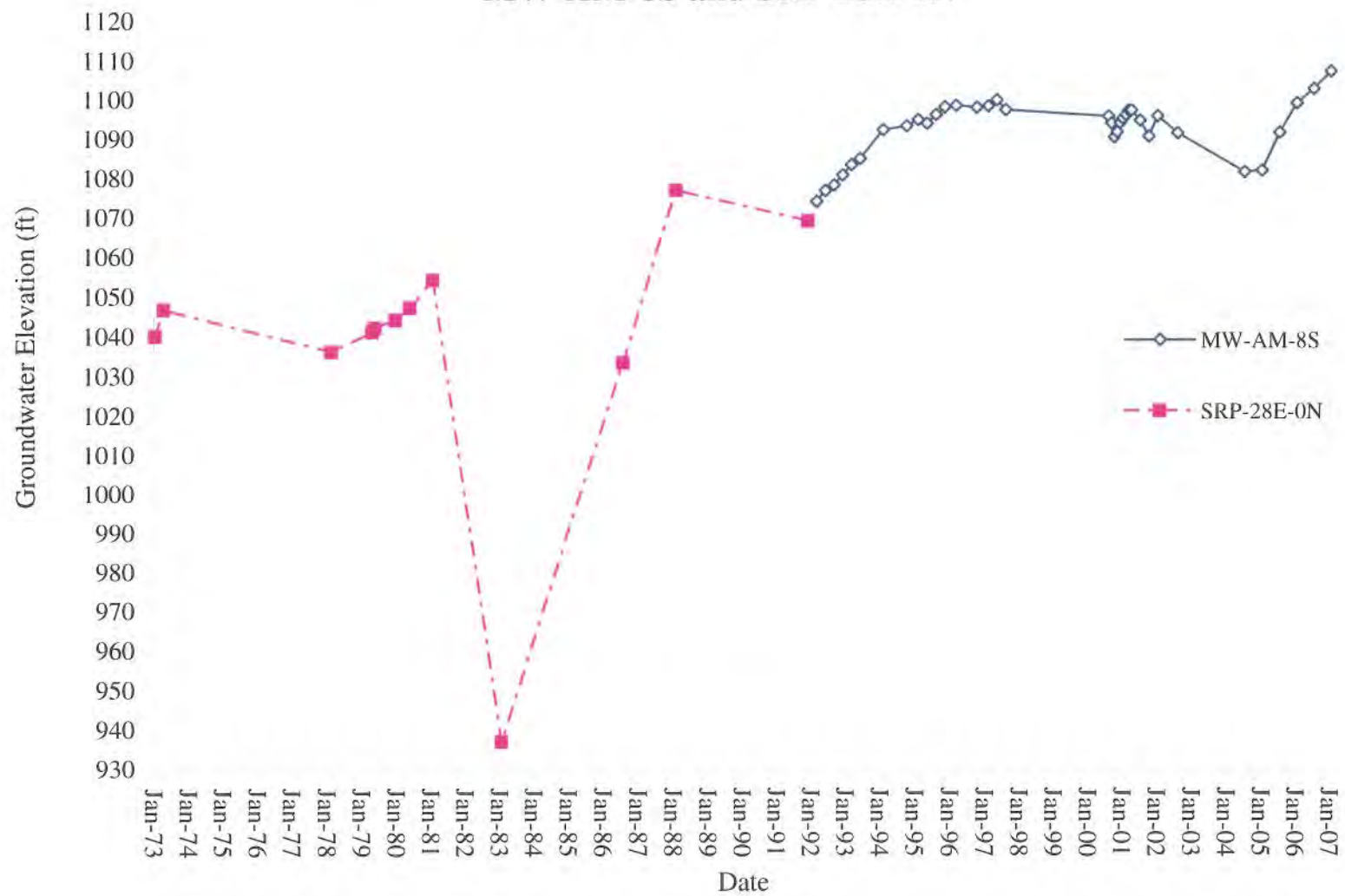
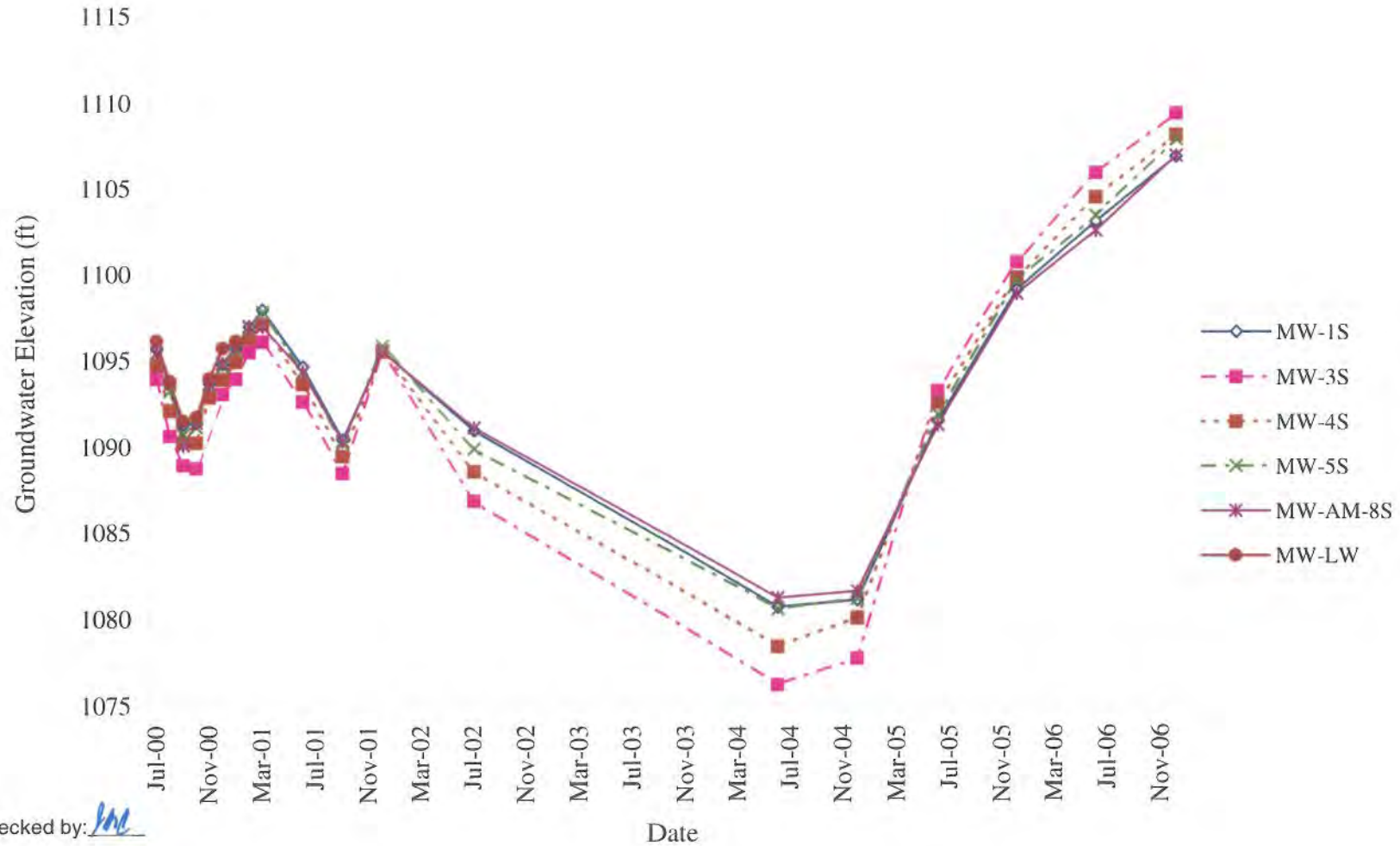
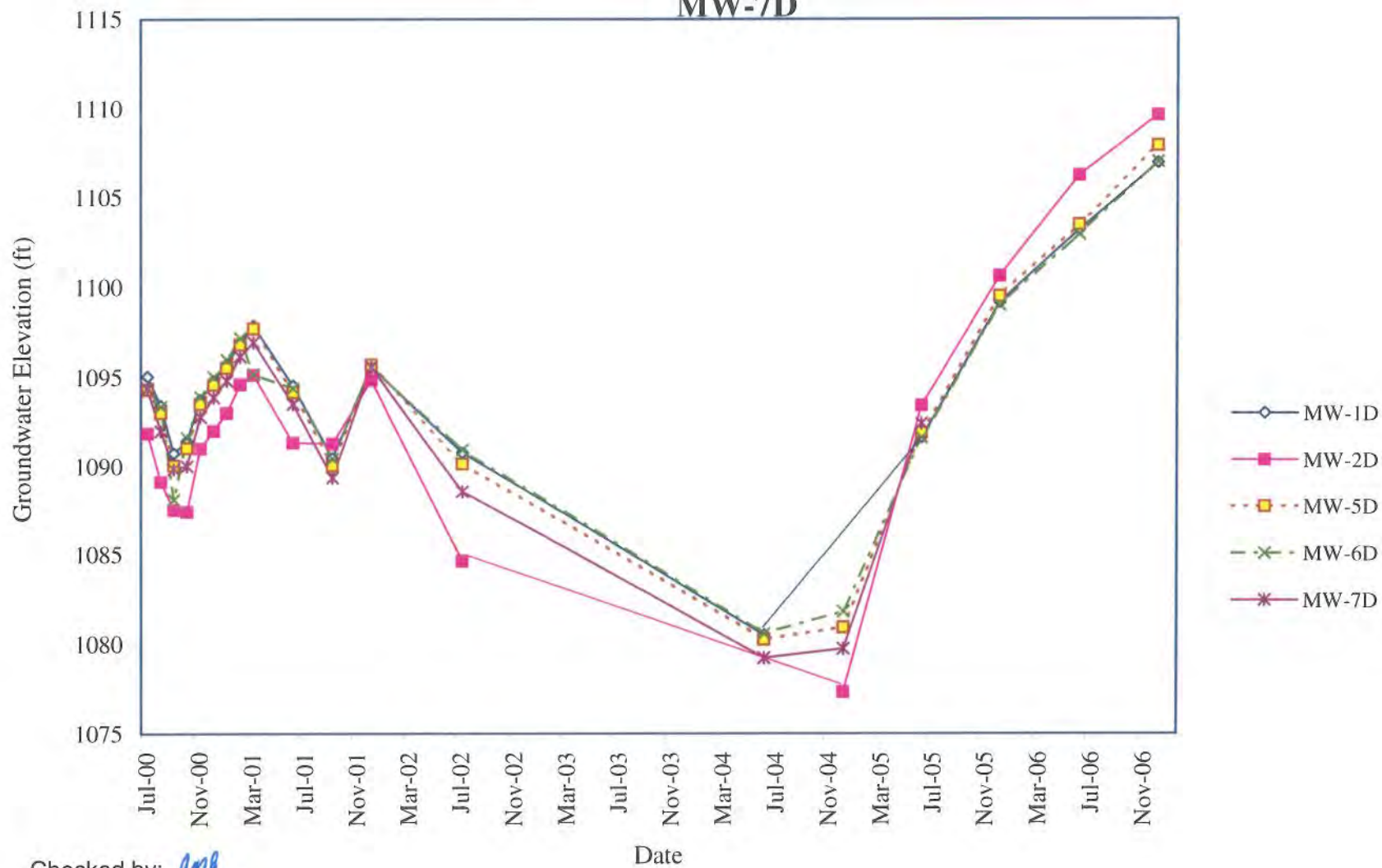


Figure 12. Well Hydrographs for MW-1S, MW-3S, MW-4S, MW-5S, MW-AM-8S, and MW-LW

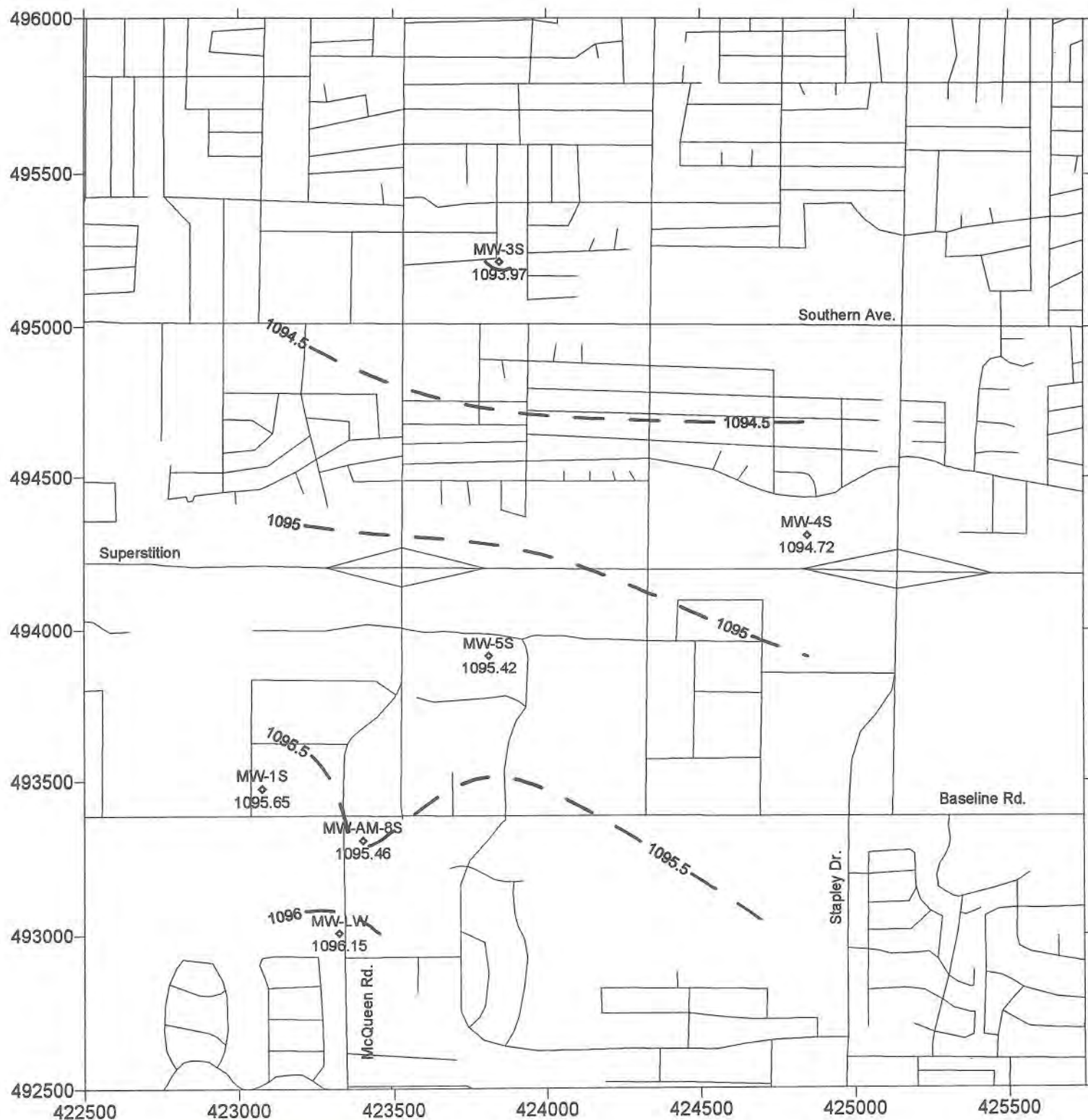


Checked by: luc

Figure 13. Well Hydrographs for MW-1D, MW-2D, MW-5D, MW-6D, and MW-7D

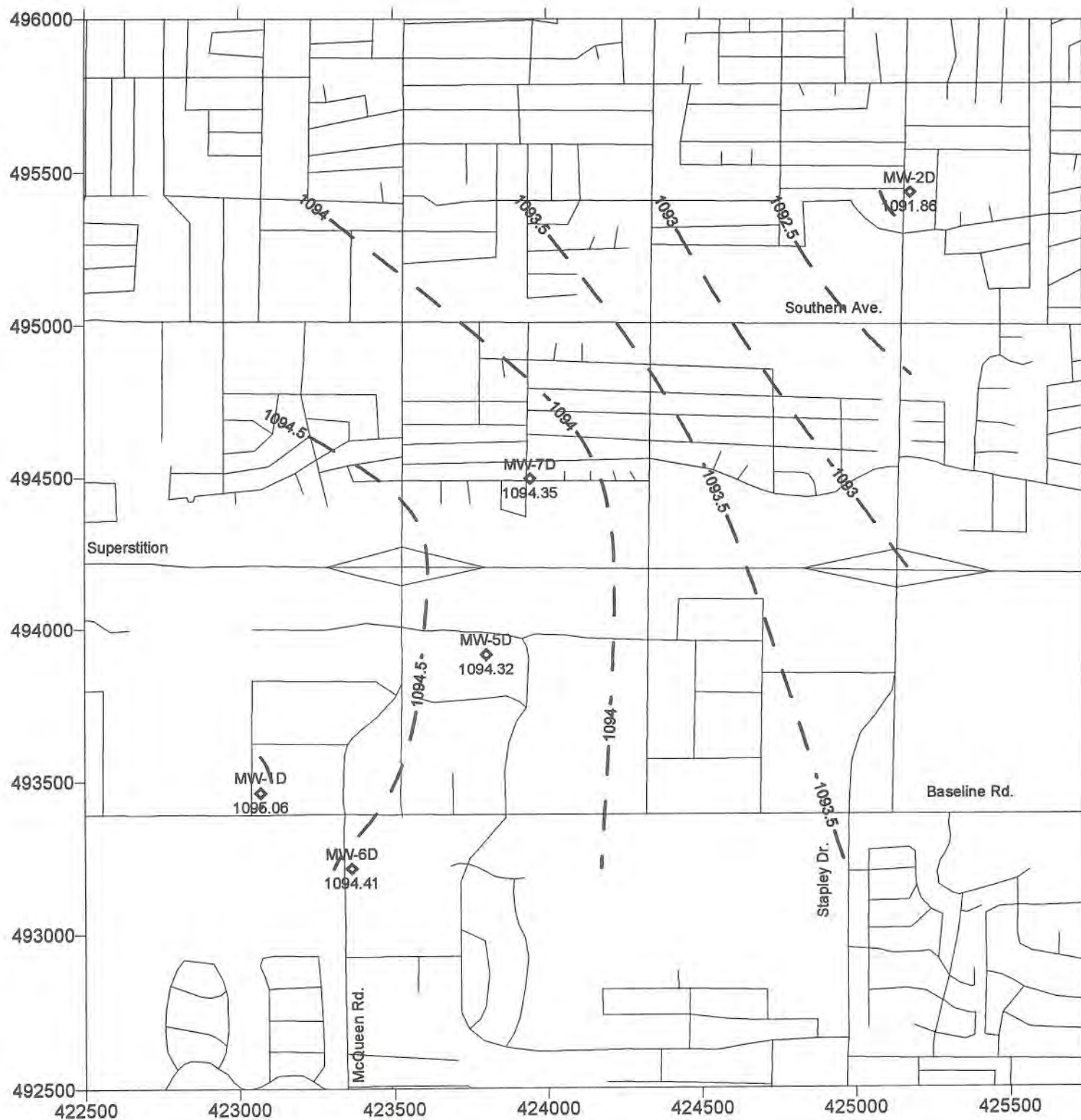


Checked by: gab

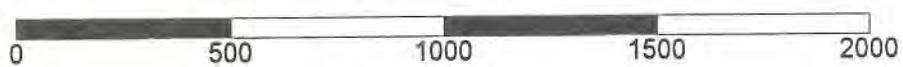


**Figure 14a Shallow Groundwater Elevation
July 8th, 2000**





**Figure 14b Deep Groundwater Elevation
July 8th, 2000**



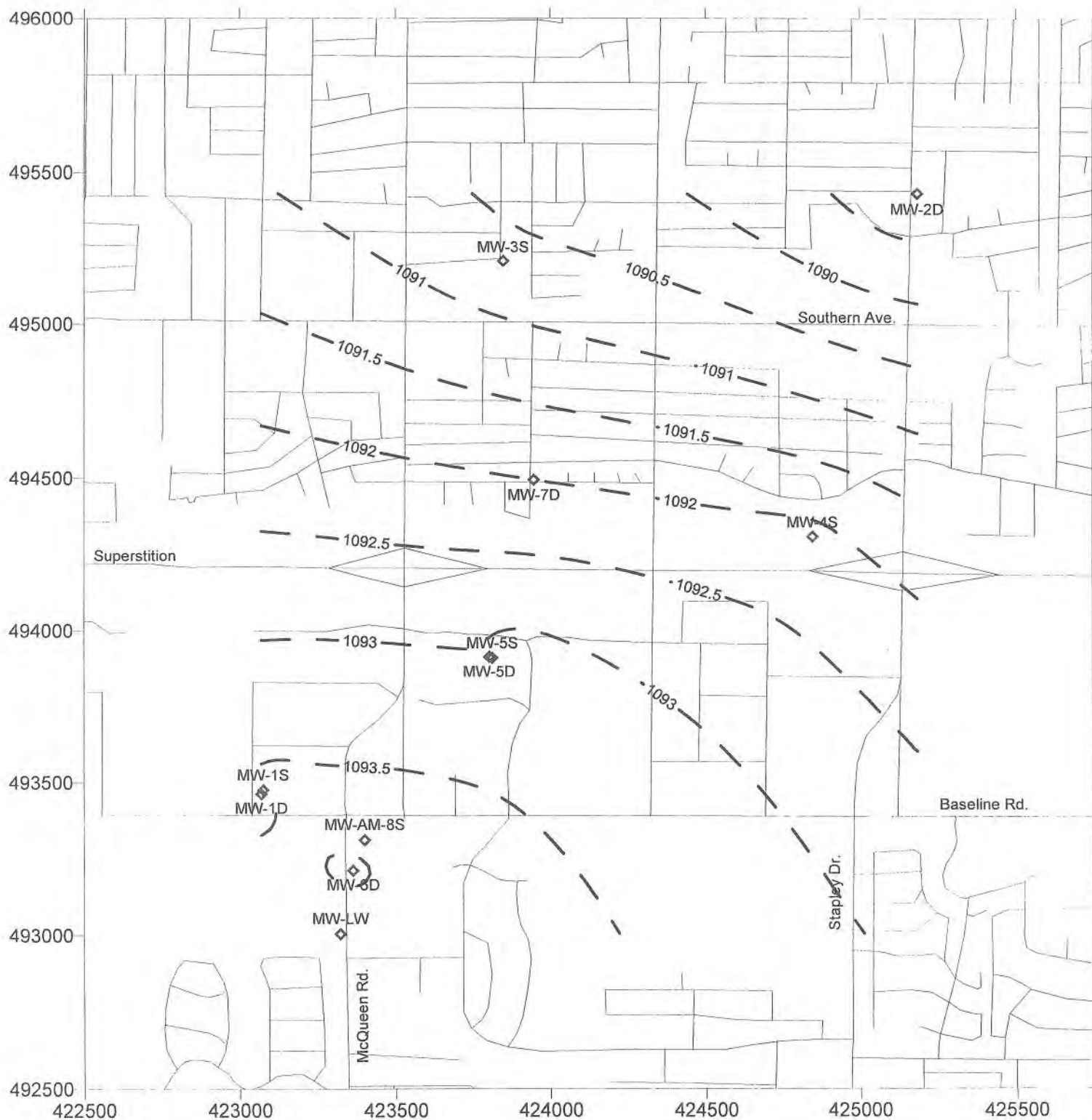


Figure 15 Groundwater Elevations
August 8th, 2000



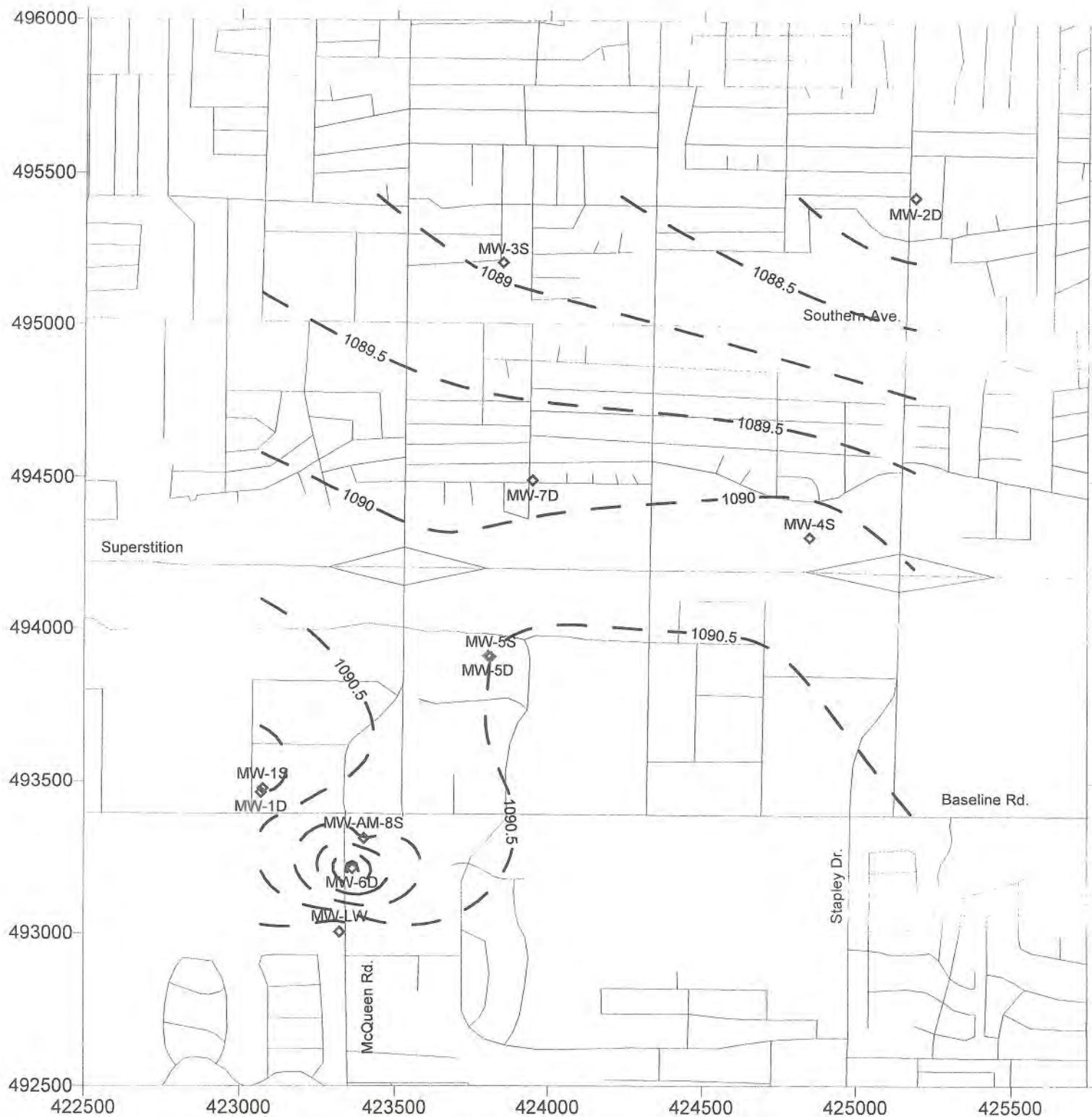


Figure 16 Groundwater Elevations
September 6th, 2000



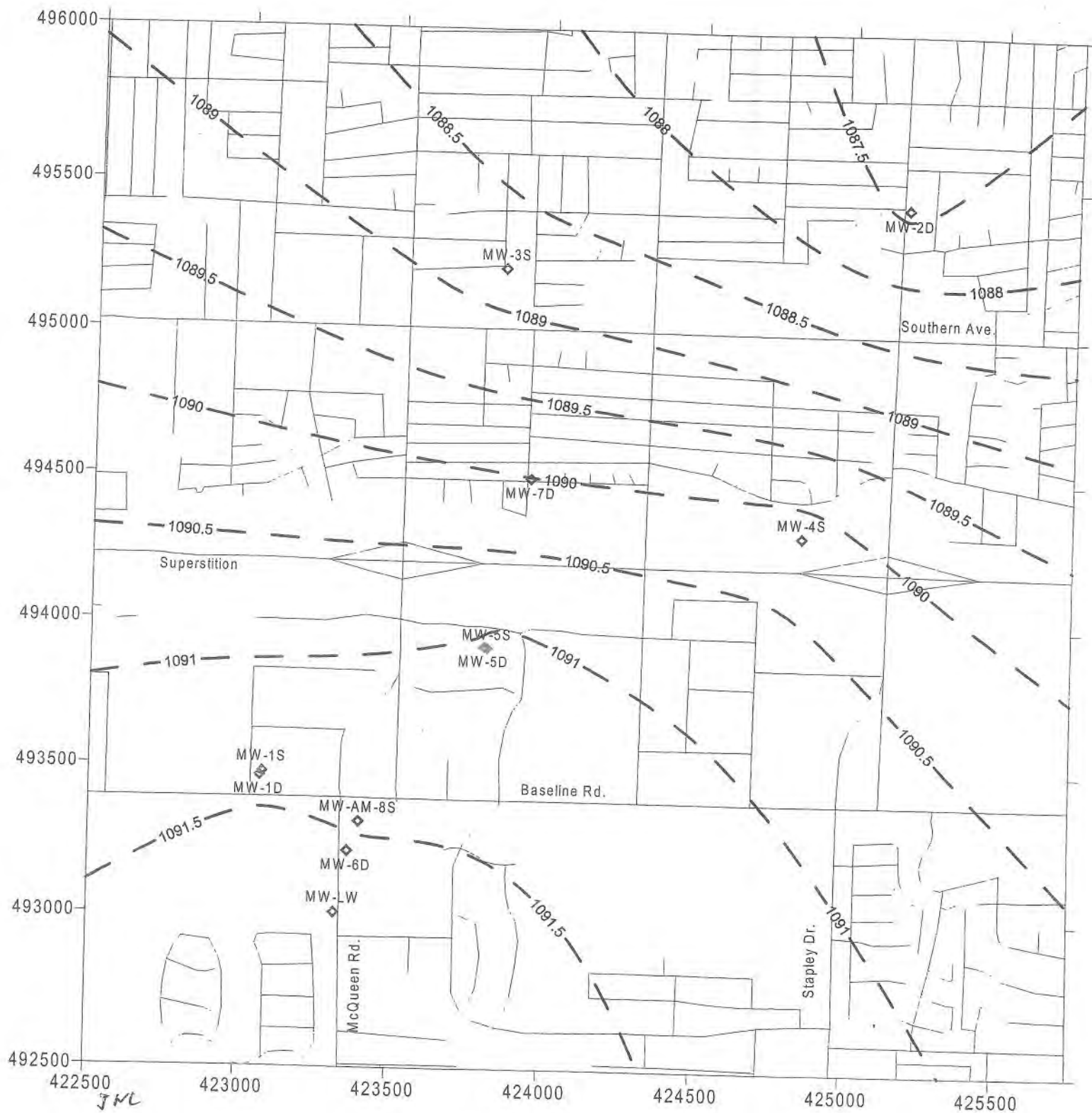


Figure 17 Groundwater Elevation, October 3, 2000

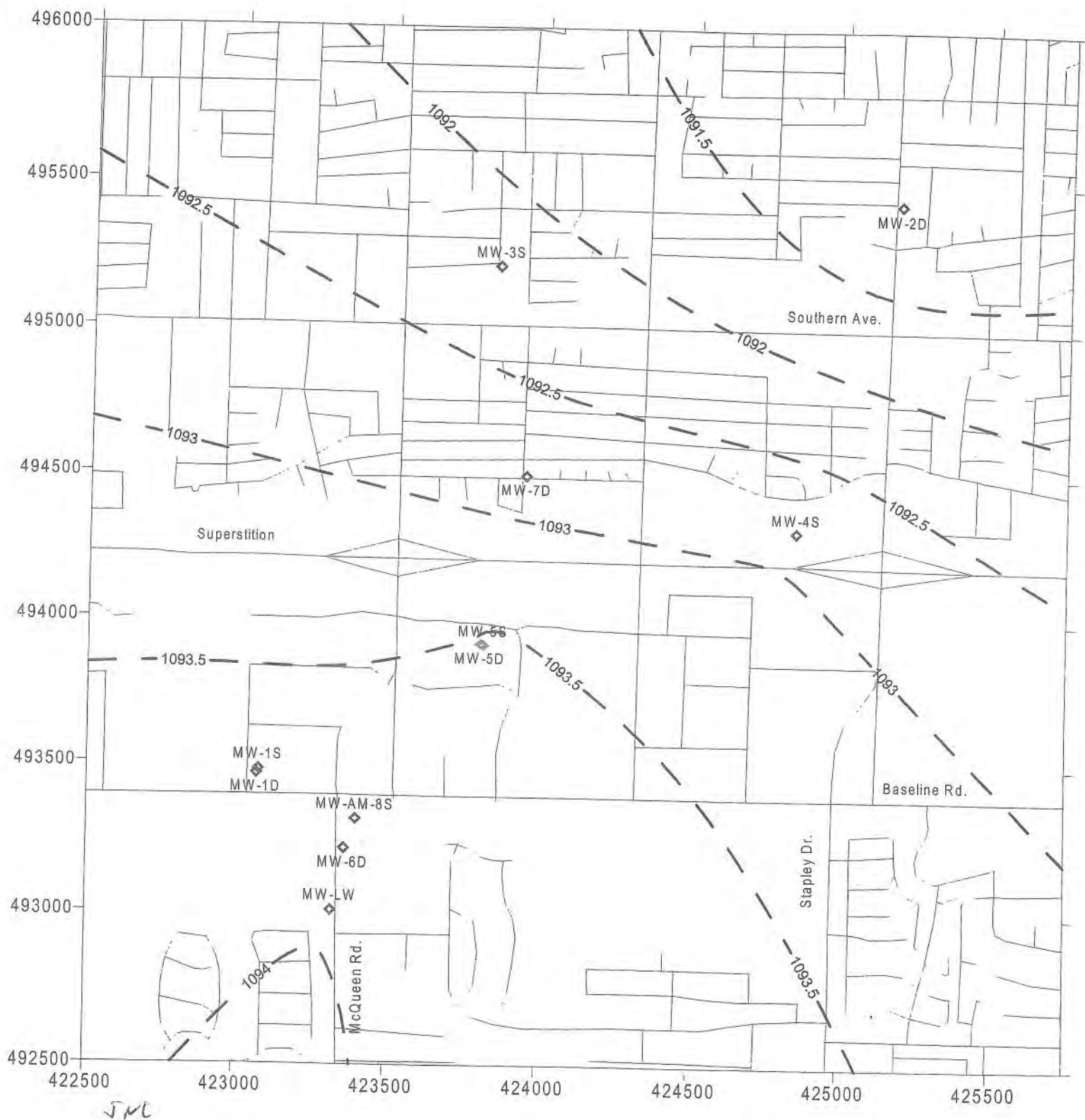


Figure 18 Groundwater Elevation, November 7, 2000



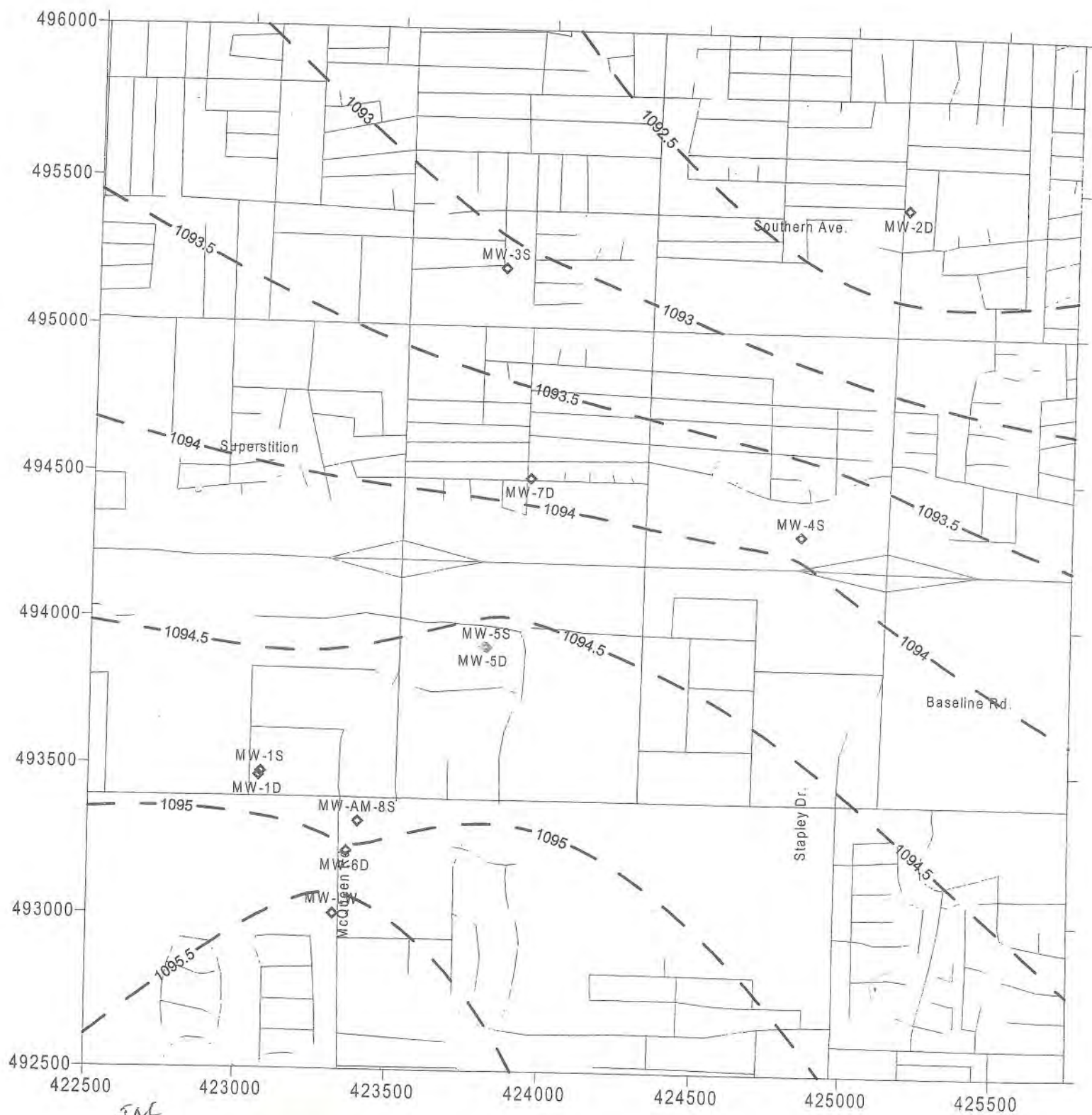
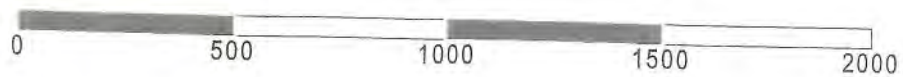


Figure 19 Groundwater Elevation, December 1, 2000



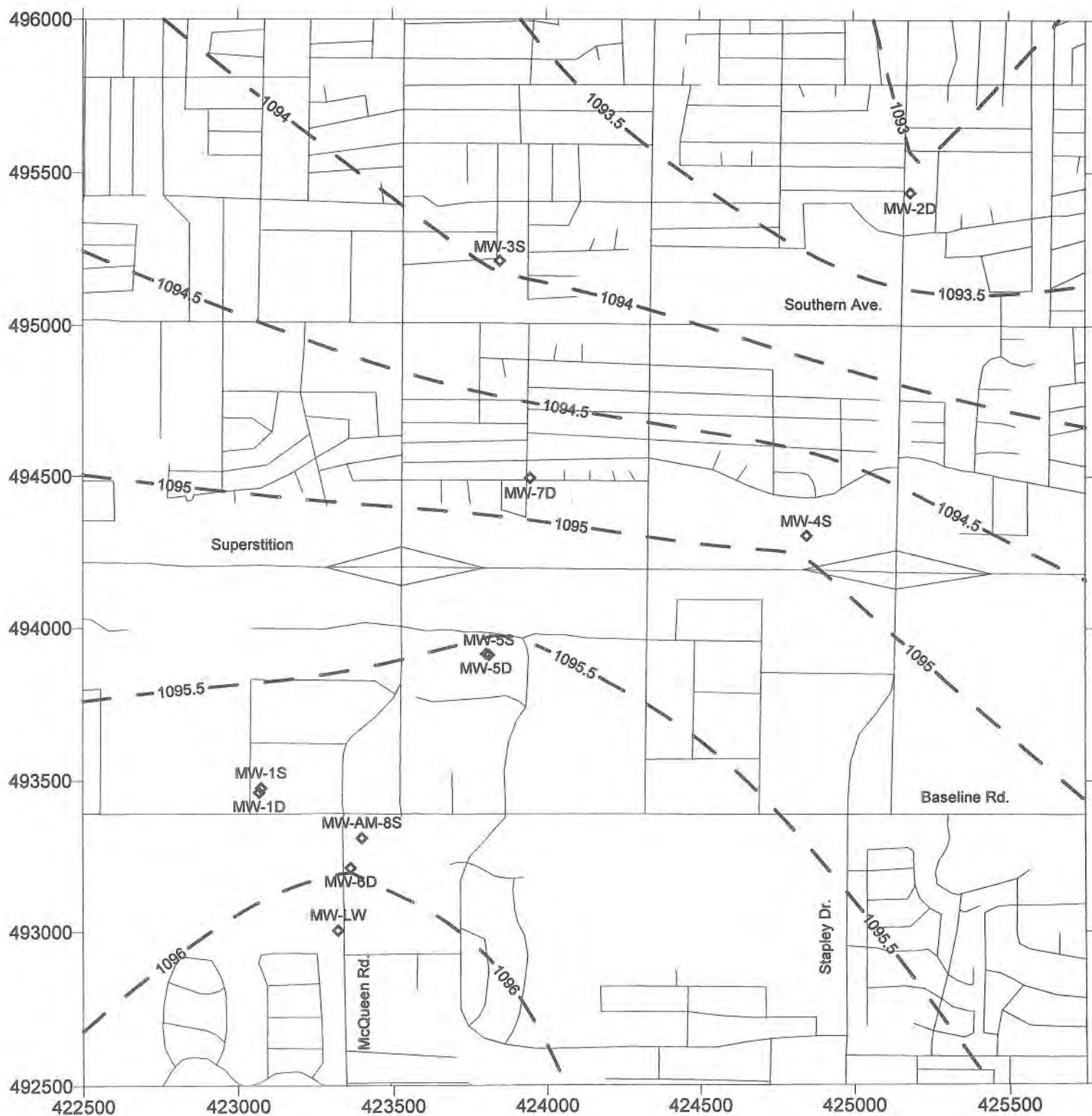


Figure 20 Groundwater Elevation, January 3, 2001



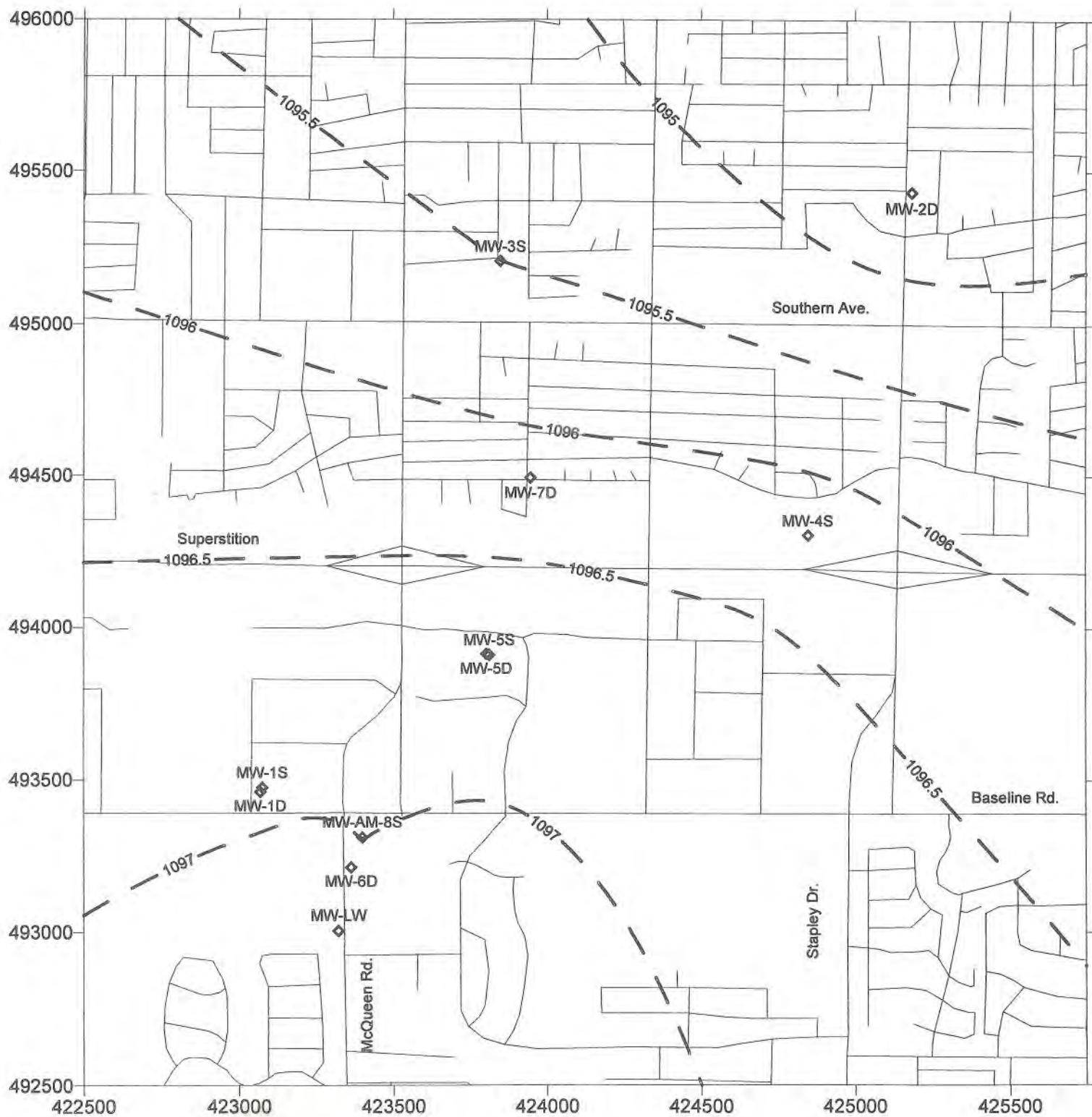


Figure 21 Groundwater Elevation, February 2, 2001



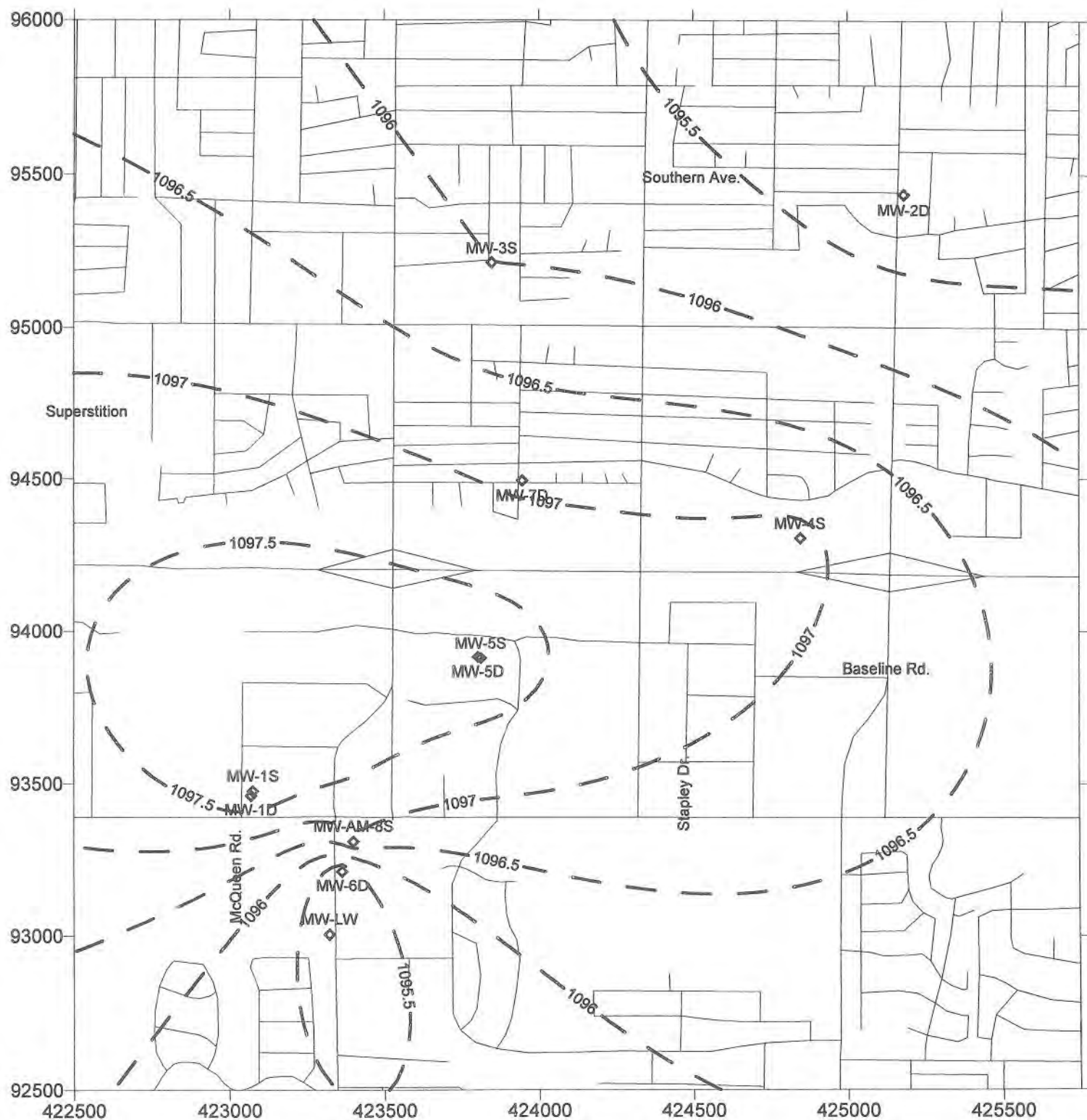


Figure 22 Groundwater Elevation, March 6, 2001



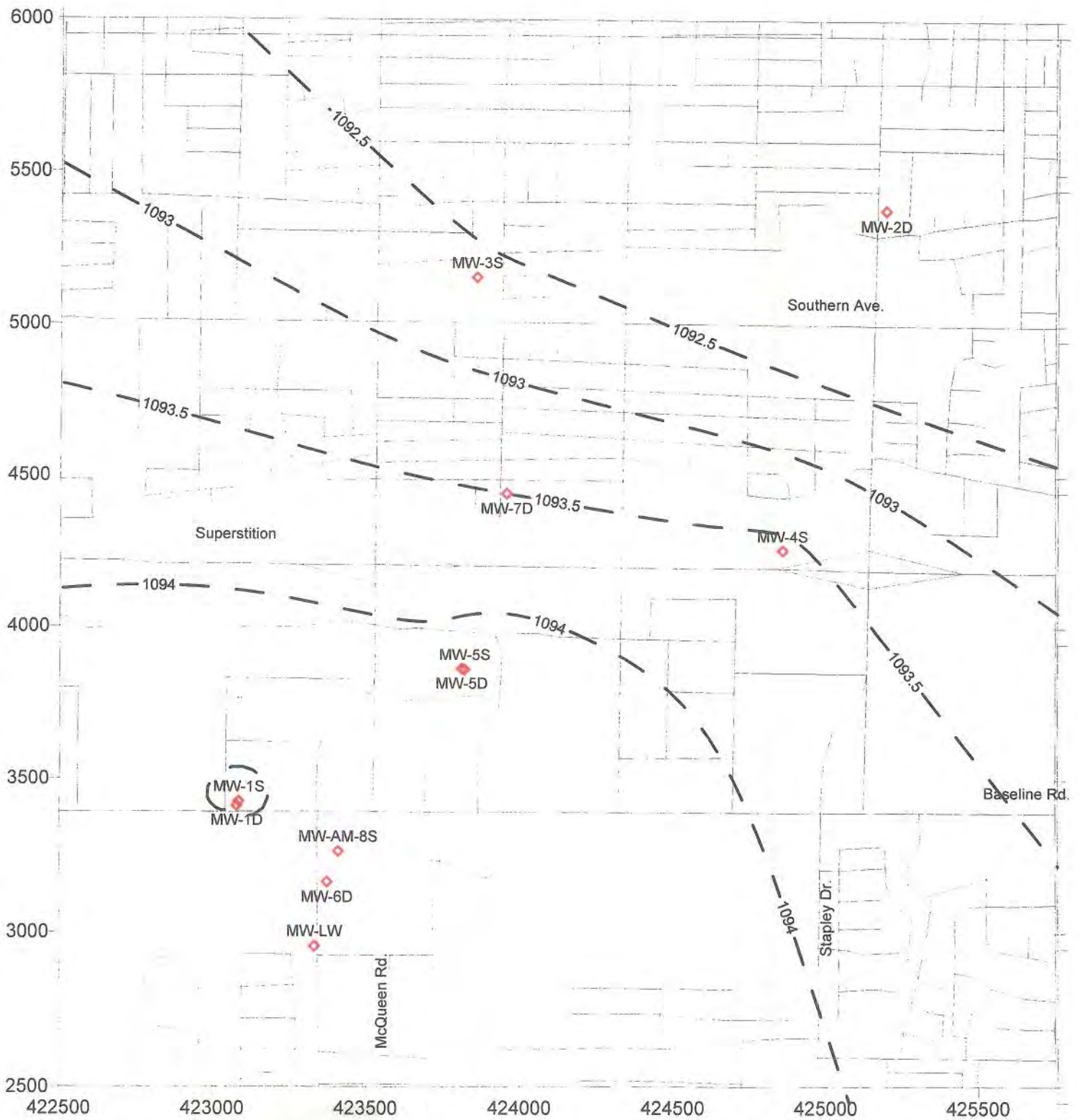
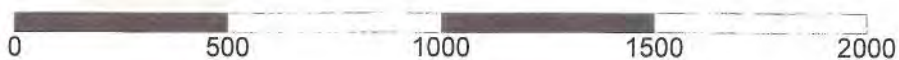


Figure 23 Groundwater Elevation, June 6, 2001



JNL
12/17/01

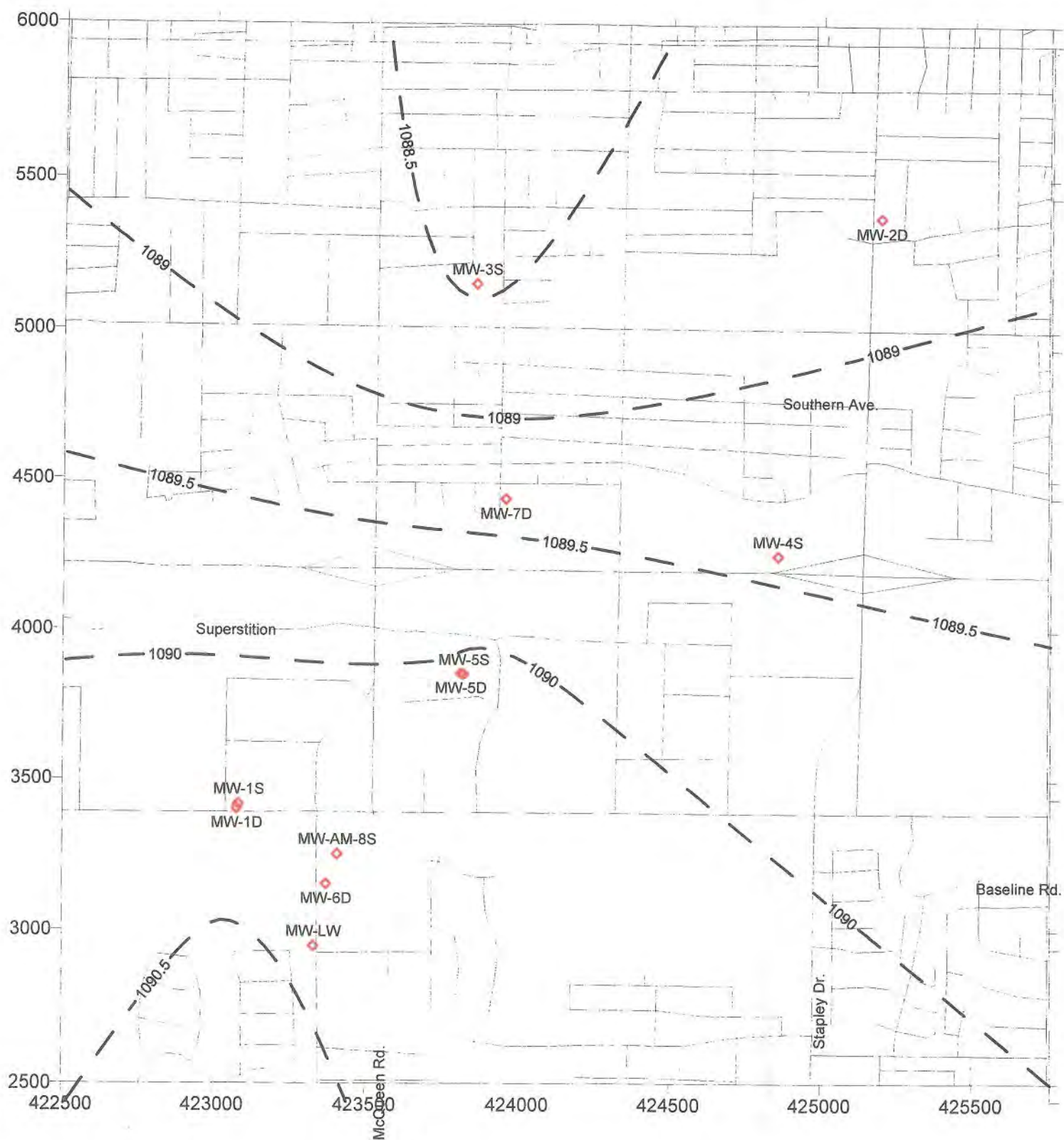
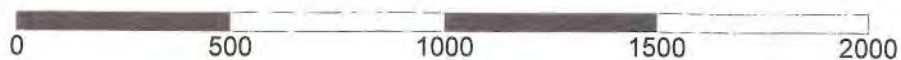


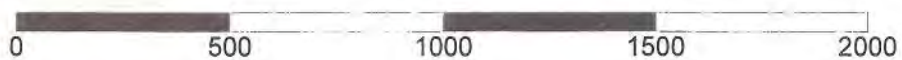
Figure 24 Groundwater Elevation, September 6, 2001



JVL 12/12/01



Figure 25 Groundwater Elevation, December 13, 2001



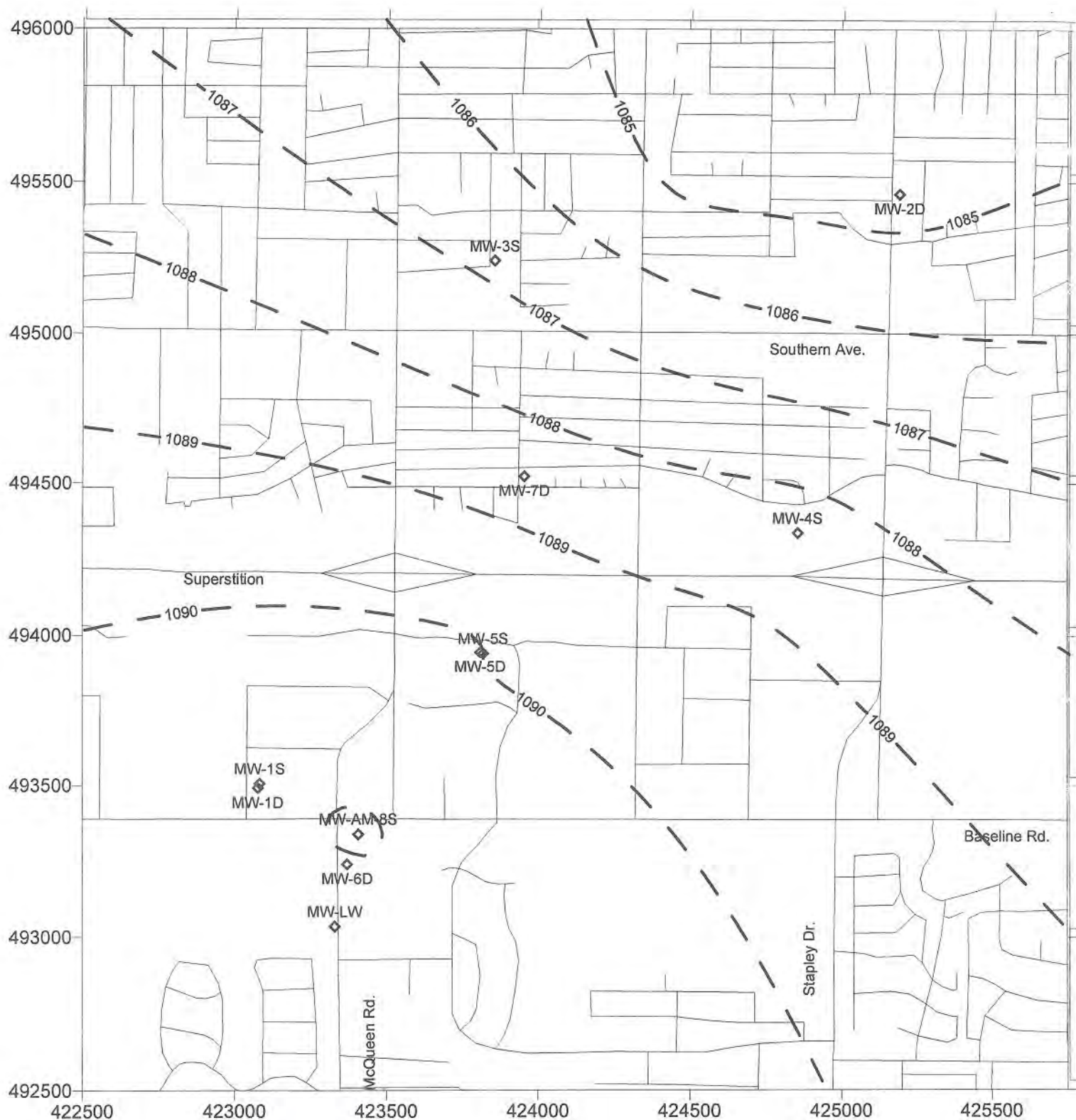
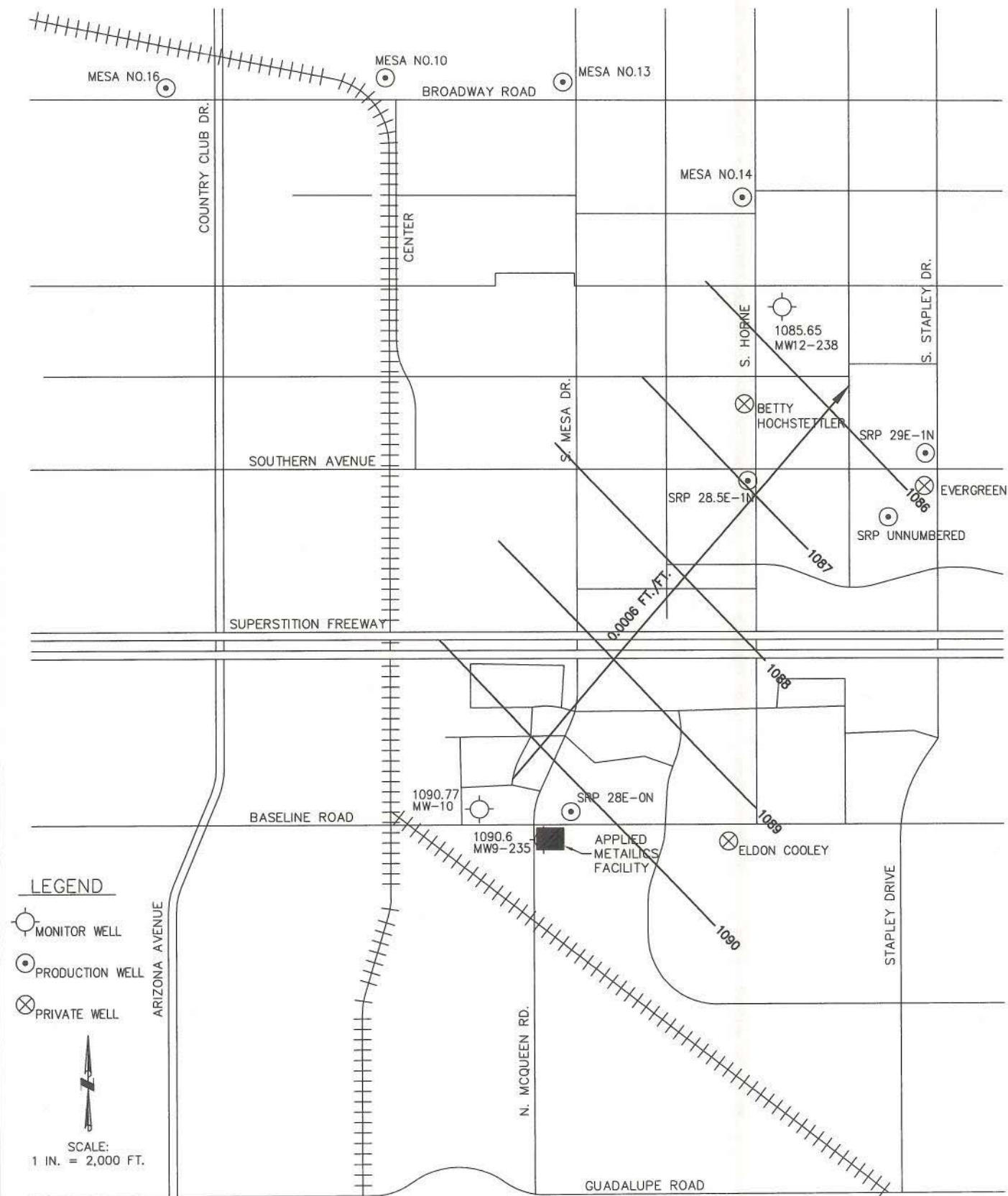


Figure 26 Groundwater Elevation, July 17, 2002



9/23/02



JULY 17, 2002 ZONE UAU4 REGIONAL
GROUNDWATER ELEVATIONS

FIGURE 27

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 70211-2-0064.2.2.6.2
 DATE: 12/18/02 E-FILE: 20064.2.2.6 FIG 27
 DRAWN BY: DAK CHECKED BY:

amec

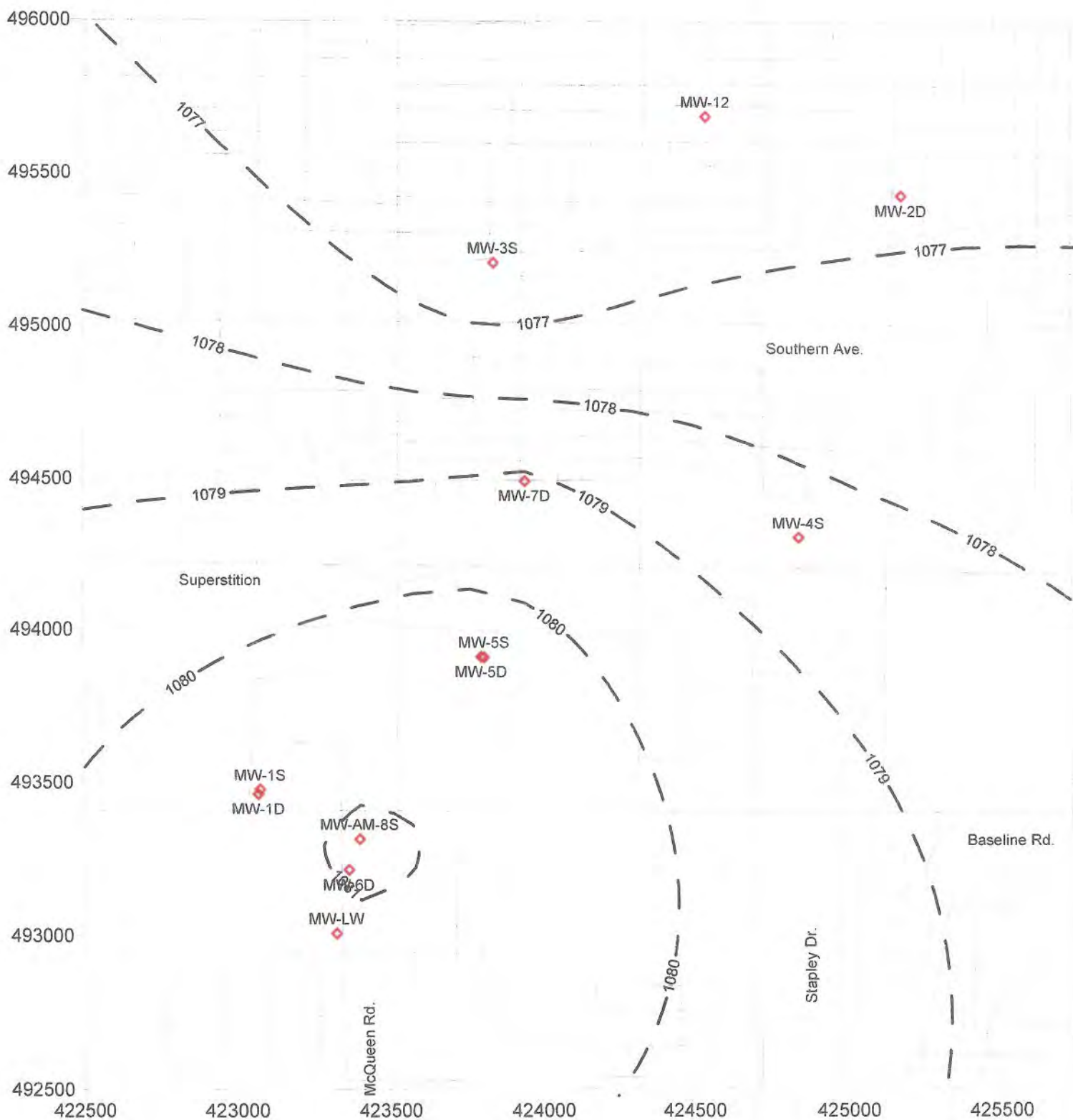


FIGURE 28 Groundwater Elevation, June 2004



0 500

1000 1500

2000

JMC 2/2/04

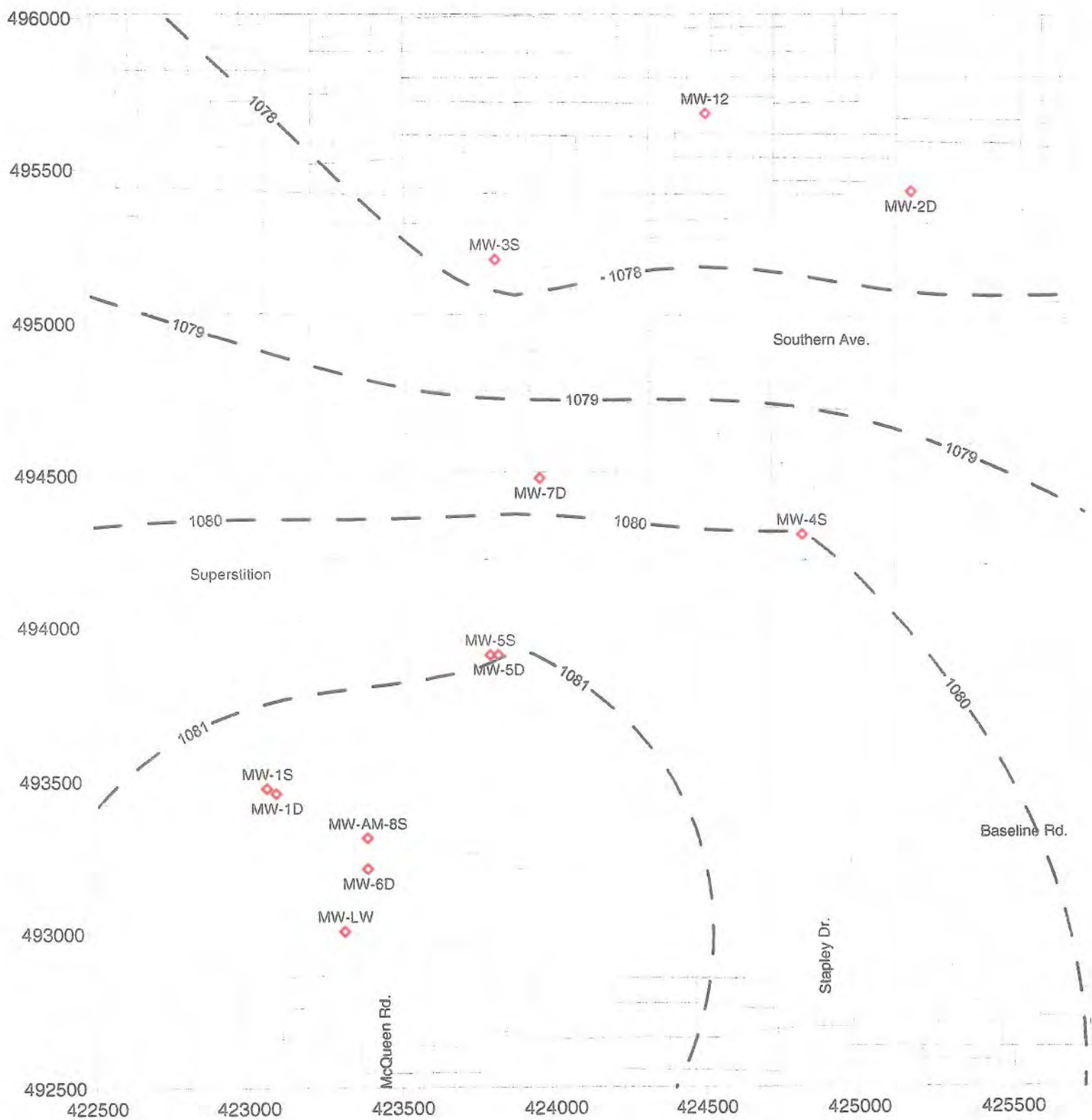
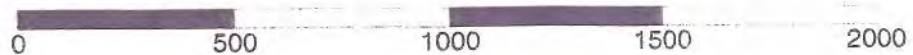
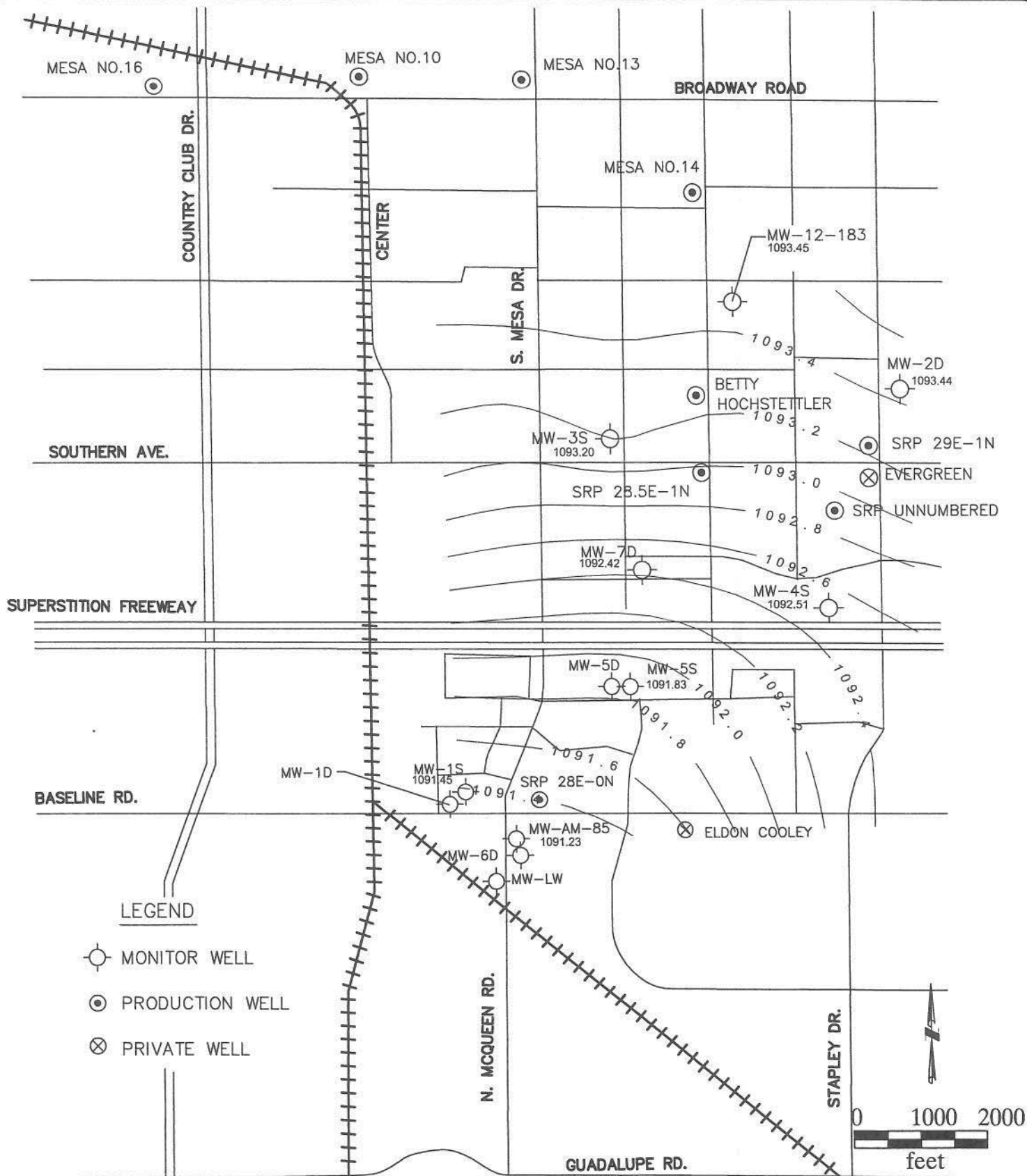


FIGURE 29 Groundwater Elevation, December 2004





JUNE 3, 2005 REGIONAL GROUNDWATER
ELEVATIONS

FIGURE 30

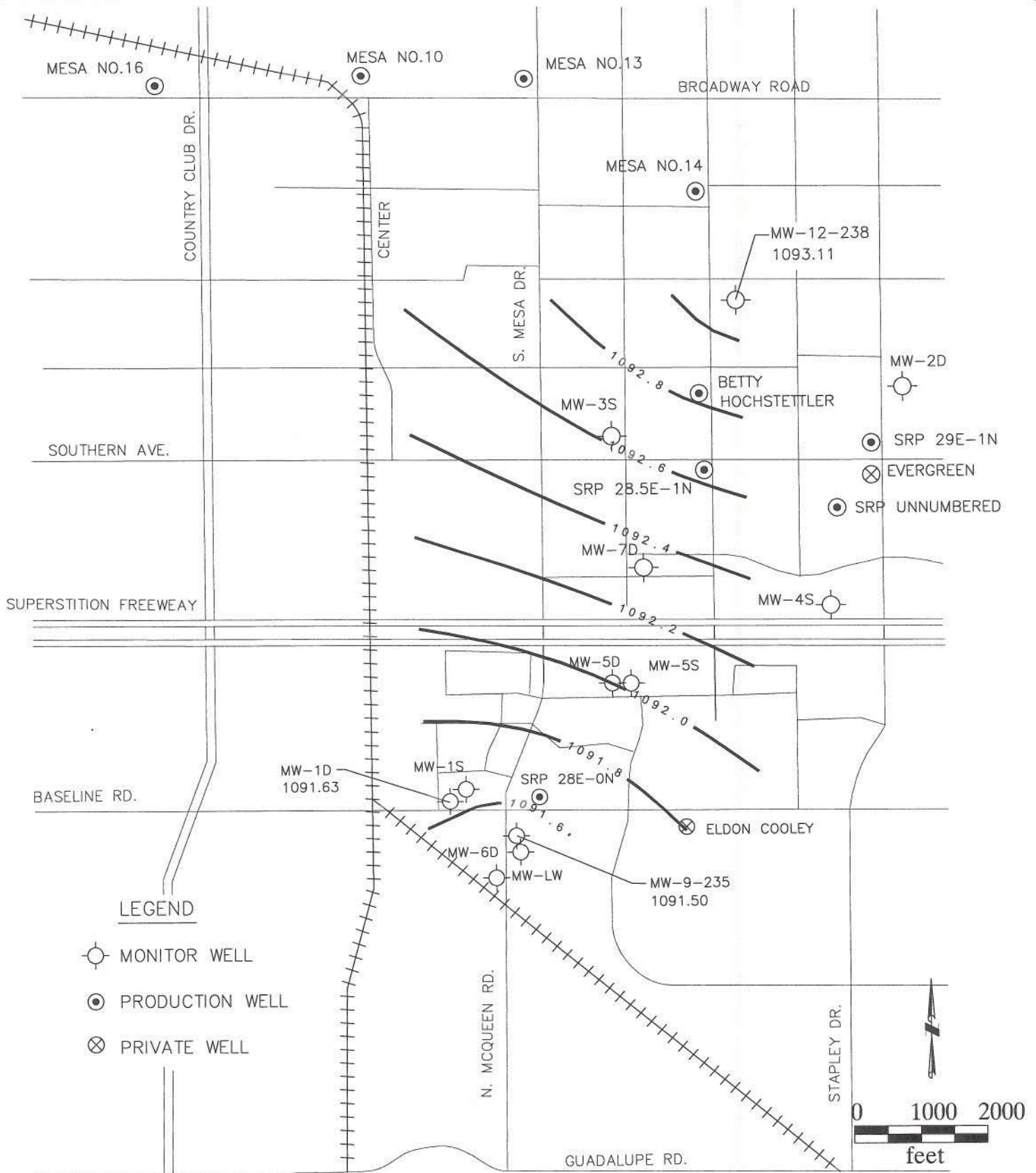
MACTEC PROJECT NAME: SOUTH MESA WQARF

MACTEC PROJECT NO: 4972-05-2034.3.8 E-FILE: 42034.3.8

DRAWN BY: Rws CHECKED BY: JNC

DATE: 07/26/05 DATE:

amec

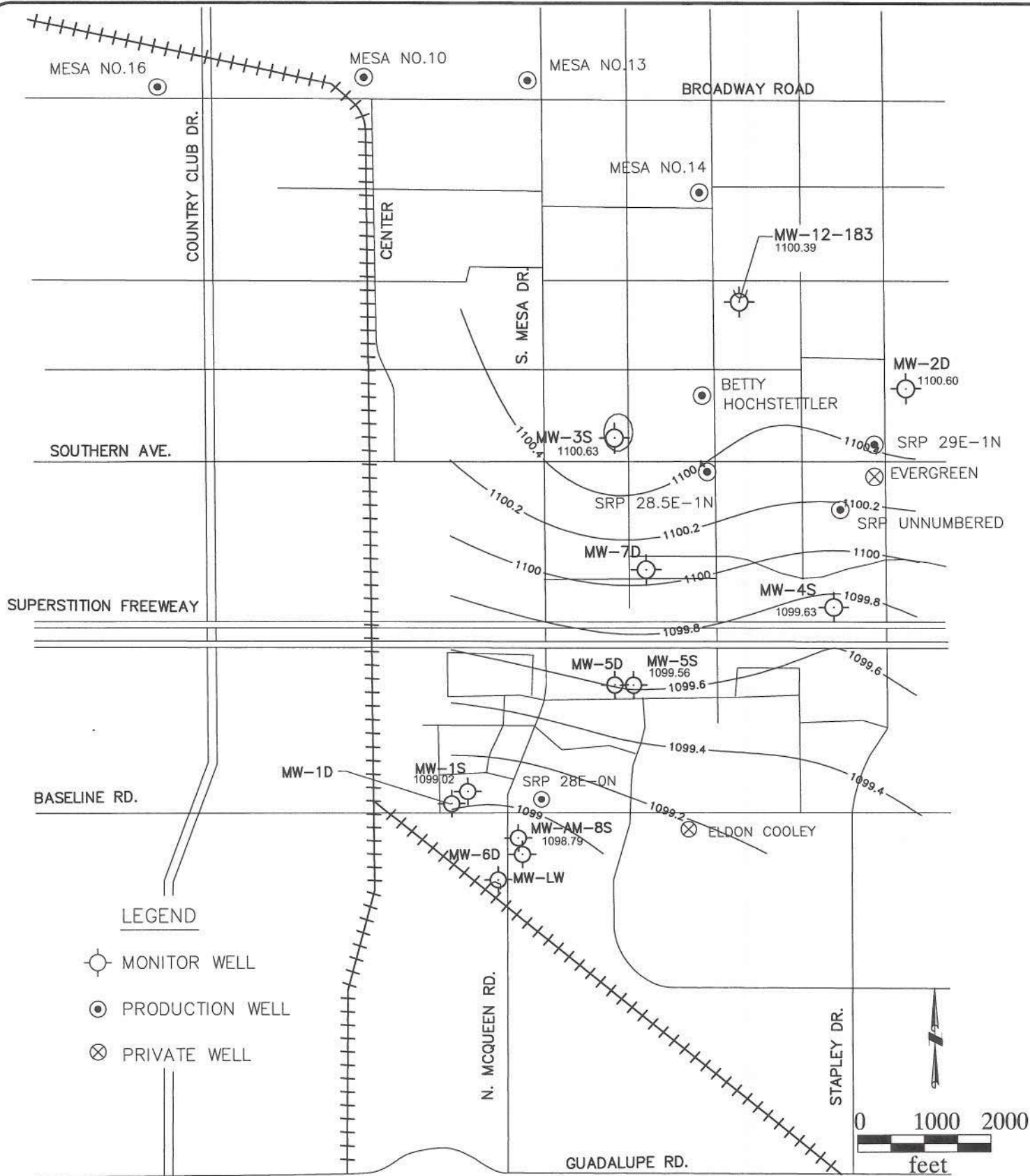


JUNE 3, 2005 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

FIGURE 31

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-06-2050.7.1 E-FILE: 62050.7.1 FIG. 31
 DRAWN BY: Rws CHECKED BY: JNC
 DATE: 07/26/05 DATE: 5/26/10

amec



DECEMBER 15, 2005 REGIONAL GROUNDWATER ELEVATIONS

FIGURE 32

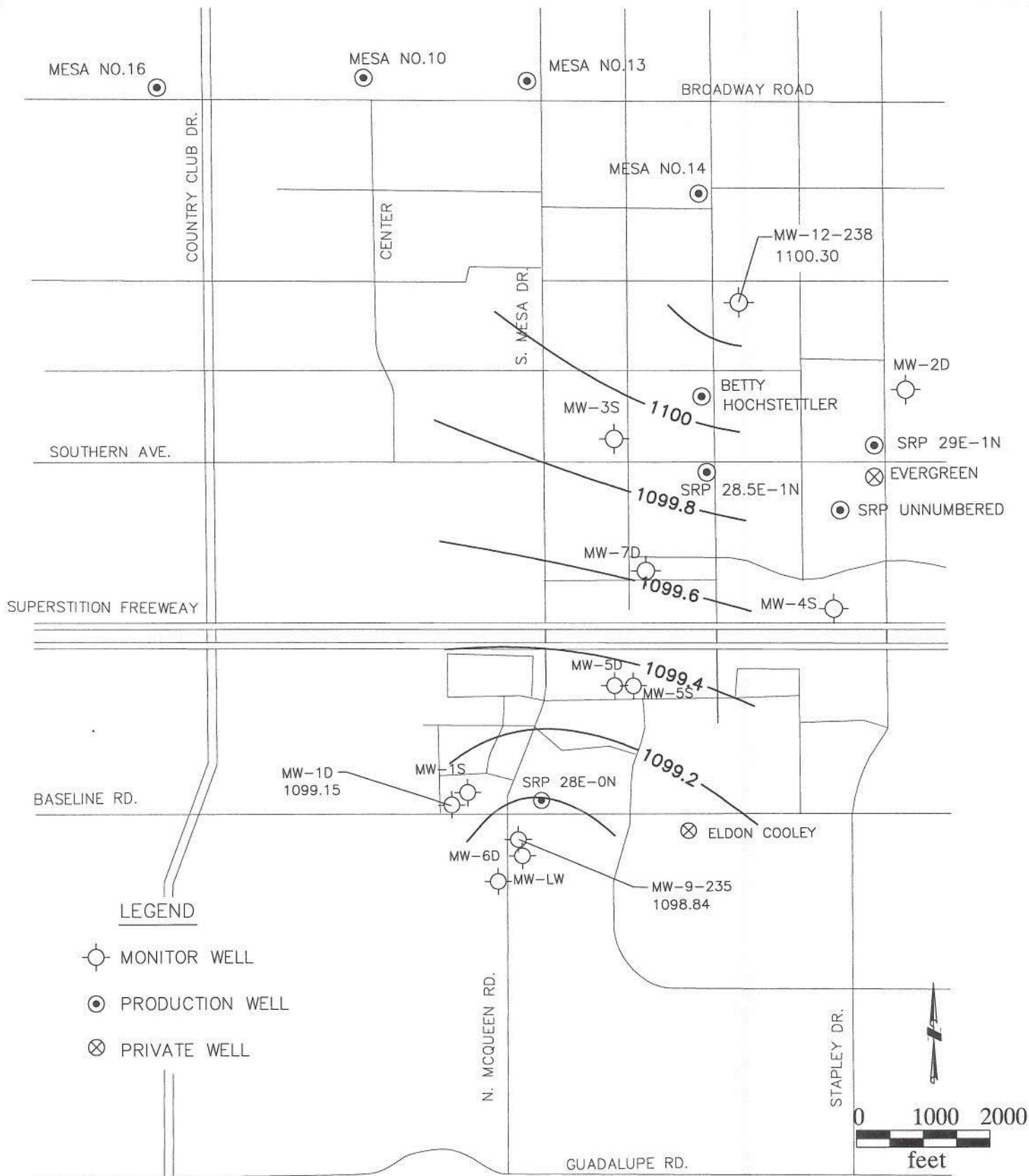
MACTEC PROJECT NAME: SOUTH MESA WQARF

MACTEC PROJECT NO: 4972-06-2050.7.1 E-FILE: 62050.7.1 FIG.32

DRAWN BY: MDF CHECKED BY: JNC

DATE: 02/22/06 DATE: 5/25/07

amec

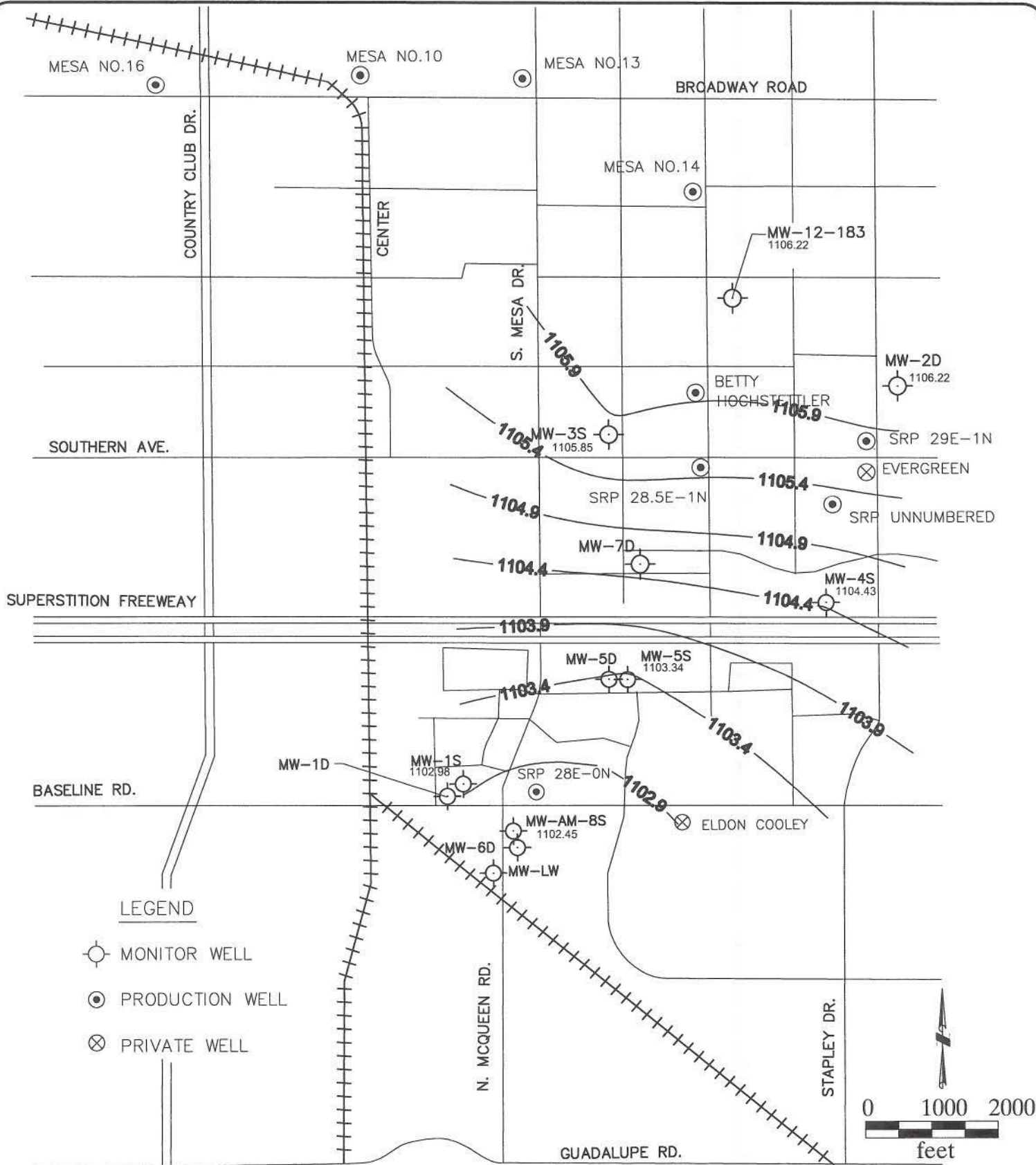


DECEMBER 15, 2005 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

FIGURE 33

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-06-2050.7.1 E-FILE: 62050.7.1 FIG. 33
 DRAWN BY: Rws CHECKED BY: JNC
 DATE: 07/26/05 DATE: 02/23/06

amec

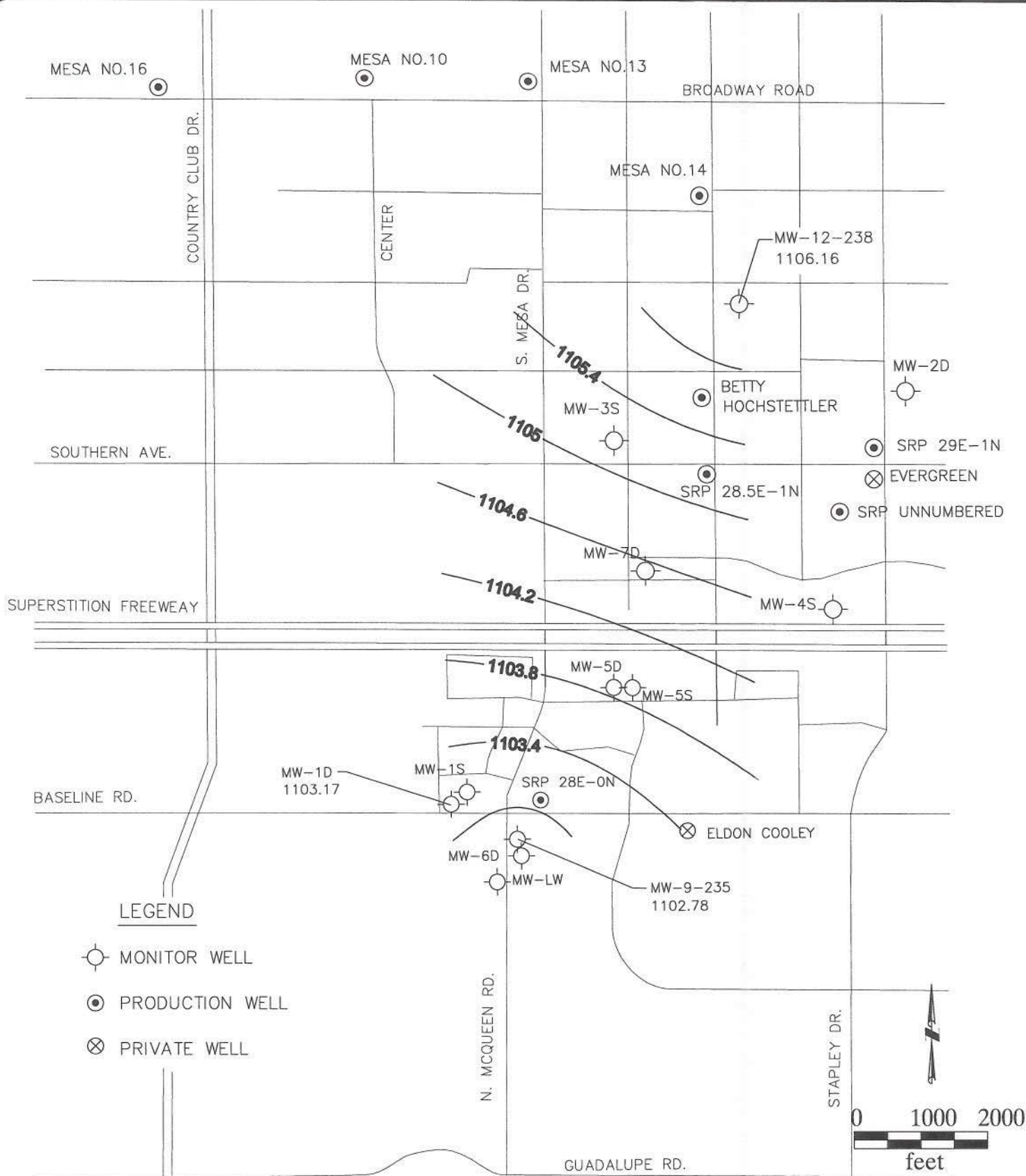


JUNE 3, 2006 REGIONAL GROUNDWATER
ELEVATIONS

FIGURE 34

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-06-2050.7.1 E-FILE: 62050.7.1 FIG. 34
 DRAWN BY: _____ CHECKED BY: fm
 DATE: 07/17/06 DATE: 6/25/07

amec

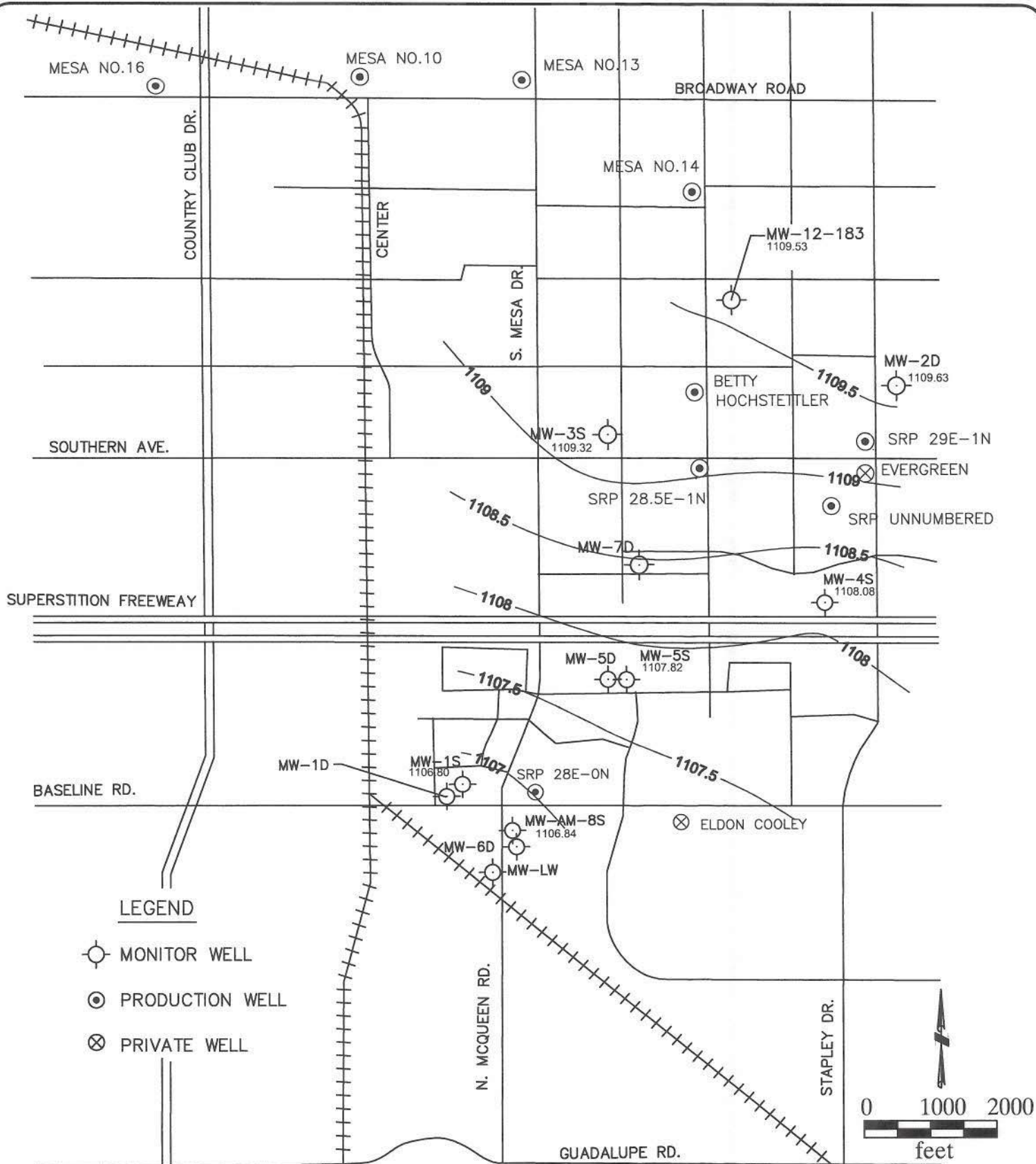


JUNE 3, 2006 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

FIGURE 35

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-06-2050.7.1 E-FILE: 62050.7.1 FIG. 35
 DRAWN BY: CJE CHECKED BY: JNC
 DATE: 07/18/06 DATE: 07/19/06

amec

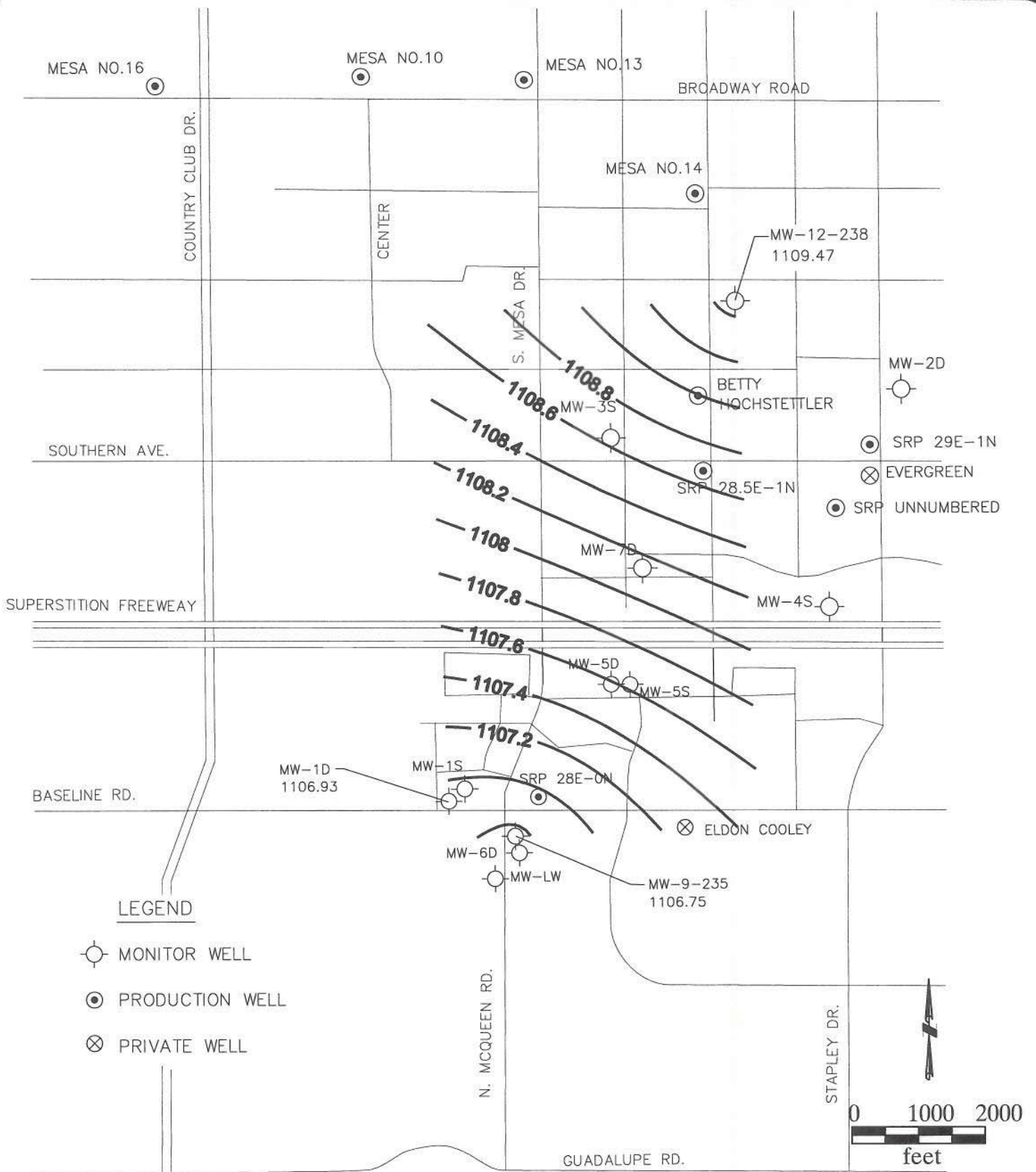


DECEMBER, 2006 REGIONAL GROUNDWATER
ELEVATIONS

FIGURE 36

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-06-2050.7.1 E-FILE: 62050.7.1 FIG 36
 DRAWN BY: CHECKED BY: JNC
 DATE: 04/03/07 DATE: 5/25/07

amec

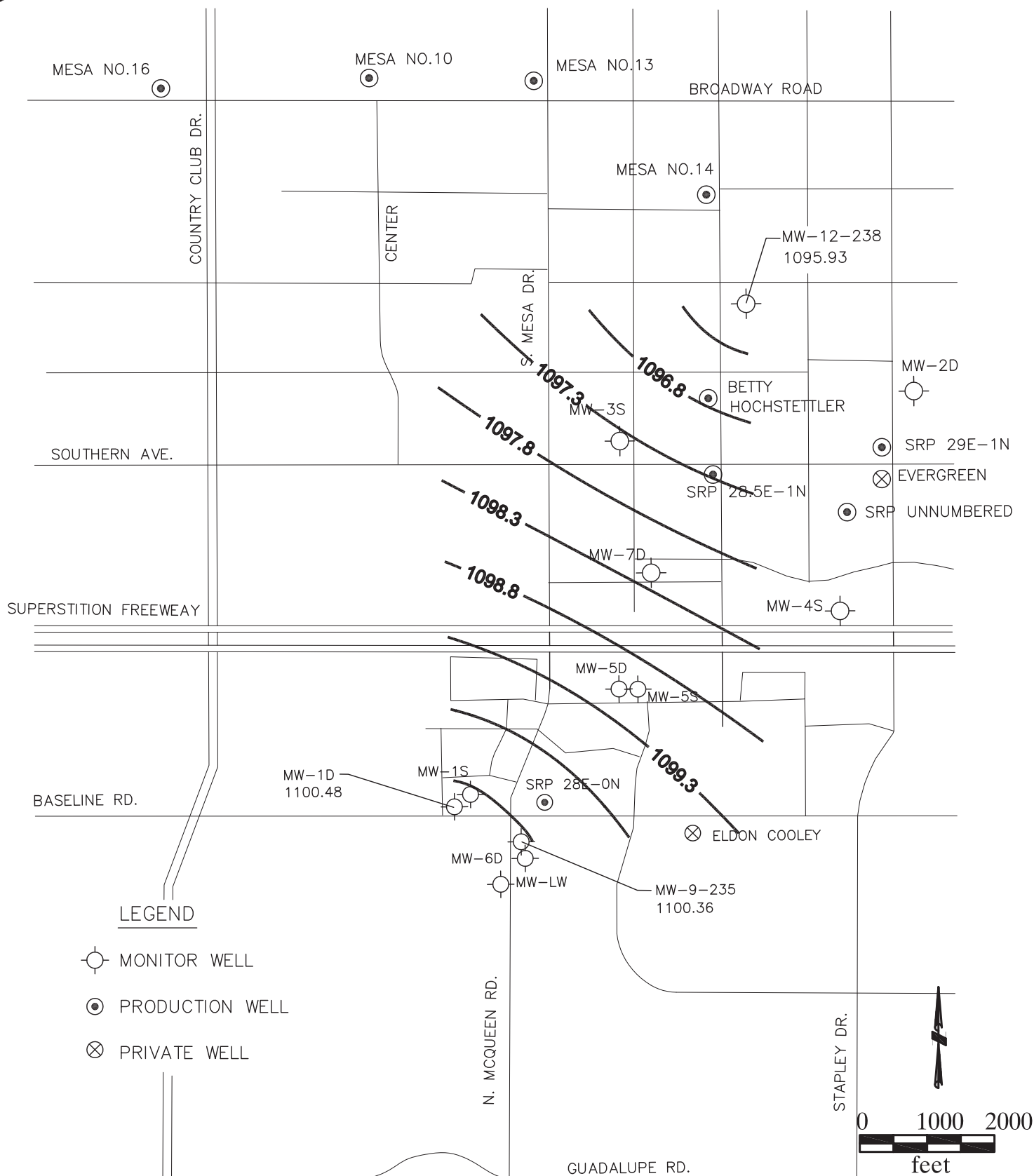


DECEMBER, 2006 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

FIGURE 37

MACTEC PROJECT NAME: SOUTH MESA WQARF
MACTEC PROJECT NO: 4972-06-2050.7.1 E-FILE: 62050.7.1 FIG. 37
DRAWN BY: CHECKED BY: JNC
DATE: 04/03/07 DATE: 04/23/07

amec

MAY 23, 2007 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

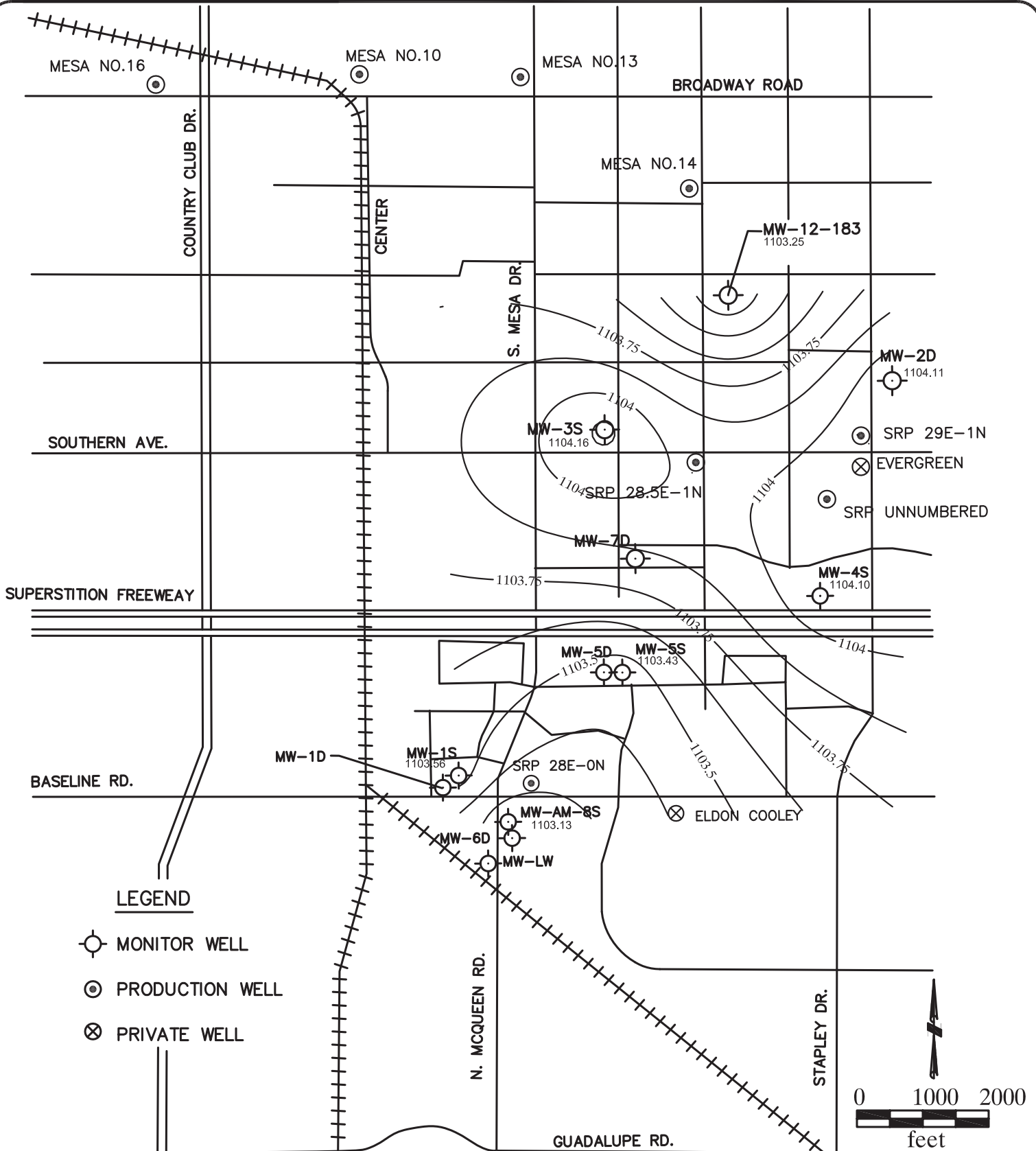
MACTEC PROJECT NAME: SOUTH MESA WQARF

MACTEC PROJECT NO: 4972-07-2050.3.12 E-FILE: 72050.3.12

DRAWN BY: _____ CHECKED BY: _____

DATE: 07/10/07 DATE: _____



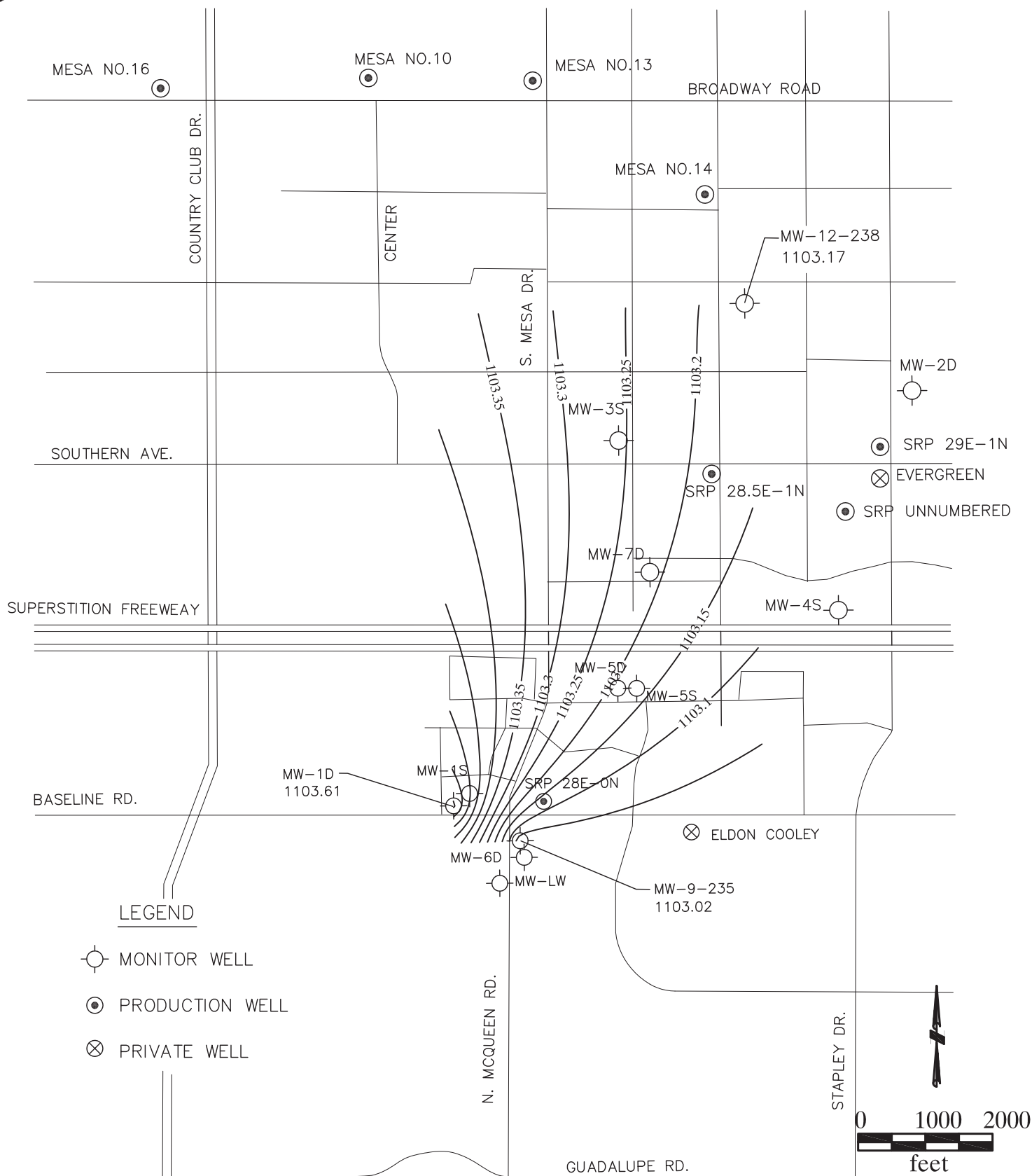


DECEMBER 2007 REGIONAL GROUNDWATER
ELEVATIONS

FIGURE 40

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-07-2050.3.13 E-FILE: 72050.3.13 FIG 40
 DRAWN BY: _____ CHECKED BY: _____
 DATE: 02/25/08 DATE: _____

amec

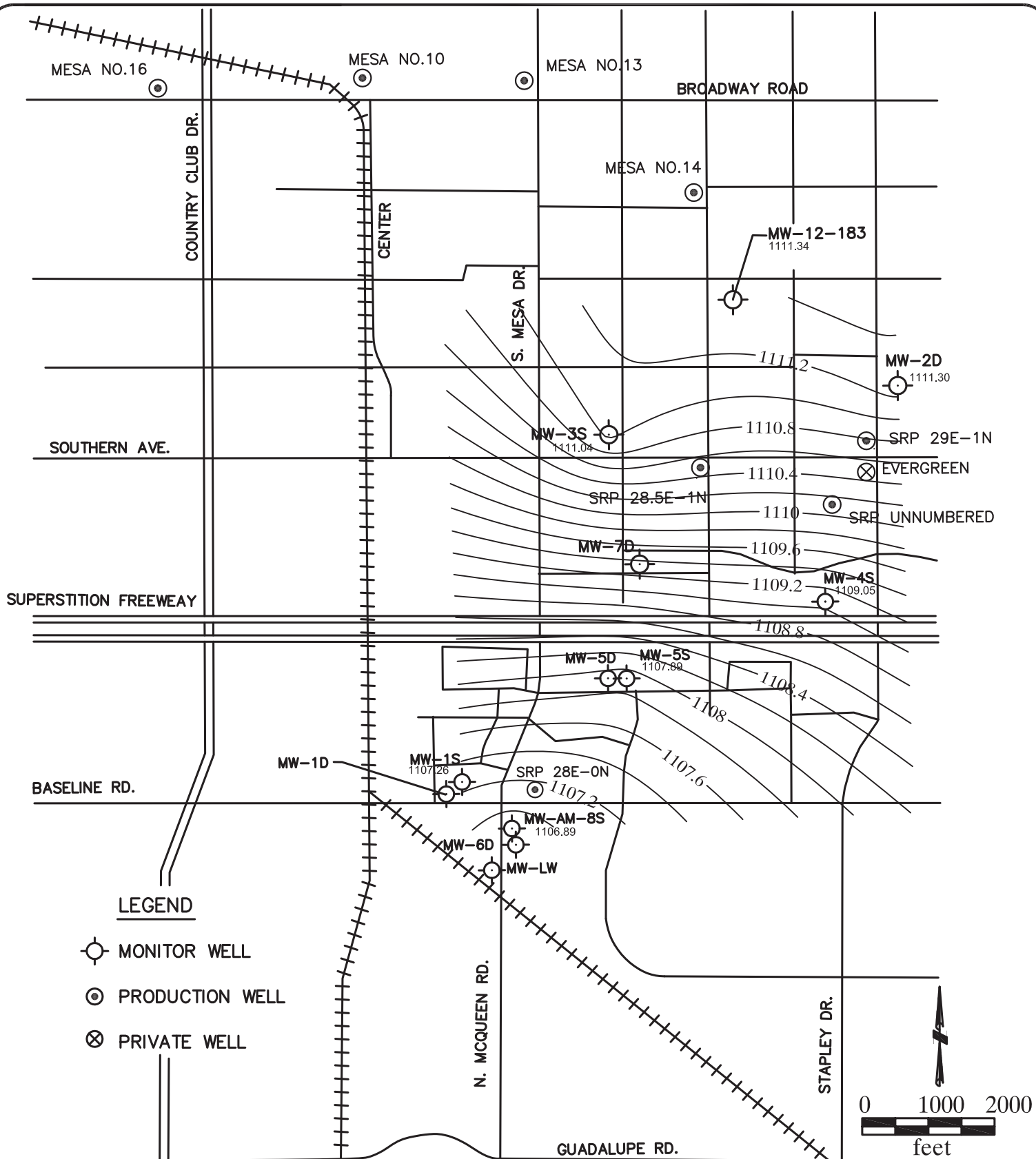
DECEMBER 2007 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

MACTEC PROJECT NAME: SOUTH MESA WQARF

MACTEC PROJECT NO: 4972-07-2050.3.13 E-FILE: 72050.3.13

DRAWN BY: _____ CHECKED BY: _____

DATE: 02/25/08 DATE: _____

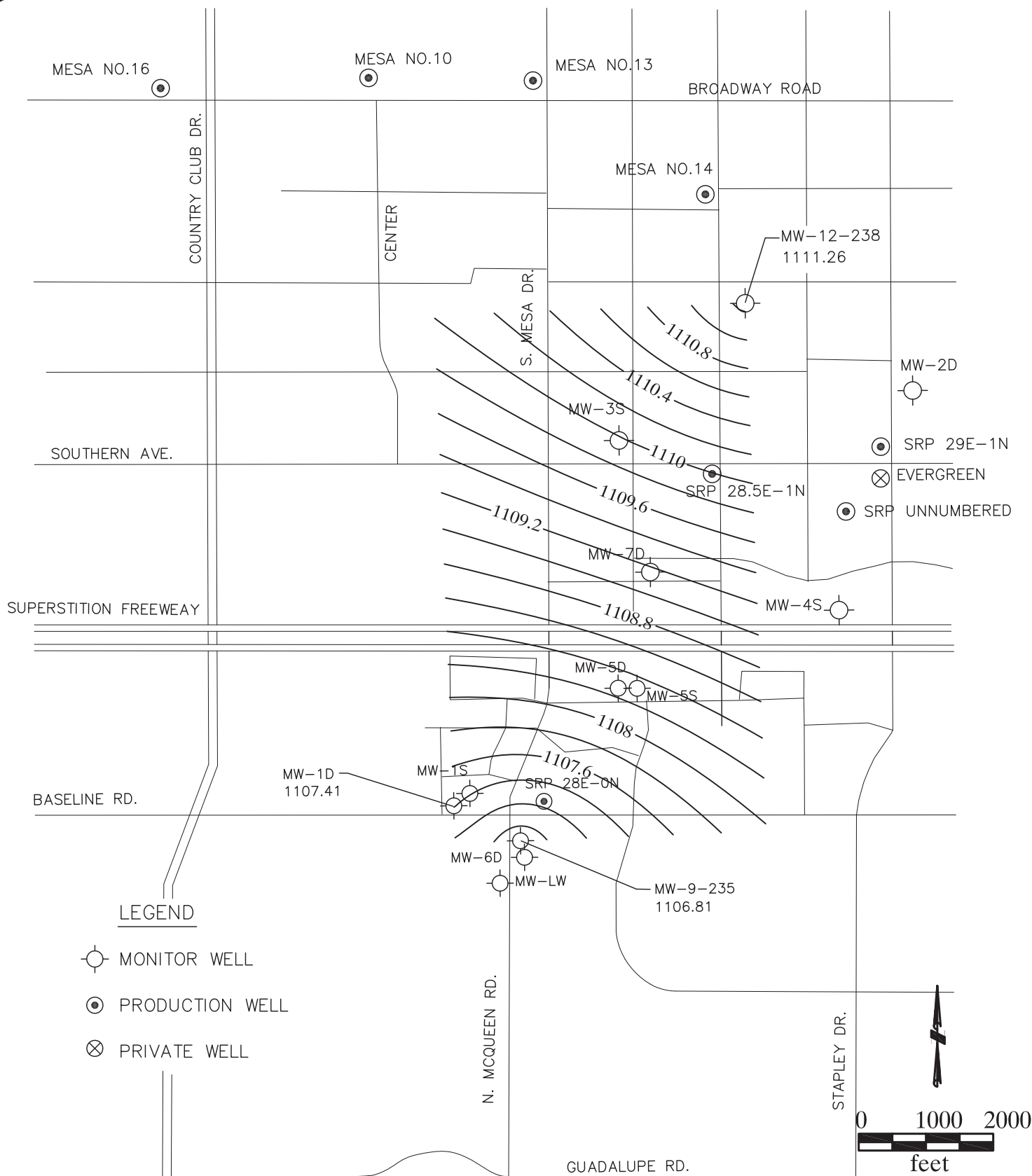


MAY 7, 2008 REGIONAL GROUNDWATER
ELEVATIONS

FIGURE 42

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-08-2050.3.18 E-FILE: 82050.3.18 FIG 42
 DRAWN BY: JMC CHECKED BY: JNC
 DATE: 07/25/08 DATE:



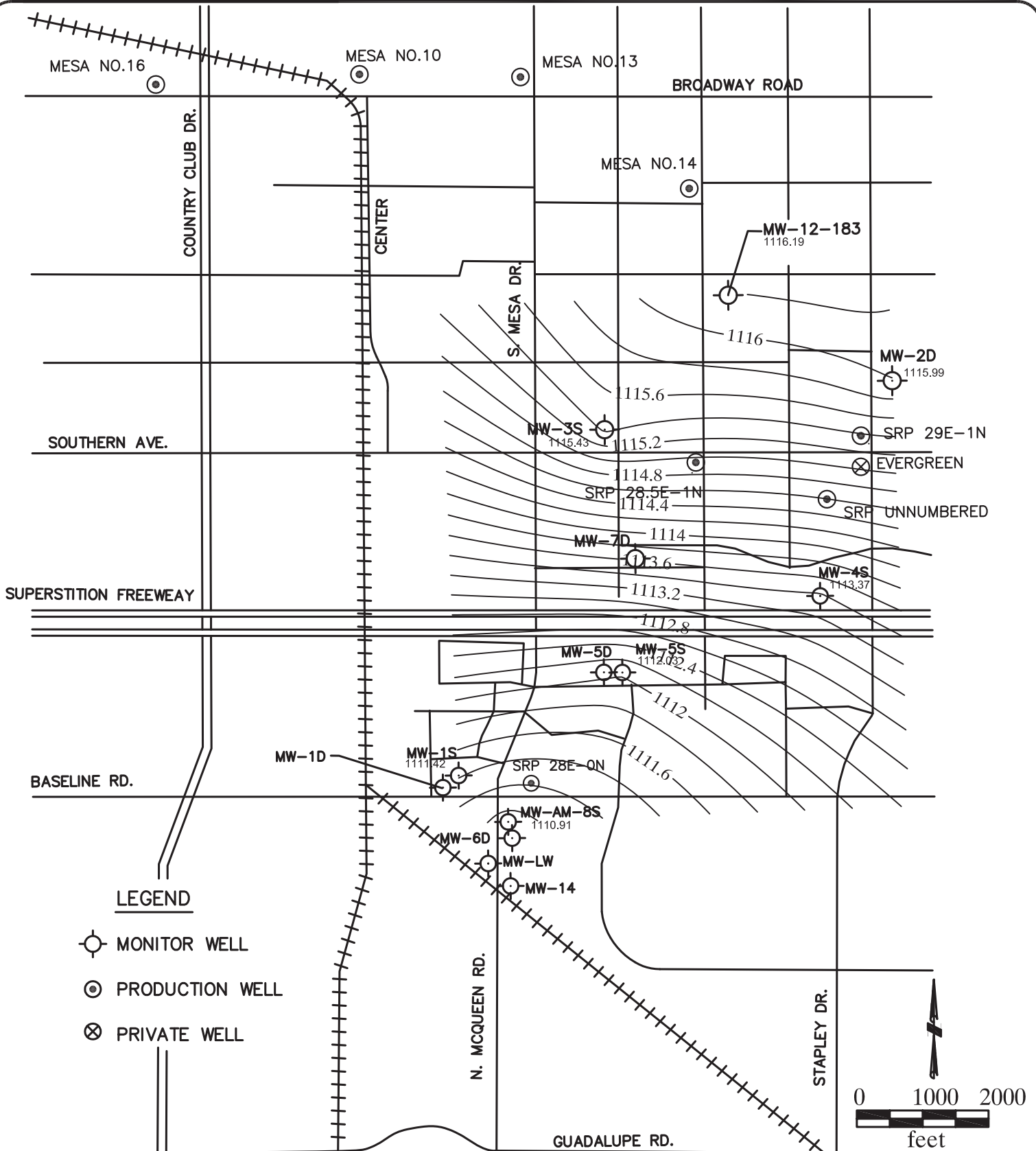


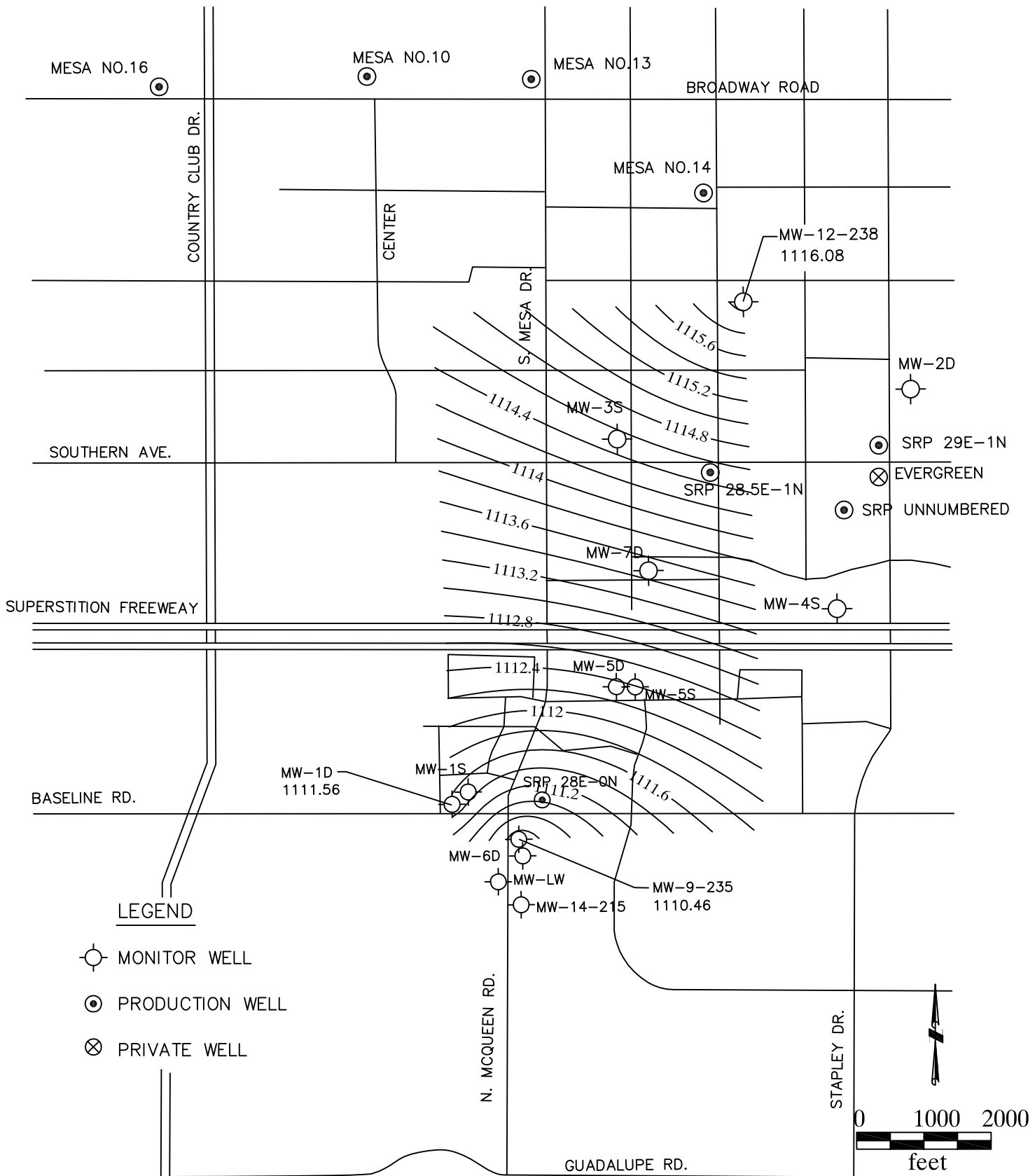
MAY 7, 2008 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

FIGURE 43

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-08-2050.3.18 E-FILE: 82050.3.18 FIG 43
 DRAWN BY: JMC CHECKED BY: JNC
 DATE: 07/25/08 DATE:







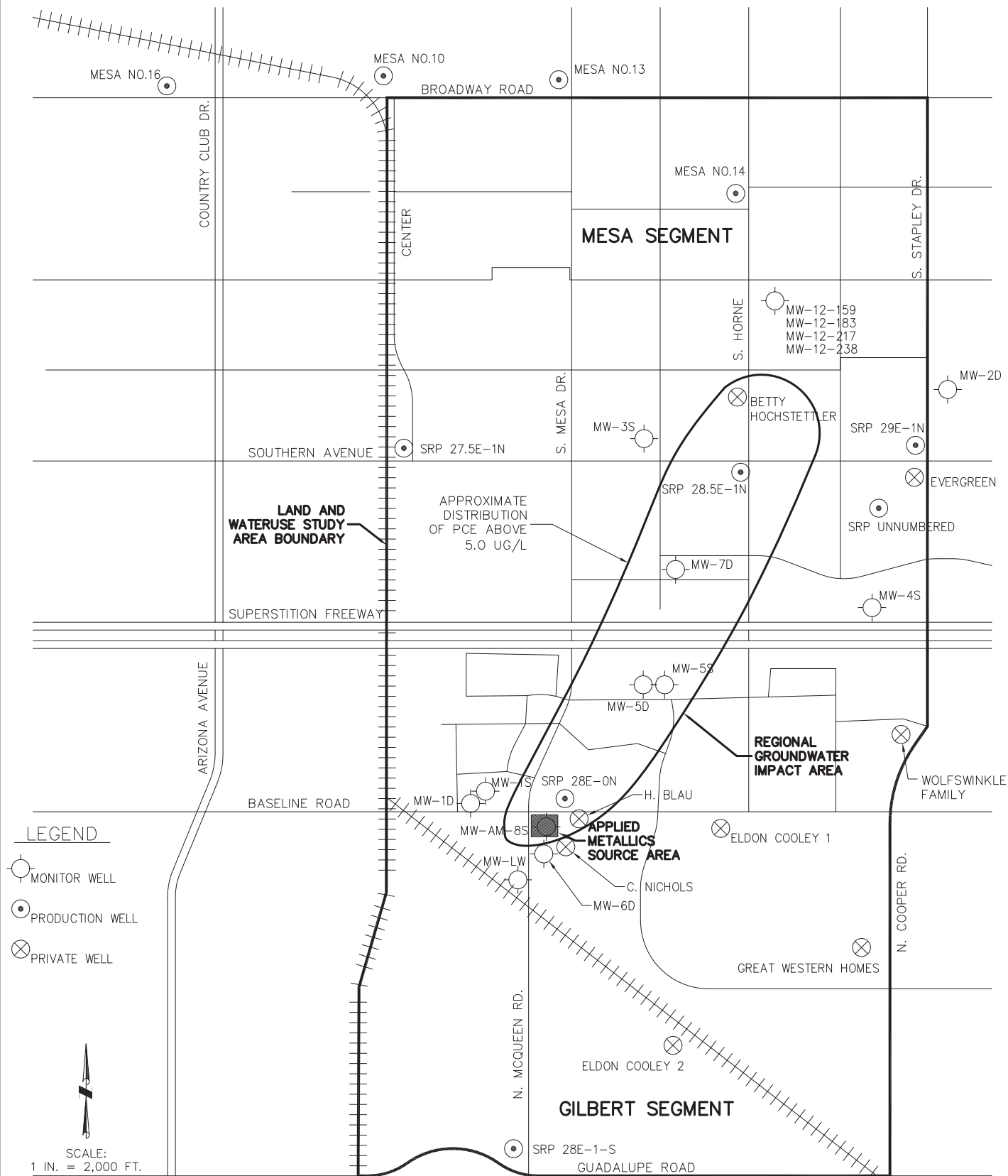
SEPTEMBER 10, 2008 REGIONAL ZONE UAU4
GROUNDWATER ELEVATION MAP

FIGURE 45

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-08-2050.3.19 E-FILE: 82050.3.19 FIG 14
 DRAWN BY: JMC CHECKED BY: JNC
 DATE: 10/06/08 DATE:

amec

P:\70211-4972\2008 Projects\4972-06-2050 - South Mesa 2009\4.0 Project Deliverables\4.1 Reports\4.1.3 RI Report\RI Report\4972062050-Electronic CD Files\Fig. 46.dwg

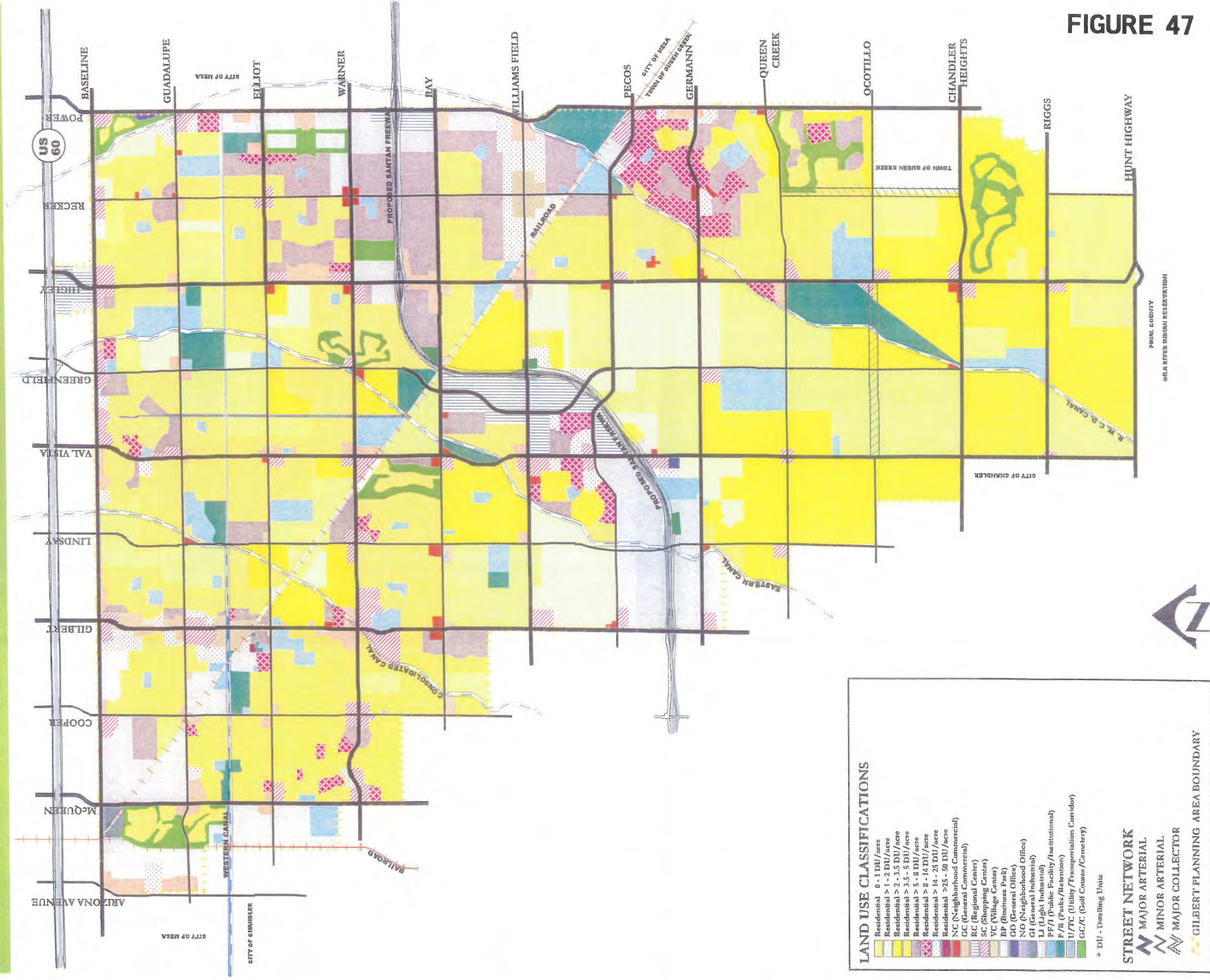


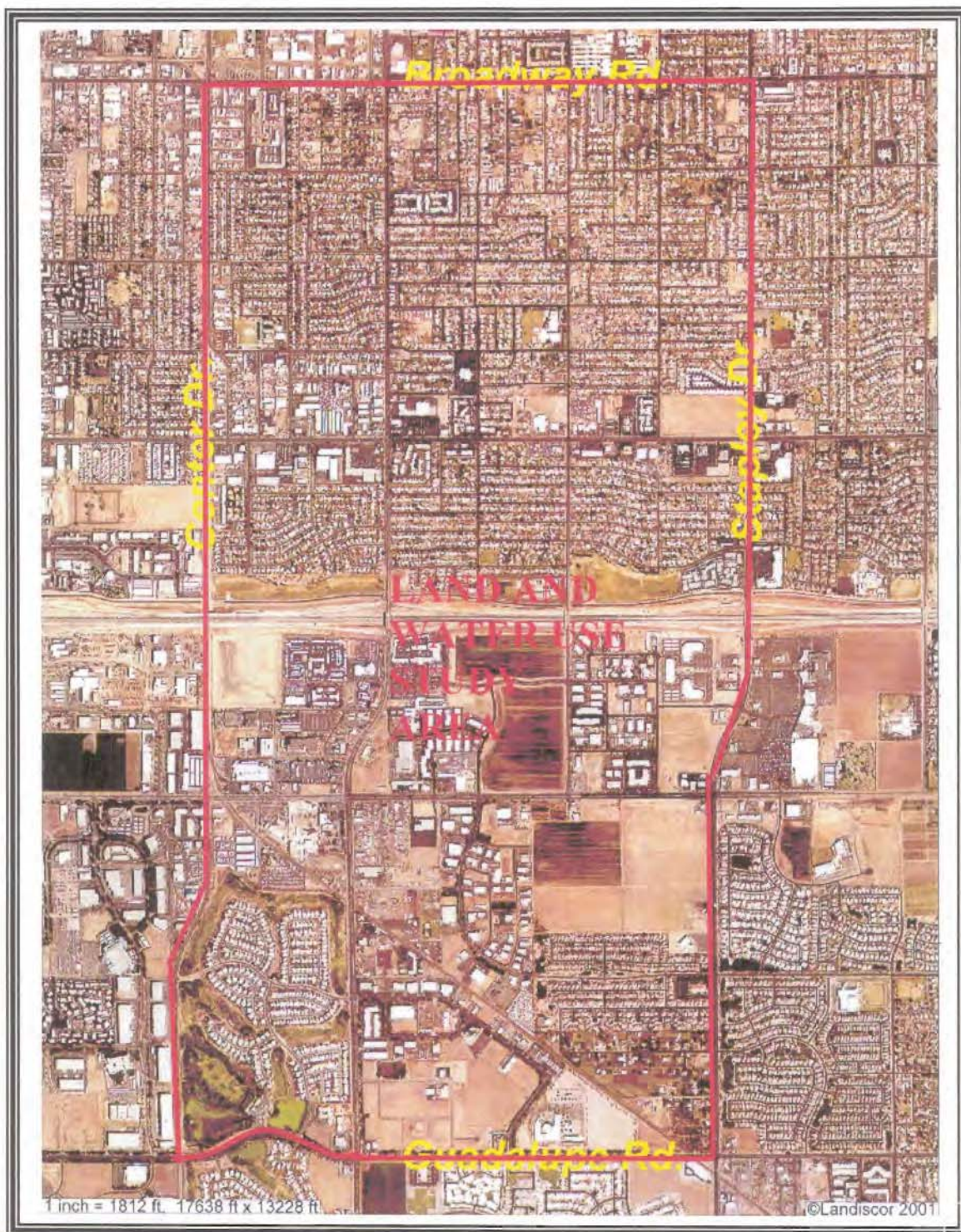
LAND AND WATER USE STUDY AREA

FIGURE 46

MACTEC PROJECT NAME: SOUTH MESA WQARF
 MACTEC PROJECT NO: 4972-06-2050.7.1
 DATE: 05/14/07 E-FILE: 62050.7.1 FIG 46
 DRAWN BY: CHECKED BY:







Site Boundaries Are Approximate

N
N.T.S.

Source: Landiscor Aerial Information, Negative #, Dated 2001

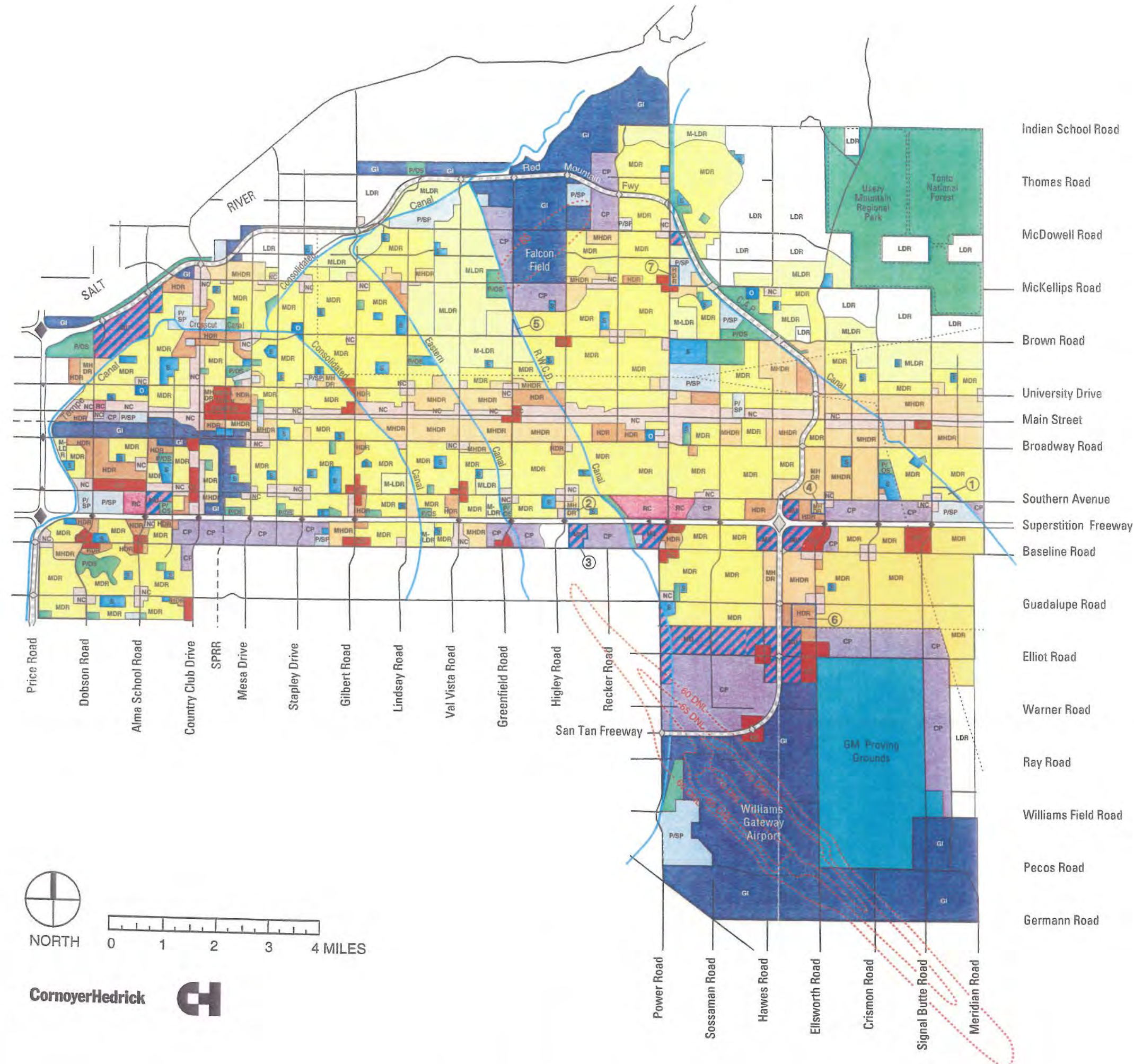
AERIAL PHOTOGRAPH

FIGURE 48

PROJECT NAME: South Mesa WQARF
 PROJECT LOCATION: Mesa, AZ
 PROJECT NO.: 4972082050.7.1
 CHECKED BY: _____ DATE: _____
 REVIEWED BY: _____ DATE: _____

amec

FIGURE 49



Land Use Categories

- | | |
|--|----------------------|
| LOW DENSITY RESIDENTIAL (0 - 1 DU/ac) | GENERAL INDUSTRIAL |
| MEDIUM-LOW DENSITY RESIDENTIAL (1 - 2 DU/ac) | PUBLIC/SEMI PUBLIC |
| MEDIUM DENSITY RESIDENTIAL (2 - 5 DU/ac) | PARK/OPEN SPACE |
| MEDIUM-HIGH DENSITY RESIDENTIAL (5 - 15 DU/ac) | SCHOOLS |
| HIGH DENSITY RESIDENTIAL (15+ DU/ac) | PROVING GROUNDS |
| REGIONAL COMMERCIAL | NOISE CONTOUR |
| COMMUNITY COMMERCIAL | TRANSMISSION LINE |
| NEIGHBORHOOD COMMERCIAL | EXISTING FREEWAY |
| OFFICE | PROPOSED FREEWAY |
| MIXED USE | EXISTING INTERCHANGE |
| COMMERCE PARK | PROPOSED INTERCHANGE |

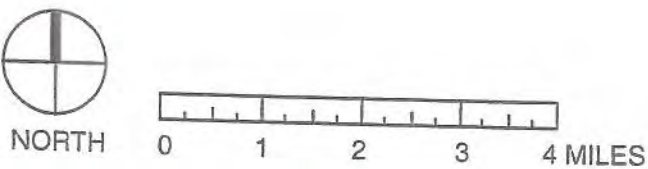
GP Land Use Map Amendments

- | | | |
|------------------|-----------------------------|-----------------|
| ① GP 97-1 | NEC Signal Butte & Southern | CC to MDR & NC |
| ② GP 98-1 | NEC Higley & US 60 | CP to MHDR |
| ③ GP 98-2 | SEC Higley & US 60 | CP to MU |
| ④ GP 99-2 | SWC Ellsworth & Southern | CC to MHDR & NC |
| Pending (2-1-00) | | |
| ⑤ GP 99-1 | NEC Greenfield & Brown | NC to MHDR |
| ⑥ GP 00-1 | SWC Guadalupe & Ellsworth | MDR to MHDR |
| ⑦ GP 00-2 | NEC McKellips & Power | HDR to CC |



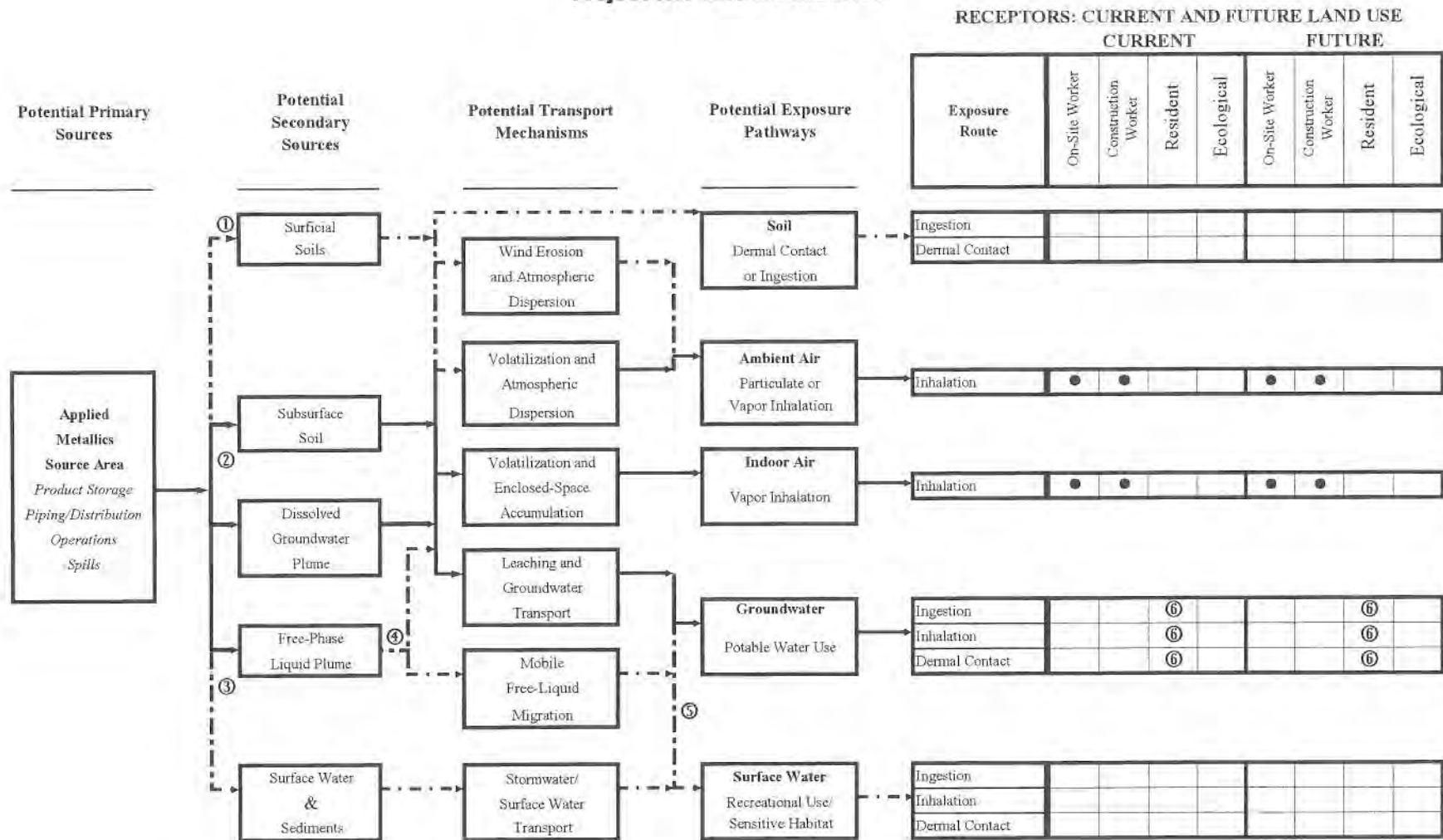
MESA GENERAL PLAN
LAND USE PLAN

Updated February, 2000



CornoyerHedrick

**Figure 50. Conceptual Site Model
South Mesa WQARF Registry Site
Mesa, Arizona
Project No. 4972-06-2050.7.1**



(Incomplete/broken pathways or insignificant exposure/risk are indicated by dashed arrows.)

- ① = no hits in surface soil, 0-15 feet bgs
- ② = VOCs not detected by site characterization down to 60 feet bgs but are in building
- ③ = no surface water on the site; no surface hits for stormwater soil sediment run-off
- ④ = NAPL or DNAPL residuals may be in soil pore space, but have never been encountered in investigation; low likelihood of finding DNAPL, if it exists, makes search impractical

- ⑤ = unlikely that artesian groundwater at 115 feet bgs would be brought to the surface to discharge into surface washes near the property.
- ⑥ = Groundwater PCE plume not currently used; open question about startup of Salt River Project Wells 28E-0N and 28.5E-1N; unlikely but unknown whether Betty Hochstetler and Elden Cooley wells are used; open question on impact to Mesa 14 for lack of a sampling port on the well head.