ADDENDUM TO THE SITE-WIDE QUALITY ASSURANCE PROJECT PLAN

DOMESTIC WELL MONITORING PLAN – REVISION 3

YERINGTON MINE SITE

July 1, 2010

PREPARED FOR:

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4 CENTERPOINTE DRIVE

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LIST OF ACRONYMS AND ABREVIATIONS

APN	Assessor's Parcel Number
AO	Administrative Order
ARC	Atlantic Richfield Company
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
COC	Chain-of-Custody
DI	Deionized (water)
DQO	Data Quality Objective
DWMP	Domestic Well Monitoring Plan
EPA	U.S. Environmental Protection Agency
ESI	Environmental Standards, Inc.
FB	Field Blanks
FD	Field Duplicate
FS	Feasibility Study
FSP	Field Sampling Plan
GPS	Global Positioning System
GMP	Groundwater Monitoring Plan
HASP	Health and Safety Plan
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicates
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAD	North America Datum
NDEP	Nevada Division of Environmental Protection
NDWR	Nevada Division of Water Resources
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QC	Quality Control
RI	Remedial Investigation
RL	Reporting Limit
RPM	Remedial Project Manager
SOP	Standard Operating Procedure
TA-I	TestAmerica Irvine, California
TA-R	TestAmerica Richland, Washington
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
WRA	Work Risk Assessment
YTP	Yerington Paiute Tribe

%	percent
%R	percent recovery
°C	degrees Centigrade
amsl	above mean sea level
bgs	below ground surface
gpm	gallons per minute
L	liter
mg	milligram
ml	milliliters
pCi	picoCurie
µg	microgram
µm	micron
yr	year

SECTION 1.0
INTRODUCTION

This *Domestic Well Monitoring Plan – Revision 3* (DWMP) has been prepared as an addendum to the *Site-Wide Quality Assurance Project Plan* (QAPP - Revision 5; Environmental Standards, Inc. [ESI] and Brown and Caldwell, 2009) at the request of the U.S. Environmental Protection Agency - Region 9 (EPA).

In a letter to Atlantic Richfield Company (ARC) dated November 9, 2009 (EPA, 2009), EPA requested that a DWMP be prepared and specified the following deliverables: 1) a "list of domestic wells that ARC intends to sample"; and 2) an addendum to the QAPP specifying quality assurance/quality control (QA/QC) methods for the DWMP including sampling objectives, detailed sampling methods and protocols, analyte lists, analytical methods and reporting limits.

The objective of this DWMP is to ensure that data collection methods and laboratory analyses are adequate and consistent throughout the duration of the domestic well monitoring program. EPA's request for the addendum is consistent with Paragraph 24 of the March 31, 2005 Administrative Order (AO; EPA, 2007), which states that ARC "shall provide EPA the QA/QC procedures followed by all sampling teams and laboratories performing data collection or analysis". Methods and standard operating procedures (SOPs) are provided for the sampling of domestic, commercial and irrigation wells (collectively referred to as domestic wells in this DWMP) near the Anaconda/Yerington Mine Site (Site; shown on Figure 1-1).

Section 2.0 of this DWMP presents the monitoring objectives, sampling locations and frequencies, analytical parameters and reporting limits, and detailed sampling methods and protocols. Section 3.0 describes QA/QC methods and SOPs applicable to this DWMP. EPA notification of sampling events, reporting requirements, and the schedule for submittal of reports

and deliverables are discussed in Section 4.0. Procedures for future modifications to the DWMP are presented in Section 5.0. Health and safety aspects of the DWMP are addressed in Section 6.0. References cited in this DWMP are listed in Section 7.0.

A document history that reflects the dates of the DWMP submittals and comments from the EPA and Yerington Paiute Tribe (YPT) is provided in Appendix A. The SOP for obtaining groundwater samples from domestic wells is provided in Appendix B. Appendix C provides a Work Risk Assessment for sampling the domestic wells.

SECTION 2.0
DOMESTIC WELL MONITORING PLAN

2.1 Monitoring Objectives

The primary objective of the DWMP program is to collect information to determine chemical concentrations in groundwater extracted from the alluvial aquifer by domestic wells, generally located north of the Site. Domestic well sampling is related to, but distinct from, ongoing monitoring of specifically designed monitor wells, as described in the *Draft Site-Wide Groundwater Monitoring Plan* (GMP). The GMP submitted to EPA in August 2007 has been revised, and the updated GMP was submitted to EPA on December 15, 2009 (Brown and Caldwell, 2009a). Groundwater data from the GMP will support technical decisions to be made by EPA's Remedial Project Manager (RPM) and ARC for Remedial Investigation/Feasibility Study (RI/FS) activities at the Site, particularly for the Site-Wide Groundwater Operable Unit (OU-1). Future quarterly and annual reports for the DWMP and the GMP will be submitted to EPA as separate documents.

The primary data quality objective (DQO) for domestic wells sampling is to obtain groundwater samples that are representative of the quality of water used for drinking water or other domestic water supply purposes. Additional domestic well monitoring objectives include:

- Monitoring temporal trends in the magnitude and distribution of chemicals in groundwater extracted by domestic wells that is used for drinking water or agricultural purposes;
- Assessing what, if any, potential risk is posed to human health and the environment by the use of groundwater extracted by domestic wells for drinking water or agricultural purposes; and
- Determining whether residents are qualified to receive bottled water (i.e., uranium concentrations equal or exceed 25 micrograms per liter [ug/L]).

Because the monitoring program for domestic wells is intended to monitor public health, domestic well sampling procedures differ from the sampling procedures typically used to sample monitor wells for groundwater characterization purposes (e.g., low-flow, minimal drawdown

methods or volumetric methods; EPA, 1996 and 2002). In comparison to low-flow sampling methods with typical flow rates of approximately 100 to 500 milliliters per minute (i.e., 0.026 to 0.132 gallons per minute [gpm]), higher flow rates (e.g., 5 to 10 gpm) are more typical of domestic well pumping rates. In comparison to volumetric sampling methods where three to five casing volumes of water are purged, domestic well owners typically use the water initially discharged from their wells. For both practical and economic reasons, domestic well owners are unlikely to purge one or more casing volumes of water each time they use their well because: 1) an unrealistic amount of time would be required to purge the well; 2) the purged water would be wasted, as would the electrical power cost to pump the well; and 3) most domestic well owners do not have a location where the purge water could be discharged.

To illustrate these points, typical well construction information presented in Table 2-1 is used to estimate pumping times and volumes. Assuming an average well diameter of 6 inches, a total well depth of 170 feet, and a depth to water of 20 feet (i.e., a 150 foot column of water in a 6 inch diameter well), three to five well casing volumes represent 675 to 1,125 gallons of water. At an assumed domestic well pumping rate of 20 gpm, it would take approximately 30 to 60 minutes to purge this amount of water. Because domestic well owners are unlikely to take the time to purge this amount of water each time they use their wells, the sampling method described in Section 2.6 is intended to replicate a more typical domestic well use pattern in which well users use the water initially discharged from the well.

ARC recognizes that there is no single, unique purge volume that reflects the variability in domestic well pumping and water use patterns. The purge volume of approximately 25 gallons specified in Section 2.6 for sampling individual domestic wells comprising this DWMP is intended to: 1) generally reflect the quality of the initial discharge water typically used by well owners on a frequent basis; 2) be consistent with historic domestic well sampling procedures to help ensure comparability of historic and new data; and 3) establish a consistent purging methodology to improve the comparability of data between individual domestic wells during future monitoring events, to the extent feasible, given the many factors and variables that may affect the representativeness of the domestic well samples.

ARC recognizes that there are many factors and variables that may affect the representativeness of domestic well samples such as the volume of water purged, well construction and screen intervals, well use patterns, formation chemistry and chemical reactions that can occur in the borehole environment. These factors and variables have the potential to affect observed chemical concentrations in domestic well water. As discussed in the *Site-Wide Groundwater Monitoring Plan, Revision 1* (Brown and Caldwell, 2009a), Gotkowitz et al. (2004) and others have shown that the quality of water under typical water use patterns differs from that of groundwater in the aquifer because of geochemical reactions that occur in the well during various withdrawal scenarios.

Conditions in wells that may affect chemical concentrations include: 1) changes in redox related to pump action, which introduces oxygen into well water; 2) the potential for the growth of microorganisms that facilitate a variety of biogeochemical reactions (Taylor et al., 1997; van Beek and van der Kooij, 1982), and 3) the residence time of the water stored within the borehole. Other factors that limit the use of domestic well chemical data include the lack of well construction details (e.g., well-screen or sand-pack intervals) for many wells and potential effects of septic systems on groundwater chemistry. Other factors that may affect the representativeness of domestic well samples may be identified as the domestic well monitoring program progresses.

These factors and data limitations have been previously discussed with the EPA, the U.S. Bureau of Land Management (BLM), the Nevada Division of Environmental Protection (NDEP), the YPT and other stakeholders. In recognition of these limitations, domestic well monitoring data are not suitable for groundwater characterization purposes (e.g., evaluating the fate and transport of chemicals in groundwater).

2.2 Domestic Well Locations and Hydrostratigraphic Zone Designations

The 173 domestic wells eligible to be sampled pursuant to this DWMP are listed in Table 2-1, and their locations are shown on Figure 2-1 (Plate 1 provides an enlarged view of the domestic wells). Additional information for domestic wells presented in Table 2-1 includes: the status of owner access agreements, sampling frequency; assessor's parcel number (APN); location

coordinates, construction details, if available; and hydrostratigraphic zone designations described below. Domestic well construction details (Table 2-1) are based on available information provided in individual Nevada Division of Water Resources (NDWR) Well Driller's Reports.

The occurrence of more than one domestic well on a single parcel in the area of the Site, with the wells used for different purposes (e.g., drinking water vs. livestock or agriculture), has been observed. Two examples of this condition are known to exist and include: 1) wells DW-07 and DW-08, which are located on parcel APN 014-271-04 and used for drinking water and agricultural purposes, respectively; and 2) wells DW-43 and DW-56, which are located on parcel APN 014-241-12 and used for drinking water and agricultural purposes, respectively. Well use information is based on information provided by the well owners. For these two parcels (and other similar situations that may be identified in the future), the wells used for drinking water were selected for sampling because they best represent potential human health risk issues associated with the groundwater pathway relative to wells used for agricultural purposes.

Alluvial groundwater flow and chemical conditions associated with the Site, as discussed in this DWMP and other groundwater-related documents (e.g., Brown and Caldwell, 2008), refer to three hydrostratigraphic zone designations based on the occurrences of discontinuous clay or fine grained silt layers. These horizons were initially identified by Seitz et al. (1982) and have been encountered in several existing monitor wells during drilling (e.g., Brown and Caldwell, 2008). Domestic wells that lack construction information due either to nonexistent or incomplete NDWR Well Driller's Reports are designated with a "U" in Table 2-1 to indicate that the zone from which well water is extracted is unknown. Wells with screens or gravel pack that occur within more than one hydrostratigraphic zone are designated accordingly (e.g., S/I, I/D or S/I/D). The hydrostratigraphic zones are defined by elevation as follows:

- Shallow: > 4,300 feet above mean sea level (amsl)
- Intermediate: 4,240 to 4,300 feet amsl
- Deep: < 4,240 feet amsl

Domestic wells are located within the alluvial aquifer, where both downward and upward vertical gradients are observed. Downward vertical gradients vary seasonally in response to agricultural pumping (Brown and Caldwell, 2008). The characterization of vertical gradients is part of ongoing groundwater remedial investigations conducted at the Site.

Of the 173 wells listed in Table 2-1 107 wells (62 percent) will be sampled on a quarterly basis and 65 wells (37 percent) will be sampled on a semi-annual basis. Well WDW019 is an irrigation well that has been sampled during the irrigation season (June and September). Well DW-174, requested by EPA for inclusion in the DWMP, does not have power and is not currently used for either domestic or agricultural purposes.

Table 2-1. Domestic Well Sampling Frequencies, Location Information, and Construction Details

Well Name	Access Agreement Signed (1)	Sampling Frequency (2)	Assessor's Parcel Number (APN)	Location Coordinates (3)			NDWR Well Log No.	Well Completion Date	Approx. Ground Surface Elevation	Well Casing Diameter	Total Depth of Well	Total Depth of Borehole	Top of Screen		Bottom of Screen Elevation	Screen Length	Top of Gravel Pack		Bottom of Gravel Pack		Gravel Pack Length	Hydro Zone (4)
				Easting	Northing				feet amsl	inches	feet bgs	feet	feet bgs	feet amsl	feet amsl	feet	feet bgs	feet amsl	feet bgs	feet amsl	feet	
DW-1	Yes	Quarterly	004-092-01	321375.00	1561875.00	b	92781	3/26/2004	4371	6.62	200	200	160	4211	4171	40	50	4321	200	4171	150	S/I/D
DW-2	Yes	Semi-annual	004-082-05	321962.00	1563579.00	a	20046	6/20/1979	4406	6.62	147	149	129	4277	4259	18	50	4356	149	4257	99	S/I
DW-3	Yes	Quarterly	014-271-13	323000.00	1564700.00	b	- - (5)	- -	4385	- -	- -	145	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-4	Yes	Semi-annual	004-091-07	321210.00	1562547.00	a	22350	1/15/1981	4397	6.62	144	145	124	4273	4253	20	50	4347	144	4253	94	S/I
DW-5	Yes	Semi-annual	004-082-01	322450.00	1563400.00	b	- -	- -	4383	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-6	Yes	Quarterly	014-271-09	323950.00	1564100.00	b	38309	6/27/1992	4363	6.62	150	150	130	4233	4213	20	60	4303	150	4213	90	I/D
DW-7	Yes	Semi-annual	014-271-04	322986.36	1564084.27	a	3794	6/1/1957	4360	6.62	110	110	60	4300	4250	50	- -	- -	- -	- -	- -	U
DW-9	Pending	Quarterly	014-271-16	322850.00	1564875.00	b	23009	6/19/1981	4390	6.62	120.5	121.5	100.5	4289.5	4269.5	20	50	4340	120.5	4269.5	70.5	S/I
DW-10	Yes	Semi-annual	014-271-05	322575.00	1564200.00	b	- -	- -	4393	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-11	Yes	Quarterly	014-271-38	322500.00	1565975.00	b	20064	6/20/1979	4403	6.62	115	115	95	4308	4288	20	- -	- -	- -	- -	- -	U
DW-12	Outstanding	Quarterly	014-251-15	322525.00	1569400.00	b	55089	3/1/1994	4355	6.62	140	140	120	4235	4215	20	- -	- -	- -	- -	- -	U
DW-13	Outstanding	Quarterly	004-083-01	323825.00	1563350.00	b	67351	6/20/1996	4358	6.62	139	139	119	4239	4219	20	50	4308	139	4219	89	S/I/D
DW-14	Yes	Semi-annual	004-081-08	321800.00	1563025.00	b	- -	- -	4390	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-15	Yes	Quarterly	014-411-14	318800.00	1554950.00	b	- -	- -	4448	- -	- -	155	135	4313	- -	- -	- -	- -	- -	- -	- -	U
DW-16	Yes	Semi-annual	004-082-02	322144.33	1563231.64	a	26691	10/21/1985	4393	6.62	142.5	143.5	122.5	4270.5	4250.5	20	50	4343	142.5	4250.5	92.5	S/I
DW-17	Outstanding	Quarterly	014-271-32	323830.97	1566321.97	a	9563	6/8/1967	4374	6.62	122.5	122.5	100	4274	4251.5	22.5	- -	- -	- -	- -	- -	U
DW-18	Yes	Quarterly	014-271-25	322570.00	1565541.00	a	- -	- -	4406	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-19	Yes	Semi-annual	014-271-35	323825.00	1566700.00	b	- -	- -	4366	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-20	Yes	Quarterly	004-071-05	321891.93	1566538.52	a	- -	- -	4465	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-21	Yes	Quarterly	014-271-64	323500.00	1566700.00	b	- -	- -	4371	- -	- -	160	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-22	Pending	Semi-annual	014-271-59	323857.53	1565636.36	a	47206	1/5/1995	4370	6.62	140	140	100	4270	4230	40	50	4320	140	4230	90	S/I/D
DW-23	Yes	Quarterly	014-271-31	324125.00	1566000.00	b	16514	10/5/1976	4363	6	- -	118	- -	- -	- -	- -	50	4313	118	4245	68	S/I
DW-24	Yes	Semi-annual	004-083-03	322950.00	1563125.00	b	46654	6/20/1994	4370	6.62	159	159	139	4231	4211	20	50	4320	159	4211	109	S/I/D
DW-25	Yes	Semi-annual	004-084-03	323498.34	1562823.17	a	36183	4/23/1991	4364	6.62	119.5	120.5	99.5	4264.5	4244.5	20	50	4314	119.5	4244.5	69.5	S/I
DW-26	Yes	Semi-annual	014-271-60	322682.21	1563460.19	a	71630	4/8/1998	4387	6	140	140	120	4267	4247	20	- -	- -	- -	- -	- -	U
DW-27	Yes	Semi-annual	004-082-04	321800.00	1563700.00	b	- -	- -	4403	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-28	Yes	Quarterly	014-271-76	322450.00	1565725.00	b	- -	- -	4404	- -	- -	120	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-29	Yes	Semi-annual	014-271-41	322475.00	1565225.00	b	- -	- -	4402	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-30	Yes	Quarterly	014-271-40	322475.00	1565350.00	b	- -	- -	4403	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-31	Yes	Quarterly	004-071-02	322500.00	1566275.00	b	64859	1/31/1997	4401	8.62/6.62	- -	220	135	4266	- -	45(6)	51	4350	155	4246	104	S/I
DW-32	Yes	Quarterly	004-091-02	322400.00	1562500.00	b	90560	8/19/2003	4370	6.62	177	177	137	4233	4193	40	50	4320	177	4193	127	S/I/D
DW-33	Outstanding	Quarterly	014-271-61	323150.00	1563500.00	b	71631	3/25/1998	4372	6	155	155	135	4237	4217	20	- -	- -	- -	- -	- -	U
DW-34	Yes	Semi-annual	014-271-44	321406.54	1565167.19	a	39522	7/3/1992	4436	6.62	183	183	163	4273	4253	20	50	4386	183	4253	133	S/I
DW-35	Yes	Quarterly	014-271-54	321825.00	1564375.00	b	- -	- -	4415	- -	- -	201	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-36	Yes	Semi-annual	004-081-10	322318.00	1562923.00	a	- -	- -	4383	- -	- -	180	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-37	Yes	Quarterly	014-271-02	322919.95	1562726.25	a	- -	- -	4374	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-38	Yes	Semi-annual	004-151-08	319295.00	1555009.00	a	27548	7/8/1986	4433	8.62	150	151	130	4303	4283	20	50	4383	150	4283	100	S/I
DW-39	Yes	Quarterly	004-151-03	319374.00	1556171.00	a	34158	8/24/1990	4413	6.62	155	155	135	4278	4258	20	- -	- -	- -	- -	- -	U

Table 2-1. Domestic Well Sampling Frequencies, Location Information, and Construction Details

Well Name	Access Agreement Signed (1)	Sampling Frequency (2)	Assessor's Parcel Number (APN)	Location Coordinates (3)			NDWR Well Log No.	Well Completion Date	Approx. Ground Surface Elevation	Well Casing Diameter	Total Depth of Well	Total Depth of Borehole	Top of Screen		Bottom of Screen Elevation	Screen Length	Top of Gravel Pack		Bottom of Gravel Pack		Gravel Pack Length	Hydro Zone (4)
				Easting	Northing				feet amsl	inches	feet bgs	feet	feet bgs	feet amsl	feet amsl	feet	feet bgs	feet amsl	feet bgs	feet amsl	feet	
DW-40	Pending	Quarterly	014-271-68	323175.00	1564450.00	b	59260	9/29/1996	4380	6.62	140	140	130	4250	4240	10	50	4330	140	4240	90	S/I
DW-41	Yes	Semi-annual	014-271-46	321664.00	1565032.00	a	- -	- -	4429	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-42	Yes	Quarterly	014-271-53	321370.85	1564318.87	a	28567	4/20/1987	4433	6.62	- -	160	- -	- -	- -	- -	50	4383	159	4274	109	S/I
DW-43	Yes	Semi-annual	014-241-12	327418.00	1562490.00	a	- -	- -	4351	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-44	Yes	Semi-annual	014-271-75	324100.00	1565150.00	b	- -	- -	4360	- -	- -	180	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-45	Yes	Semi-annual	004-084-04	323691.00	1563010.00	a	- -	- -	4364	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-46	Yes	Semi-annual	004-081-04	321296.00	1564065.00	a	- -	- -	4429	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-47	Yes	Quarterly	004-151-20	319341.67	1556530.41	a	9010	5/28/1966	4406	6.62	108	108	85	4321	4298	23	- -	- -	- -	- -	- -	U
DW-48	Yes	Semi-annual	014-271-28	324219.00	1565617.00	a	- -	- -	4370	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-49	Yes	Quarterly	004-153-08	319165.00	1553967.00	a	- -	- -	4465	- -	- -	152	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-50	Yes	Semi-annual	004-071-01	322187.00	1566595.00	a	- -	- -	4403	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-51	Yes	Quarterly	014-243-01	323630.41	1557499.11	a	- -	- -	4357	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-52	Outstanding	Quarterly	014-271-01	322756.00	1562124.00	a	26693	10/14/1985	4367	6.62	139	140	119	4248	4228	20	50	4317	139	4228	89	S/I/D
DW-53	Yes	Semi-annual	004-091-06	321500.00	1562500.00	b	- -	- -	4384	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-54	Yes	Semi-annual	014-242-07	320730.57	1557773.72	a	- -	- -	4357	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-55	Yes	Semi-annual	014-181-09	322254.66	1577712.68	a	- -	- -	4322	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-57	Yes	Semi-annual	014-251-12	321366.48	1570143.22	a	92770	3/1/2004	4366	6.62	- -	157	100	4266	- -	57(6)	50	4316	157	4209	107	S/I/D
DW-58	Yes	Semi-annual	014-291-15	330193.09	1565362.44	a	- -	- -	4346	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-59	Yes	Quarterly	014-431-04	330260.33	1546168.05	a	- -	- -	4384	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-60	Yes	Quarterly	014-231-40	329400.00	1577000.00	b	10083	5/28/1968	4330	6	80	83	60	4270	4250	20	- -	- -	- -	- -	- -	U
DW-61	Outstanding	Semi-annual	014-181-09	325125.00	1576200.00	b	- -	- -	4329	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-62	Yes	Semi-annual	004-081-09	322075.00	1563025.00	b	29346	10/12/1987	4383	6.62	147	148	127	4256	4236	20	- -	- -	- -	- -	- -	U
DW-63	Yes	Semi-annual	004-152-02	319015.64	1555385.71	b	25113	1/12/1984	4430	8.62	147.5	148.5	127.5	4302.5	4282.5	20	50	4380	147.5	4282.5	97.5	S/I
DW-64	Yes	Semi-annual	004-152-04	319173.29	1555838.15	b	- -	- -	4412	- -	- -	120	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-65	Yes	Quarterly	014-251-03	321912.76	1569391.17	a	- -	- -	4367	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-66	Yes	Quarterly	014-271-57	323125.00	1565625.00	b	39955	11/24/1992	4386	6.62	136	140	116	4270	4250	20	60	4326	136	4250	76	S/I
DW-67	Outstanding	Quarterly	014-271-58	323500.00	1565600.00	b	39638	9/20/1992	4376	6	150	150	130	4246	4226	20	50	4326	150	4226	100	S/I/D
DW-68	Outstanding	Quarterly	004-081-02	322100.00	1564025.00	b	- -	- -	4402	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-69	Pending	Semi-annual	014-181-09	323815.37	1575178.03	a	- -	- -	4328	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-70	Pending	Semi-annual	014-271-34	324288.75	1566193.19	a	- -	- -	4364	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-71	Yes	Quarterly	014-281-08	318875.00	1562050.00	b	91042	10/7/2003	4426	6.62	233	233	213	4213	4193	20	50	4376	200	4226	150	S/I
DW-72	Yes	Semi-annual	014-411-03	317532.41	1557046.57	a	42790	6/6/1993	4492	6.62	239	239	219	4273	4253	20	50	4442	239	4253	189	S/I
DW-73	Yes	Quarterly	014-411-22	317662.81	1554124.39	a	62472	10/12/1996	4528	6.62	260	260	200	4328	4268	60	50	4478	260	4268	210	S/I
DW-74	Yes	Quarterly	004-152-06	319049.71	1556129.24	a	- -	- -	4423	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-75	Yes	Semi-annual	004-151-04	319630.76	1556006.59	b	35936	3/28/1991	4394	6.62	160	160	140	4254	4234	20	- -	- -	- -	- -	- -	U
DW-76	Yes	Quarterly	004-153-10	319142.30	1554402.05	a	67353	3/5/1996	4452	6.62	199	199	159	4293	4253	40	50	4402	199	4253	149	S/I
DW-77	Yes	Semi-annual	004-153-13	318952.78	1554159.04	a	- -	- -	4465	- -	- -	240	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-78	Yes	Semi-annual	014-242-08	320447.63	1557623.40	a	- -	- -	4360	- -	- -	160	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-79	Yes	Semi-annual	014-231-42	329450.00	1577750.00	b	- -	- -	4328	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U

Table 2-1. Domestic Well Sampling Frequencies, Location Information, and Construction Details

Well Name	Access Agreement Signed (1)	Sampling Frequency (2)	Assessor's Parcel Number (APN)	Location Coordinates (3)			NDWR Well Log No.	Well Completion Date	Approx. Ground Surface Elevation	Well Casing Diameter	Total Depth of Well	Total Depth of Borehole	Top of Screen		Bottom of Screen Elevation	Screen Length	Top of Gravel Pack		Bottom of Gravel Pack		Gravel Pack Length	Hydro Zone (4)
				Easting	Northing				feet amsl	inches	feet bgs	feet	feet bgs	feet amsl	feet amsl	feet	feet bgs	feet amsl	feet bgs	feet amsl	feet	
DW-80	Outstanding	Semi-annual	014-181-09	323886.55	1574078.28	a	- -	- -	4330	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-83	Outstanding	Quarterly	014-261-02	323875.00	1566800.00	b	- -	- -	4363	- -	- -	160	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-85	Yes	Semi-annual	004-083-02	323475.00	1563150.00	b	- -	- -	4362	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-86	Yes	Semi-annual	004-082-06	322425.00	1563550.00	b	- -	- -	4386	- -	- -	120	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-87	Yes	Semi-annual	014-271-51	321300.00	1564875.00	b	- -	- -	4434	- -	- -	221	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-88	Outstanding	Semi-annual	004-081-05	321425.00	1563650.00	b	14706	4/23/1975	4412	6.62	180	180	140	4272	4232	40	50	4362	180	4232	130	S/I/D
DW-89	Yes	Semi-annual	014-271-67	323361.70	1564457.09	a	43261	10/31/1993	4380	6.62	150	150	130	4250	4230	20	50	4330	150	4230	100	S/I/D
DW-90	Yes	Semi-annual	004-081-01	322284.18	1563885.99	a	- -	- -	4400	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-91	Yes	Quarterly	004-151-21	319317.25	1556780.23	a	42088	3/5/1993	4406	6.62	159	159	139	4267	4247	20	50	4356	159	4247	109	S/I
DW-92	Yes	Quarterly	014-281-05	319425.00	1562725.00	b	81115	5/25/2000	4421	6.62	258	260	240	4181	4163	18	- -	- -	- -	- -	- -	U
DW-93	Outstanding	Quarterly	014-271-22	323313.27	1565196.77	a	- -	- -	4387	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-94	Pending	Semi-annual	014-271-19	323558.86	1564976.57	a	39810	9/24/1992	4387	6	160	160	140	4247	4227	20	50	4337	160	4227	110	S/I/D
DW-95	Pending	Quarterly	014-271-17	323178.05	1565012.53	a	- -	- -	4387	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-96	Outstanding	Semi-annual	014-271-11	323922.58	1564588.61	a	- -	- -	4370	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-97	Outstanding	Quarterly	014-271-49	322374.09	1564915.47	a	- -	- -	4410	- -	- -	116	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-98	Pending	Quarterly	014-271-65	322970.22	1566528.46	a	42798	9/30/1993	4390	6	130	140	100	4290	4260	30	50	4340	140	4250	90	S/I
DW-99	Outstanding	Quarterly	014-261-05	323244.52	1567600.99	a	- -	- -	4364	- -	104	104	45	4319	4260	59	- -	- -	- -	- -	- -	U
DW-100	Denied	Quarterly	004-152-10	319232.25	1557260.20	a	- -	- -	4410	- -	- -	180	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-101	Yes	Quarterly	014-411-08	317101.06	1555171.55	b	21005	4/10/1980	4518	8	230	250	210	4308	4288	20	- -	- -	- -	- -	- -	U
DW-102	Yes	Quarterly	014-411-25	318425.00	1552975.00	b	- -	- -	4500	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-103	Yes	Quarterly	014-271-77	322150.00	1565450.00	b	93614	6/4/2009	4412	6.62	160	160	140	4272	4252	20	50	4362	160	4252	110	S/I
DW-104	Yes	Quarterly	014-271-07	323350.00	1564200.00	b	- -	- -	4374	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-105	Outstanding	Semi-annual	014-271-27	324025.00	1565600.00	b	- -	- -	4365	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-106	Yes	Quarterly	014-271-08	323700.00	1564200.00	b	- -	- -	4366	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-107	Yes	Quarterly	014-271-14	322750.00	1564550.00	b	22858	- -	4392	6.6	115.5	116.5	75.5	4316.5	4276.5	40	50	4342	115.5	4276.5	65.5	S/I
DW-108	Yes	Semi-annual	014-291-03	330250.00	1566500.00	b	- -	- -	4344	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-109	Yes	Quarterly	014-231-30	329800.72	1574904.94	a	85991	3/1/2002	4334	8.62	240	240	200	4134	4094	40	100	4234	240	4094	140	D
DW-110	Yes	Quarterly	014-271-18	323350.00	1564975.00	b	39811	9/29/1992	4377	6	160	160	140	4237	4217	20	50	4327	160	4217	110	S/I/D
DW-112	Yes	Semi-annual	004-081-03	321642.00	1563915.00	a	14403	10/18/1974	4416	- -	199	200	169	4247	4217	30	- -	- -	- -	- -	- -	U
DW-113	Yes	Quarterly	004-092-02	321692.65	1561808.34	a	95003	10/20/2004	4370	6.62	220	220	180	4190	4150	40	- -	- -	- -	- -	- -	U
DW-114	Yes	Quarterly	014-251-13	321403.21	1569612.70	a	95002	9/25/2004	4376	6.62	170	170	150	4226	4206	20	51	4325	170	4206	119	S/I/D
DW-115	Outstanding	Quarterly	004-091-04	322406.92	1561998.27	a	24182	10/13/1982	4367	6.62	130.5	131.5	110.5	4256.5	4236.5	20	50	4317	130.5	4236.5	80.5	S/I/D
DW-116	Yes	Quarterly	004-151-23	319313.10	1557296.29	b	- -	- -	4393	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-117	Yes	Semi-annual	014-291-13	329804.79	1565432.44	a	- -	- -	4345	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-118	Yes	Quarterly	014-291-09	330260.82	1565894.89	a	18534	6/23/1978	4346	6.62	96	96	76	4270	4250	20	50	4296	96	4250	46	I
DW-119	Yes	Quarterly	014-291-05	330193.53	1566243.14	a	- -	- -	4344	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-120	Yes	Quarterly	014-271-29	324539.42	1565911.27	a	- -	- -	4357	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-121	Outstanding	Quarterly	014-231-05	330285.71	1575771.02	a	28962	6/28/1987	4334	8	122	130	102	4232	4212	20	- -	- -	- -	- -	- -	U
DW-122	Yes	Quarterly	014-271-63	323566.90	1563480.50	a	58915	8/1/1996	4370	6.62	150	150	130	4240	4220	20	53	4317	150	4220	97	S/I/D

Table 2-1. Domestic Well Sampling Frequencies, Location Information, and Construction Details

Well Name	Access Agreement Signed (1)	Sampling Frequency (2)	Assessor's Parcel Number (APN)	Location Coordinates (3)			NDWR Well Log No.	Well Completion Date	Approx. Ground Surface Elevation	Well Casing Diameter	Total Depth of Well	Total Depth of Borehole	Top of Screen		Bottom of Screen Elevation	Screen Length	Top of Gravel Pack		Bottom of Gravel Pack		Gravel Pack Length	Hydro Zone (4)
				Easting	Northing				feet amsl	inches	feet bgs	feet	feet bgs	feet amsl	feet amsl	feet	feet bgs	feet amsl	feet bgs	feet amsl	feet	
DW-123	Yes	Semi-annual	014-411-27	319160.65	1553526.17	a	90771	4/12/2002	4452	6.62	220	220	180	4272	4232	40	50	4402	220	4232	170	S/I/D
DW-124	Yes	Quarterly	004-152-07	319193.25	1556364.68	a	- -	- -	4423	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-125	Yes	Semi-annual	004-153-02	319104.79	1552777.16	a	101145	6/23/2005	4462	6.62	- -	260	160	4302	- -	100(6)	90	4372	260	4202	170	S/I/D
DW-126	Yes	Quarterly	014-242-04	321834.00	1557872.00	a	101211	3/25/2006	4348	6.62	162	166	158	4190	4186	4	- -	- -	- -	- -	- -	U
DW-127	Outstanding	Semi-annual	014-411-01	317211.65	1557192.38	a	- -	- -	4511	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-128	Yes	Semi-annual	004-151-13	319336.34	1553988.55	a	99667	4/10/2006	4459	6.62	200	200	180	4279	4259	20	51	4408	200	4259	149	S/I
DW-129	Yes	Semi-annual	004-153-07	318922.81	1553807.47	a	- -	- -	4459	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-130	Yes	Semi-annual	014-251-24	321850.96	1570855.29	a	- -	- -	4343	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-131	Denied	Quarterly	014-242-05	321691.82	1557447.01	a	97805	7/17/2005	4357	6.62	180	180	160	4197	4177	20	55	4302	180	4177	125	S/I/D
DW-132 (7)	Yes	Quarterly	004-152-01	319045.02	1555079.28	a	- -	- -	4436	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-133	Outstanding	Quarterly	014-261-04	323037.95	1566931.01	a	29002	9/5/1987	4380	8	118	126	100	4280	4262	18	- -	- -	- -	- -	- -	U
DW-134	Yes	Semi-annual	014-281-23	318609.91	1558831.57	a	- -	- -	4413	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-135	Yes	Semi-annual	014-281-21	318787.33	1559420.33	a	- -	- -	4397	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-136	Yes	Semi-annual	014-251-07	321525.80	1570101.50	b	- -	- -	4364	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-138	Yes	Quarterly	004-084-02	323125.00	1562900.00	b	26692	1/30/1986	4364	6.62	120	121	98.5	4265.5	4244	21.5	50	4314	120	4244	70	S/I
DW-139	Yes	Semi-annual	014-281-06	319075.00	1562200.00	b	- -	- -	4419	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-140	Yes	Quarterly	014-261-31	322742.34	1566971.88	a	- -	- -	4382	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-141	Denied	Quarterly	004-153-11	319122.84	1554520.68	a	- -	- -	4445	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-142	Yes	Quarterly	004-151-12	319308.87	1554247.26	a	- -	- -	4442	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-143	Yes	Quarterly	004-151-11	319326.55	1554362.40	a	101360	6/28/2006	4439	6.62	180	200	140	4299	4259	40	60	4379	200	4239	140	S/I
DW-144	Outstanding	Quarterly	004-151-10	319451.06	1554626.05	a	35169	1/21/1991	4430	6.62	150	150	130	4300	4280	20	50	4380	150	4280	100	S/I
DW-145	Denied	Quarterly	004-151-06	319319.57	1555428.81	a	- -	- -	4415	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-146	Yes	Quarterly	014-261-32	323307.00	1568124.09	a	- -	- -	4351	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-147	Yes	Quarterly	004-081-06	321298.55	1563404.29	a	- -	- -	4406	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-148	Yes	Quarterly	014-411-30	318475.00	1553760.00	c	- -	- -	4485	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-149	Yes	Quarterly	014-411-06	317375.00	1555740.00	c	24788	6/20/1983	4487	8.62	198	198	178	4309	4289	20	50	4437	197	4290	147	S/I
DW-150	Outstanding	Quarterly	014-281-02	320800.00	1560125.00	c	95007	7/21/2004	4348	6.62	236	236	230	4118	4112	6	50	4298	236	4112	186	I/D
DW-151	Yes	Quarterly	004-092-03	322450.00	1561850.00	c	39956	11/12/1992	4359	6.62	113	113	93	4266	4246	20	60	4299	113	4246	53	I
DW-152	Outstanding	Quarterly	004-091-01	322100.00	1562700.00	c	- -	- -	4377	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-153	Outstanding	Quarterly	004-082-03	321825.00	1563325.00	c	- -	- -	4394	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-154	Yes	Quarterly	014-271-62	323475.00	1563450.00	c	71629	3/10/1998	4365	6	150	150	130	4235	4215	20	- -	- -	- -	- -	- -	U
DW-155	Denied	Quarterly	014-271-55	322100.00	1564150.00	c	26690	7/10/1985	4403	6.62	147	148	123	4280	4256	24	50	4353	147	4256	97	S/I
DW-156	Denied	Quarterly	014-271-56	322200.00	1564150.00	c	- -	- -	4401	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-157	Outstanding	Quarterly	014-271-06	323100.00	1564300.00	c	20729	1/15/1980	4380	6.62	123.5	122	103.5	4276.5	4256.5	20	50	4330	123.5	4256.5	73.5	S/I
DW-158	Yes	Quarterly	014-271-52	321250.00	1564775.00	c	- -	- -	4434	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-159	Yes	Quarterly	014-271-50	322100.00	1564750.00	c	22091	10/20/1980	4410	6.62	148.5	148.5	128.5	4281.5	4261.5	20	50	4360	147.5	4262.5	97.5	S/I
DW-160	Outstanding	Quarterly	014-271-15	322750.00	1564700.00	c	- -	- -	4392	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-161	Yes	Quarterly	014-271-66	323725.00	1564700.00	c	67339	6/27/1995	4369	6.62	139	140	119	4250	4230	20	50	4319	139	4230	89	S/I/D
DW-162	Yes	Quarterly	014-271-47	321900.00	1564900.00	c	17992	4/24/1978	4416	6	146	146	126	4290	4270	20	50	4366	146	4270	96	S/I

Table 2-1. Domestic Well Sampling Frequencies, Location Information, and Construction Details

Well Name	Access Agreement Signed (1)	Sampling Frequency (2)	Assessor's Parcel Number (APN)	Location Coordinates (3)			NDWR Well Log No.	Well Completion Date	Approx. Ground Surface Elevation	Well Casing Diameter	Total Depth of Well	Total Depth of Borehole	Top of Screen		Bottom of Screen Elevation	Screen Length	Top of Gravel Pack		Bottom of Gravel Pack		Gravel Pack Length	Hydro Zone (4)
				Easting	Northing				feet amsl	inches	feet bgs	feet	feet bgs	feet amsl	feet amsl	feet	feet bgs	feet amsl	feet bgs	feet amsl	feet	
DW-163	Yes	Quarterly	014-271-45	321475.00	1564975.00	c	24544	4/14/1983	4429	6.62	169	170	149	4280	4260	20	50	4379	169	4260	119	S/I
DW-164	Pending	Quarterly	014-271-43	321525.00	1565250.00	c	- -	- -	4429	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-165	Pending	Quarterly	014-271-42	321950.00	1565400.00	c	21181	5/10/1980	4418	8	155	160	119	4299	4263	36	- -	- -	- -	- -	- -	U
DW-166	Yes	Quarterly	014-271-24	322850.00	1565375.00	c	58927	5/8/1996	4393	6.62	109	109	103	4290	4284	6	50	4343	109	4284	59	S/I
DW-167	Yes	Quarterly	014-271-23	323175.00	1565375.00	c	- -	- -	4383	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-168	Yes	Quarterly	014-271-21	323650.00	1565375.00	c	- -	- -	4372	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-169	Yes	Quarterly	014-261-31	322650.00	1567450.00	c	- -	- -	4371	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-170	Yes	Quarterly	014-261-06	323400.00	1567925.00	c	- -	- -	4354	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-171	Denied	Quarterly	014-261-30	322975.00	1568200.00	c	- -	- -	4352	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-172	Denied	Quarterly	014-261-29	322975.00	1568300.00	c	27757	9/19/1986	4352	6.62	99	100	79	4273	4253	20	50	4302	99	4253	49	S/I
DW-173	Yes	Quarterly	014-241-42	330050.00	1558550.00	c	- -	- -	4355	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-174(8)	Not Applicable	None(8)	014-281-29	320800.00	1559550.00	c	- -	- -	4348	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
DW-175	Yes	Quarterly	014-231-38	329550.00	157635.00	c	- -	- -	4333	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
TW-06	Yes	Quarterly	014-181-10	329151.24	1573424.35	a	- -	- -	4338	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
WDW017	Yes	Quarterly	014-242-09	320081.64	1557735.04	a	- -	- -	4364	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
WDW018	Yes	Semi-annual	014-242-06	320929.11	1557664.14	a	- -	- -	4357	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	U
WDW019	Yes	Quarterly (9)	014-401-20	326973.67	1557484.37	b	78925	1/19/2000	4355	30/16	365	365	50	4305	3990	315	2	4353	365	3990	363	S/I/D
Well 4	Yes	Semi-annual	014-181-09	321746.43	1572812.65	a	31222	1/11/1989	4341	8	- -	200	105	4236	- -	85(6)	- -	- -	- -	- -	- -	U

Notes:
(1) Yes = signed access agreement received; Pending = owner verbally agreed to sign and submit access agreement; Outstanding = access agreement sent to owner but the signed agreement has not been returned and not able to contact owner for verbal verification; Denied = owner refused access.
(2) Sampling frequency based on bottled water program recipients.
(3) NAD27 NV-West State Plane Coordinate system.
(a) Estimated location based on pre-existing GPS survey.
(b) Estimated location modified to match the well address and parcel number in the Site database and the NDWR well log.
(c) Newly identified and designated residences that were not included in the draft DWMP.
(4) Zone designation based on gravel-pack interval. S = shallow; I = intermediate; D = deep; U = Unknown (i.e., either due to incomplete or non-existent NDWR Well Driller's Reports). Combinations used where long screen and/or sand-pack intervals span multiple hydrostratigraphic zones.
(5) "- -" means information not available on the NDWR Well Driller's Report.
(6) Multiple screen intervals.
(7) DW-132 was formerly designated as DW-111.
(8) EPA requested inclusion of this well in the DWMP but the well does not have power and is not currently being used for domestic or agricultural purposes.
(9) WDW019 operates during the irrigation season (April through September), and sampling may only be possible during the second and third quarters.
bgs = below ground surface; amsl - above mean sea level.

As indicated in the footnotes to Table 2-1, the location coordinates for some domestic wells are based on pre-existing Global Positioning System (GPS) measurements taken in the late 1990s and presented in previous reports. The GPS units used at that time likely had a horizontal accuracy of approximately ± 100 feet. The locations of other domestic wells have been estimated by correlating the NDWR well log number with the APN, and providing location coordinates for the developed portion of the parcel.

During the first quarter 2010 monitoring event, domestic well locations will be surveyed by Brown and Caldwell using a Fast Static GPS survey method referenced to a known Project Datum survey point using the Nevada State Plane West Zone coordinate system (NAD27). The GPS method will be used to establish horizontal coordinates (X and Y). The GPS unit (a Trimble GeoXT handheld unit) is capable of achieving a horizontal accuracy of ± 3.0 feet (i.e., submeter). Vertical coordinates (Z) for each well will be established by plotting the locations on a topographic map and estimating the elevation of the drilling location. A vertical accuracy of ± 0.5 feet is typically achieved using this method. The new, more accurate, location coordinates will be presented in the quarterly domestic well monitoring reports. Similarly, if new wells are added to the program, GPS coordinates of the well location will be obtained when the well is first sampled and the location coordinates and available well construction information will be provided in the next quarterly domestic well monitoring report.

2.3 Sampling Frequency

Domestic wells belonging to residents who currently receive bottled water will be sampled semi-annually (March and September) to assess water quality relative to use of the well for agricultural purposes. Domestic wells belonging to residents who do not currently receive bottled water, or that have never been sampled, will be sampled quarterly. Pursuant to the EPA letter dated November 9, 2009 (EPA, 2009), the first quarterly sampling event, to include all domestic wells subject to quarterly or semi-annual sampling with signed access agreements, will begin in March 2010.

2.4 Laboratory Analytical Parameters

Domestic well water samples will be submitted to the analytical laboratory for analysis of the parameters presented in Table 2-2. Standard inorganic chemical analyses will be conducted by TestAmerica Irvine (TA-I) in Irvine, California. Radiochemical analyses will be conducted by TestAmerica Richland (TA-R) in Richland, Washington.

Table 2-2. Analyte List for Domestic Well Sampling

Parameter or Analyte	Total or Dissolved (1)	Method (2)	Reporting Limit (2)	MCLs (3)	Units
Physical Parameters and Major Anions/Cations					
Alkalinity, Bicarbonate (as $CaCO_3$)	Total	SM 2320B	2.0	- -	mg/L
Alkalinity, Carbonate (as $CaCO_3$)	Total	SM 2320B	2.0	- -	mg/L
Alkalinity, Hydroxide (as $CaCO_3$)	Total	SM 2320B	2.0	- -	mg/L
Alkalinity, Total (as $CaCO_3$)	Total	SM 2320B	2.0	- -	mg/L
Chloride	Total	EPA 300.0	0.5	- -	mg/L
Fluoride	Total	EPA 300.0	0.5	4.0	mg/L
Nitrate (as N)	Total	EPA 300.0	0.1	10	mg/L
Nitrate (NO_3 + NO_2 as N)	Total	EPA 300.0	0.1	10	mg/L
Nitrite (as N)	Total	EPA 300.0	0.1	1	mg/L
pH (Lab)	Total	SM 4500B	0.1	- -	pH units
Sulfate	Total	EPA 300.0	0.5	- -	mg/L
Total Dissolved Solids (TDS)	Total (Lab Filtered)	SM 2540C	10	- -	mg/L
Total Organic Carbon (TOC)	Total	SM 5310B	1.0	- -	mg/L
Metals					
Aluminum	Total	EPA 200.7	0.05	- -	mg/L
Arsenic	Total	EPA 200.8	0.001	0.010	mg/L
Barium	Total	EPA 200.8	0.001	2.0	mg/L
Beryllium	Total	EPA 200.8	0.0005	0.004	mg/L
Boron	Total	EPA 200.7	0.05	- -	mg/L
Cadmium	Total	EPA 200.8	0.001	0.005	mg/L
Calcium	Total	EPA 200.7	0.1	- -	mg/L
Chromium	Total	EPA 200.8	0.002	0.1	mg/L
Cobalt	Total	EPA 200.8	0.001	- -	mg/L
Copper	Total	EPA 200.8	0.001	1.3	mg/L
Iron	Total	EPA 200.7	0.04	- -	mg/L
Lead	Total	EPA 200.8	0.001	0.015 (4)	mg/L
Lithium	Total	EPA 200.7	0.002	- -	mg/L
Magnesium	Total	EPA 200.7	0.02	- -	mg/L
Manganese	Total	EPA 200.8	0.001	- -	mg/L
Molybdenum	Total	EPA 200.8	0.002	- -	mg/L
Nickel	Total	EPA 200.8	0.002	- -	mg/L
Potassium	Total	EPA 200.7	0.5	- -	mg/L
Selenium	Total	EPA 200.8	0.002	0.05	mg/L

Table 2-2. Analyte List for Domestic Well Sampling

Parameter or Analyte	Total or Dissolved (1)	Method (2)	Reporting Limit (2)	MCLs (3)	Units
Metals - Continued					
Silicon	Total	EPA 200.7	0.05	- -	mg/L
Sodium	Total	EPA 200.7	0.5	- -	mg/L
Strontium	Total	EPA 200.7	0.02	- -	mg/L
Uranium, Total	Total	EPA 200.8	0.001	0.03	mg/L
Vanadium	Total	EPA 200.8	0.002	- -	mg/L
Zinc	Total	EPA 200.8	0.01	- -	mg/L
Radiochemicals					
Gross Alpha	Total	EPA 900.0	1.0	15	pCi/L
Gross Beta	Total	EPA 900.0	1.0	4;50 (5)	millirems/yr; pCi/L
Radium-226	Total	EPA 903.0	1.0	5 (6)	pCi/L
Radium-228	Total	EPA 904.0	1.0	5 (6)	pCi/L

Notes: (1) The sample container for TDS is filtered in the analytical laboratory with a disposable 0.45 micron filter.
(2) EPA laboratory analytical methods and reporting limits are consistent with those provided in Revision 5 of the QAPP; alternative analytical methods identified in the QAPP may also be used.
(3) EPA National Primary Drinking Water Maximum Contaminant Level (MCL); "- -" means no MCL.
(4) The MCL set at zero; action level is 0.015 mg/L.
(5) The MCL for gross beta is 4 millirems per year. 50 pCi/L, which is approximately equivalent to 4 millirems per year, is used as a screening level for gross beta.
(6) The MCL for combined Radium 226 + 228 is 5 pCi/L.
"mg/L" is "milligrams per liter"
"pCi/L" is "picocuries per liter"

2.5 Access Agreements for Domestic Well Owners

Before a water sample can be collected from a domestic well system for the first time, a written access agreement between the well owner(s) and ARC will be required. For each domestic well proposed for sampling for the first time, the contact information (name, mailing address, phone number(s)) of the well owner(s) will be identified using information available at county/local agencies. Once a well owner(s) has been identified, an access agreement to allow sampling of the domestic well will be sent to the well owner(s) by certified mail at least 30 days in advance of the proposed sampling dates. It will be explicitly noted in the agreement that domestic well samples will be collected from the water supply line outside of the residence (ARC's contractors will not enter a residence under any circumstances to collect water samples).

If the domestic well owner(s) and/or residents do not respond to the mailing approximately two weeks after sending the proposed agreement and questionnaire, contact will be attempted by

other means (mailing, phone call, direct contact, etc.). If contact with the well owner(s) is unsuccessful after another two weeks has elapsed, additional efforts at contacting the well owner may be attempted as necessary. ARC will keep EPA informed of access agreement status during this process (i.e., after the first two weeks following the initial mailing and after the second alternative attempt at contact).

Under no circumstances will a water sample be collected from a domestic well system without having a valid written access agreement in place. This may limit the actual number of domestic wells sampled during a sampling event compared to wells summarized in Table 2-1, or additional wells identified after EPA approval of this DWMP. The status of the agreements for the March 2010 event is shown in Table 2-1 and will be discussed further with EPA prior to the March 2010 event and subsequent sampling events. Completed access agreements between a well owner and the client will be kept in the project file at Brown and Caldwell's Carson City office.

2.6 Field Sampling Plan

The Field Sampling Plan (FSP) for the DWMP presents the specific procedures for monitoring domestic well water quality including a description of the sampling methods, QC sample protocols, sample container requirements, sample preservation methods, decontamination procedures, and documentation of sampling activities. A specific SOP for sampling domestic wells is provided in Appendix B of this DWMP. Other SOPs referenced in this DWMP are included in Appendix E of the QAPP (Revision 5).

This FSP also serves as the field manual for sampling personnel, with easy-to-use procedures and methods for collecting quality, representative samples. Sampling personnel will: 1) read, understand, and use this FSP as a field manual during the sampling events; 2) consistently follow the procedures and protocols specified in this FSP for all sampling events; and 3) clearly document deviations from the FSP, including reasons for the deviations.

2.6.1 Sample Collection Location and Procedures

Water samples from domestic wells will be collected from a spigot on the water supply line located outside of the residence, at the location that is closest to the wellhead, which is consistent with previous domestic well sampling events and the monitoring objectives identified in Section 2.1. Samples will be collected from the same sample location during each sampling event, as conditions allow. Water will typically be purged at discharge rates between 5 and 10 gpm for a period of approximately 5 minutes. During past sampling events, higher discharge rates and/or longer purging times, when attempted, have been considered a nuisance by a number of domestic well owners or residents.

The specific location for discharging purge water will be left to the discretion of the field sampling staff and/or direction of the domestic well owner or resident. Samples will be collected directly into laboratory-supplied containers appropriate for the specific analysis being conducted. Each sample bottle is filled by tipping the sample container at a slight angle and allowing a steady stream of water to run down the inner wall. The sample container will be placed near the spigot, but not allowed to touch it. The domestic wells will be purged and sampled using the following procedures:

1. Arrive at well location and notify the occupant that well purging and sampling activities will occur.
2. If the occupant is home, provide a copy of the "Domestic Well Testing Program" flyer. If the occupant is not at home, indicate the well identification and date/time of sampling on the flyer and leave it at the front door.
3. Fill out **Domestic Well Field Sample Form**. Fill out: Date, Time, Well ID, and Sampler. Leave no blank spaces on the form.
4. Put on nitrile gloves.
5. Go to the "preferred sample location" as identified on previous field sampling records (i.e., the outside spigot closest to the well). A spigot closest to the well (i.e., upstream of any treatment system) should be used for purging and sampling so that only untreated water is sampled. However, an alternate spigot requested by the homeowner may be used as long as it is upstream of and does not draw water from a water softener tank, in-line filter, or other treatment system. Record information (e.g., presence, type, location, etc.) regarding water treatment if provided by the owner/resident on the **Domestic Well Field Sample Form**.

6. Remove the hose from the spigot. If necessary, the hose may be left on the spigot for purging, but it must be removed before sampling.
7. Turn on the spigot.
8. Allow water to run through the spigot for approximately 5 minutes or until approximately 25 gallons of water has discharged. Direct the purge water onto the ground or onto landscaping in the general area of the well.
9. Collect the groundwater sample. The valve on the spigot should be turned almost to the closed position to provide a low sampling flow rate that is as laminar as possible. The lip of the sample container should not be allowed to touch the spigot.
10. Close the spigot and re-attach the hose.
11. Complete the field documentation including field log book, field sampling form, chain of custody, and sample labels.
12. Place the sample containers in a chilled sample cooler (if required) until they are returned to the field office and prepared for shipment.
13. Pack up the equipment and go to next well.

At locations where purging and/or sampling vary from the above procedures due to location-specific well configurations or other conditions, actual purging and sampling procedures will be documented. As appropriate, procedures during future sampling events will be similar to previous sampling events to help promote data comparability and evaluation of long-term trends.

2.6.2 Sample Containers, Preservation, and Holding Times

Table 2-3 lists the number of sample bottles, the laboratory analyte(s), type and size of the sample containers, preservatives, holding times, and the analytical laboratory for groundwater samples that are collected from the domestic wells. All samples will be collected as unfiltered samples in new bottles supplied by the laboratory. Preservatives will be added into the sample containers by the laboratory before use at the Site. For consistency, sample containers will be filled in the following order during each monitoring event: physical parameters and cations/anions, metals, and radiochemicals. Consistent with the requirements of Revision 5 of the QAPP (ESI and Brown and Caldwell, 2009), each cooler containing samples that require temperature preservations will contain a temperature blank.

Each preserved container will be clearly marked with the appropriate preservative by the laboratory. Once the sample is collected in the field and shipped back to the laboratory, the pH of the preserved sample will be checked by the laboratory. If the pH of the sample is above 2, consistent with standard laboratory practice, more acid will be added to the sample to ensure that the pH is below 2 and the sample will be allowed to sit for 16 hours at room temperature so that constituents may desorb and/or re-dissolve back into the aqueous solution prior to analysis. Sample preservation methods are summarized in SOP-02 of the QAPP (Revision 5).

Table 2-3. Sample Parameter Groups, Container Sizes, Preservation Methods, Holding Times, and Analytical Laboratories

Qty.(1)	Analyte(s)	Type-Size	Preservative	Filter(2)	Holding Time	Lab
1	Physical parameters and cations/anions(3)	Polyethylene-500 ml	Cool to 4 °C	No filter	48 hours for nitrate and nitrite, 14 days for alkalinity, 28 days for others	TestAmerica-Irvine
1	Metals(4)	Polyethylene-500 ml	Nitric Acid to pH < 2; Cool to 4 °C	No filter	6 months	TestAmerica-Irvine
1	TOC	Glass with Septum Cap-250 ml	Hydrochloric Acid to pH < 2; Cool to 4 °C	No filter	28 days	TestAmerica-Irvine
4	Radiochemicals(5)	Polyethylene-1000 ml	Nitric Acid to pH < 2	No filter	6 months	TestAmerica-Richland

Notes: (1) Number of sample bottles filled for analyte(s).
(2) Samples for TDS analysis will be filtered in the analytical laboratory using a 0.45 micron disposable filter.
(3) Physical parameters and cation/anions listed in Table 2-2. Total Organic Carbon not included.
(4) Metals listed in Table 2-2.
(5) Radiochemicals listed in Table 2-2.
"ml"=milliliters
"µm"=micron

2.7 Documentation of Field Activities

All daily field activities including sample locations and identification numbers, and field observations, will be described in detail on appropriate forms following procedures in SOP-03 of the QAPP (Revision 5). The activities and details, complete with time tags, will also be written in the bound field logbook. Deviations from this FSP, the QAPP, SOPs or other guidance documents will be specifically documented in the logbook. The domestic well sampling form is included as an attachment to the domestic well sampling SOP included in Appendix B.

Sampling events will be recorded and documented in sufficient detail to allow personnel to reconstruct events that transpired during the life of the domestic well monitoring program. Entries are written in black indelible ink to allow preservation of information. A detailed description of logbook requirements is included in SOP-03 in the QAPP. The general documentation requirements are summarized as follows:

1. There will be no blank lines.
2. There will be no pages left blank.
3. Entries will be legible.
4. Entries will be written in indelible black ink.
5. Mistakes will be corrected by drawing a single line though the error. Corrections will be initialed. No entries will be obliterated for any reason.
6. The tops of pages will be numbered sequentially and dated. The sampler will initial and date the bottom of each page and sign the last page for each day.
7. Opinion or subjective material will not be entered into the logbook.

Each day, the following data will be recorded in the logbook:

1. Project name and date.
2. Weather (temperature, cloudiness, barometric pressure, wind).

At each well, the following data will be recorded in the logbook:

1. Well name and arrival time.
2. Person(s) sampling.
3. QA/QC samples collected and the sample designation.
4. Samples preservation (ice, acid preservative).
5. Equipment decontamination procedures, as necessary.
6. Decontamination/purge water disposal.
7. Comments (difficulties, questionable data, deviations from this FSP, etc).
8. Problems with field meters.
9. Visitors (name, title, organization).

2.8 Sample Identification, Documentation, and Custody

Collected samples will be labeled in water-proof ink with the following information: sample name, date and time of collection, name or initials of person collecting the sample, and analyte list. Similar information will also be entered on the chain-of-custody (COC) form, which remains with the respective collected sample through delivery to the laboratory. Field personnel will maintain custody of their respective samples until delivery to the laboratory, or if the samples are relinquished to another party.

A sample will be considered to be under a person's custody if the sample is:

- in the person's physical possession;
- in view of the person after that person has taken possession of the sample;
- secured by that person so that no individual can tamper with the sample; or
- secured by that person in an area that is restricted to authorized personnel.

The information required on the sample labels will also be entered on the COC form, which remains with the collected samples through delivery to the analytical laboratory. One COC form is completed for each collected sample. Completed COC forms are delivered with the samples to the appropriate analytical laboratory (TA-I or TA-R). Because two labs are being used for groundwater analysis, each sample is listed on two COC forms (one for each lab). Each COC form must match the samples included in the associated cooler.

The COC form will be filled out and signed in black indelible ink. The appropriate COC forms will be included in a cooler to match the samples in the cooler. Before sealing a cooler with tape, the COC forms will be double-checked against the samples in that cooler. The COC number and the date and time of delivery to the laboratory will be noted in the field logbook. A copy of the COC form is delivered to and retained by the Brown and Caldwell Project Manager.

The COC forms will include the following information:

- Project name.
- Unique sample identification number.
- Unique COC number.
- Sample collection date and time.
- Sample matrix.
- Number and type of containers submitted.
- Preservation method, if applicable.
- Analyses requested for each sample.
- Special handling or analysis requirements.
- Courier shipment tracking number.
- Dated signature of the person collecting the samples.
- Dated signature(s) of persons, other than the sampler, involved in the delivery of the samples to the laboratory.
- Dated signature of the laboratory acknowledging receipt of the collected samples.

2.9 Sample Packing and Transport

Once collected, groundwater samples will be packed for transport to the analytical laboratory using a courier service via overnight air and standard ground delivery. As indicated in Table 2-2, the samples for radiochemical analysis will be analyzed by TA-R, whereas the remaining samples are analyzed by TA-I. Because the hold time for analysis of nitrates/nitrites is 48 hours, samples will be shipped on ice overnight for delivery to TA-I the next business morning. Samples for radiochemical analysis will be shipped without ice to TA-R via ground delivery.

Sample handling and transport procedures are provided in SOP-01 of the QAPP (Revision 5), and summarized below:

1. COC forms are shipped in each set of coolers, and the forms need to match the bottles included in the cooler. The sampler needs to sign the COC when the samples are relinquished to the courier or the person delivering the coolers to the courier. The last person controlling the samples should relinquish the samples by signing and dating the form. A copy of the COC is retained by the sampler for storage in project files in Brown and Caldwell's Carson City office

2. Samples analyzed by TA-I will be stored and shipped on ice, whereas ice is not needed for samples shipped to TA-R.
3. In an empty cooler, place protective packing material (bubble wrap) on the bottom and sides of the cooler.
4. Place the sample bottles in the cooler such that there are no large voids between the sample bottles.
5. Count the number of samples in the cooler and the number of COCs. **If not the same, empty the cooler and start over.**
6. Fill new resealable plastic bags (i.e., Ziploc® bags) with ice. Check for rips or tears in the bag. Place the bagged ice in a second resealable plastic bag. Place the ice-filled bags in the cooler for shipment to TA-I to maintain a temperature in the cooler that is < 4 ^{o}C.
7. Cover the bottles and ice with bubble wrap. Ice should not be used to secure bottles.
8. Place the COCs that correspond to the samples in the cooler in a resealable plastic bag and place on top of the bubble wrap.
9. Close the cooler and tape the cooler closed by wrapping tape around the cooler 3-4 times, or an equivalent method. Tape the spigot closed.
10. Place custody seals on the right and left front side across the gap from the lid to the cooler.
11. Coolers shipped to TA-I contain ice as a preservative and are delivered via overnight air. If samples are shipped on a Friday afternoon, request a Saturday delivery to the lab on the courier form. Coolers shipped to TA-R are delivered via ground service.
12. Deliver the samples to either the TA-I or the TA-R lab at the following addresses:

TestAmerica Irvine	TestAmerica Richland
17461 Derian Avenue, Suite 100	2800 George Washington Way
Irvine, CA 92614-5817	Richland, WA 99354
(949) 261-1022	(509) 375-3131

2.10 Sample Documentation and Records

Field activities, including daily activities, sample locations and identification numbers, and any significant observations or events, will be described in detail on the appropriate forms and/or in the field notebook following procedures in SOP-03 of the QAPP. The activities and details, complete with time tags, will also be written in the bound field logbook. Any deviations from this DWMP, the QAPP including the SOPs, or any other guidance documents are specifically documented in the notebook and/or logbook. The form for domestic well sampling is included as an attachment to the domestic well sampling SOP (Appendix B).

Entries will be written in black indelible ink to allow preservation of data. Mistakes will be corrected by drawing a single line though the error and the author initialing next to the deleted error. No entries will be obliterated for any reason. A more detailed description of logbook requirements is in SOP-03 of the QAPP (Revision 5).

2.11 Handling and Disposition of Investigation-Derived Wastes

Wastes generated during field investigations are handled following procedures indicated in SOP-06 of the QAPP (Revision 5). Purge water associate with sampling of the domestic wells will be discharged to the ground surface. The specific location for discharging purge water will be left to the discretion of the field sampling staff and/or direction of the domestic well owner or resident. Typically, purge water will be discharged onto the ground or landscaping in the general area of the sampled well.

SECTION 3.0
QUALITY ASSURANCE/QUALITY CONTROL

The monitoring activities presented in this DWMP will be conducted pursuant to the QAPP (Revision 5) and incorporate the following: SOPs, equipment calibration and maintenance, independent audit, field and laboratory QC samples, data validation, corrective action, and data completeness. Additional QA/QC procedures specific to the DWMP are described below.

3.1 Standard Operating Procedures

Domestic well sampling SOPs are detailed, written procedures that are followed during the collection of unfiltered samples. The use of SOPs is meant to ensure consistency across multiple sampling events that may be conducted by different personnel. As described above, the SOP describing procedures for sampling domestic wells is provided in Appendix B. Other SOPs that are pertinent to this DWMP are included in Appendix E of the QAPP (Revision 5).

3.2 Sample Analysis Validation

The type and reliability of methods used to analyze samples is very important in ensuring that the data are of a known and acceptable quality, and that the data can be used for their intended purpose. The following sections describe the methods that are likely to be used, and the standards and procedures that will be followed to ensure that data are acceptable. This is described in greater detail in the QAPP (Revision 5).

3.2.1 Data Quality Objectives and Measurement Performance Criteria

The QAPP (Revision 5) contains a discussion and summary of DQOs and measurement performance criteria for laboratory and field work. Specifically, these include precision, accuracy, comparability, and sensitivity of data. These are generally described as follows.

Precision refers to the degree to which repeated measurements are similar to one another. It measures the reproducibility among individual measurements obtained under prescribed similar conditions. Measurements, which are precise, are in close agreement. The QAPP identifies the measurements that are precise as well as the formula used to determine precision. Precision is generally assessed by the measurement of sample duplicates, matrix spike/matrix spike duplicate (MS/MSDs), and laboratory control sample/laboratory control sample duplicates (LCS/LCSD).

Accuracy is defined as the measurement of the closeness of an individual reading, or the average of a number of readings, to the true value. The accuracy measurement is generally determined by the percent recovery (%R) of a known value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations. The variance from the true value represents the bias associated with the accuracy.

Comparability is generally defined as a measure of the confidence with which one data set or method can be compared to another. Comparability of data is achieved by ensuring samples have been collected and analyzed following the same protocols.

Sensitivity is defined as the capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest. The QAPP includes a definition of method detection limits (MDLs) and reporting limits (RLs), and identifies how MDLs and RLs have been determined.

3.2.2 Quality Assurance and Quality Control Sampling

QA/QC samples to be collected at regular intervals as part of the DWMP include duplicate, MS/MSD and field blank samples. Equipment rinsate blanks will not be collected because non-dedicated sampling equipment will not be used to collect samples from domestic wells. QA/QC sample designations and the associated original samples will be documented on the sampling logs and in the field logbook.

Duplicate samples will be used to compare the results from two separate samples taken from the same location will be collected at a rate of one duplicate per ten samples (or less) collected. For each duplicate sample, a second set of bottles will be filled following the same procedure used for the original sample. The duplicate and original sample bottles will be filled by alternating the discharge between the bottles after each one-third of the bottle is filled. Duplicate samples will be designated by adding the suffix "-FD" to the well name from which the duplicate was collected (e.g., a duplicate sample from B/W-3S is designated as B/W-3S-FD). Wells where duplicate samples will be collected will be selected at random prior to each sampling event, and may be subject to change during the event based on access and/or field conditions. Wells selected for duplicate analysis will be identified on the sampling log.

MS/MSD samples will be collected to evaluate laboratory control procedures and to verify the DQOs. MS/MSD samples will be collected at a rate of one MS/MSD per 20 samples (or less). MS/MSD sampling entails filling twice the number of bottles as a regular sample, and the bottles will be given the same sample identification. MS/MSD samples will also be collected by alternating the discharge between the original sample bottles and the MS/MSD sample bottles, and will be noted on the sample COC. Wells where MS/MSD samples will be collected will be selected at random prior to each sampling event, and may be subject to change during the event based on access and/or field conditions. Wells selected for MS/MSD analysis will be identified on the sampling log.

Blank samples will be used to evaluate if chemicals have been introduced into samples during the purging/sampling procedures. Each blank sample is a full bottle set with a unique sample designation. Field blanks will be designated as "FB". Each blank will be sequentially numbered in the order collected starting with "-01". The sample bottles will be filled with laboratory-supplied deionized (DI) water in the same manner as the original sample. A field blank will be collected at a rate of one blank for every 20 samples (or less).

SECTION 4.0

NOTIFICATION, REPORTING REQUIREMENTS AND SUBMITTAL SCHEDULE

4.1 Notification of Sampling Events

ARC will provide EPA a 30-day advance notice of the mobilization date for each quarterly and semi-annual sampling event so EPA can coordinate field oversight by its staff and/or its contractors. Additionally, within 30 days of each sampling event, ARC will provide EPA with a list of domestic wells that it intends to sample and the status of any outstanding access agreements, if any.

4.2 Domestic Well Monitoring Reports

A report documenting each quarterly domestic well sampling event will be submitted to the EPA within thirty (30) days of data verification/validation, which is conducted in accordance with the procedures specified in Section 8.0 of the QAPP (Revision 5). These Quarterly Domestic Well Monitoring Reports will include:

- a description of the monitoring activities conducted during the previous quarter;
- a chronological summary of water quality analyses for all domestic wells (including wells periodically or no longer sampled);
- maps illustrating the distributions of sulfate (which is an indicator of mine-impacted groundwater) and uranium (which is used for making decisions regarding bottled water supply);
- charts illustrating trends in chemical concentrations versus time at each domestic well;
- a discussion of the distribution of chemicals in Site groundwater;
- a discussion of the trend in chemical concentrations in Site groundwater; and
- a discussion of any QA/QC issues that arose in the previous quarter.

Also, EPA comments on any quarterly report will be addressed in the subsequent quarterly report or annual report. An Annual Domestic Well Monitoring Report will be prepared for the fourth quarter sampling event, which will include the elements specified above for the Quarterly Domestic Well Monitoring Reports and will also include the following:

- a description of the scope and objectives of the monitoring program;
- an assessment of trends in chemical concentrations in the domestic wells using the non-parametric Mann-Kendall statistical test;
- identification of new chemicals or changes in chemical distribution; and
- recommendations for changes or additions to/deletions from the list of domestic wells to be sampled, including changes to the monitoring frequency for specific wells.

The DWMP will be updated as necessary to document EPA-approved modifications to the monitoring program for the next year that may be presented in the Annual Domestic Well Monitoring Reports.

SECTION 5.0
FUTURE MODIFICATIONS TO THE MONITORING PROGRAM

Potential future modifications of the DWMP may include the elimination or addition of domestic wells, changes to the frequency for water quality sampling, elimination or addition of laboratory analytical parameters and other possible modifications. The proposed process for potential modifications to the DWMP is presented below.

The decision process for permanently eliminating domestic wells included in the monitoring program will take into consideration, but may not be limited to the following: DWMP objectives, rationale for initially including the well, results of domestic well water chemical analyses, risk estimates and/or the decision to supply alternative water sources to current domestic well users. Similarly, the decision process for changing the frequency of water quality monitoring will take into consideration the objectives of the DWMP, rationale for the initial monitoring frequency and temporal variability in chemical data to determine if a change is warranted.

Decisions on the elimination or addition of laboratory analytical parameters for groundwater monitoring will be based on their presence/absence, magnitude with respect to background concentration ranges, spatial distribution, temporal variability, and use in assessing potential risk. Criteria that will be applied to determine which parameters should be eliminated may include:

- Analytes that are not detected above the laboratory reporting limit during four consecutive quarterly sampling events;
- Analytes that are infrequently detected (e.g., detected in < 5% of the samples from a given well) and/or when detected are present at concentrations that are only slightly above laboratory reporting limits;
- Analytes that have a limited spatial distribution, are not detected in off-Site groundwater at concentrations that exceed background, and are redundant with other analytes for providing information on spatial distribution and temporal variability of contaminant plumes;
- Analytes that remain below their respective drinking water standard during four consecutive quarterly sampling events, and do not exhibit a statistically significant increase in magnitude;

- Analytes for which there is no drinking water standard, do not exhibit a statistically significant increase in magnitude, and are not typically associated with the ore or waste products of a porphyry copper deposit; and
- Analytes that are not typically associated with copper ore processing, are not considered "indicator parameters", have not exceeded drinking water standards during the previous year, and have been reported at generally low levels shall be recommended for elimination.

ARC will proposed any changes to the DWMP, including the removal of wells and analytical parameters, to the EPA and provide the technical basis for the requested change. Changes to the DWMP will only occur after EPA approval is received. An explanation of the rationale for eliminations to the program will be documented in the Domestic Well Monitoring Report following the elimination.

SECTION 6.0
HEALTH AND SAFETY

DWMP field activities will be conducted in accordance with Revision 1 of the Health and Safety Plan (HASP) for the Site (Brown and Caldwell, 2009b). The HASP identifies, evaluates, and prescribes control measures for health and safety hazards, including radiological hazards, and describes emergency response procedures for the Site. HASP implementation and compliance is the responsibility of Brown and Caldwell, with ARC taking an oversight and compliance assurance role. Copies of the HASP are located at the Site, in ARC's La Palma, California office, and in Brown and Caldwell's Carson City, Nevada office. The HASP includes:

- safety and health risk or hazard analysis;
- employee training requirements;
- personal protective equipment (PPE);
- medical surveillance;
- site control measures (including dust control);
- decontamination procedures; and
- emergency response.

The HASP includes a section for Site characterization and analysis that would identify specific Site hazards and aid in determining appropriate control procedures. Required information for Site characterization and analysis includes:

- description of the response activity or job tasks to be performed;
- duration of the planned employee activity;
- site topography and accessibility by air and roads;
- identified safety and health hazards;
- hazardous substance dispersion pathways; and
- emergency response capabilities.

6.1 Training

All contractors will receive applicable training, as outlined in 29 Code of Federal Regulations (CFR) 1910.120(e) and as stated in the HASP. Site-specific training will be covered at the pre-entry briefing, with an initial Site tour and review of Site conditions and hazards. Records of pre-entry briefings will be maintained at the Site.

Site-specific training elements include:

- persons responsible for Site-safety;
- Site-specific safety and health hazards;
- use of PPE;
- work practices;
- engineering controls;
- major tasks; and
- decontamination procedures and emergency response.

Other required training, depending on the particular activity or level of involvement, includes Occupational Safety and Health Administration (OSHA) 40-hour training and annual 8-hour refresher courses. Other training may include, but is not limited to, competent personnel training for excavations and confined space. Copies of Site personnel OSHA certificates will be maintained at the Site and in employee personnel records.

6.2 Personal Protective Equipment

Minimum PPE requirements while performing the sampling task or other field activities outlined in this DWMP include:

- safety glasses with side shields;
- steel-toe boots;
- high-visibility reflective vest;
- nitrile and/or leather work gloves (as needed); and
- long sleeve shirt.

6.3 Work Risk Assessment

Work Risk Assessment (WRA) is a tool that is used to identify the hazards associated with all aspects of a specific task and to then identify the preventive actions that can be implemented to minimize the hazards. Hazard control can be accomplished by: 1) task elimination; 2) use of engineering controls to reduce hazard exposure; or 3) the use of PPE to protect personnel from injury.

Comprehensive WRAs are completed for the field tasks required in this DWMP before the work is initiated and are developed jointly by the field staff conducting the work and the Site Safety Manager. All field staff and sub-contractors review the WRA before conducting the work and frequently throughout the task to identify new hazards or controls. Task-specific WRAs are kept on-Site at all times. A general summary of the potential hazards for groundwater sampling and related tasks is provided in Table 7-1. Task-specific WRAs for sampling of domestic wells are provided in Appendix C, and are subject to revision at any time before or during implementation of these field activities.

Table 7-1. Work Risk Assessment Summary

Field Activities	Potential Hazards
1. Groundwater (domestic well) sampling	▪ Skin irritation from dermal or eye contact with groundwater. ▪ Slipping or falling on uneven or wet ground surface. ▪ Encounters with domestic animals or livestock. ▪ Burn or corrosion from sample preservatives. ▪ Lifting and ergonomic hazards from lifting sample cooler
2. General activities	▪ Heat stress due to high ambient temperature, improper clothing, lack of ventilation, lack of water, or lack of shade. ▪ Hypothermia or frostbite due to low ambient temperature, improper clothing, damp or wet clothing, or lack of source for heat. ▪ Sunburn from lack of shade or improper clothing. ▪ Biological hazard from contact with spiders, insects, or reptiles.
3. Unsafe conditions	▪ Unexpected hazardous conditions such as wind, rain, snow, fire, earthquake, or other natural disaster can occur.

Note: This is a partial list of potential hazards. The proper WRA(s) should be reviewed before commencement of work activities.

SECTION 7.0
REFERENCES

Brown and Caldwell, 2008, *Second-Step Hydrogeologic Framework Assessment (HFA) Data Summary Report Yerington Mine Site, Lyon County, Nevada.* Prepared for the Atlantic Richfield Company. October 15, 2008.

Brown and Caldwell, 2009a, *Site-Wide Groundwater Monitoring Plan, Yerington Mine Site, Lyon County, Nevada (Revision 1).* Prepared for the Atlantic Richfield Company. December 15, 2009.

Brown and Caldwell, 2009b, *Site-Wide Health and Safety Plan, Yerington Mine Site, Lyon County, Nevada, Revision 1.* Prepared for the Atlantic Richfield Company. December 15, 2009.

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EPA, 2002, *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers.* Ground Water Forum Issue Paper by D. Yeskis and B. Zovala. Office of Solid Waste and Emergency Response. EPA 542-S-02-001.

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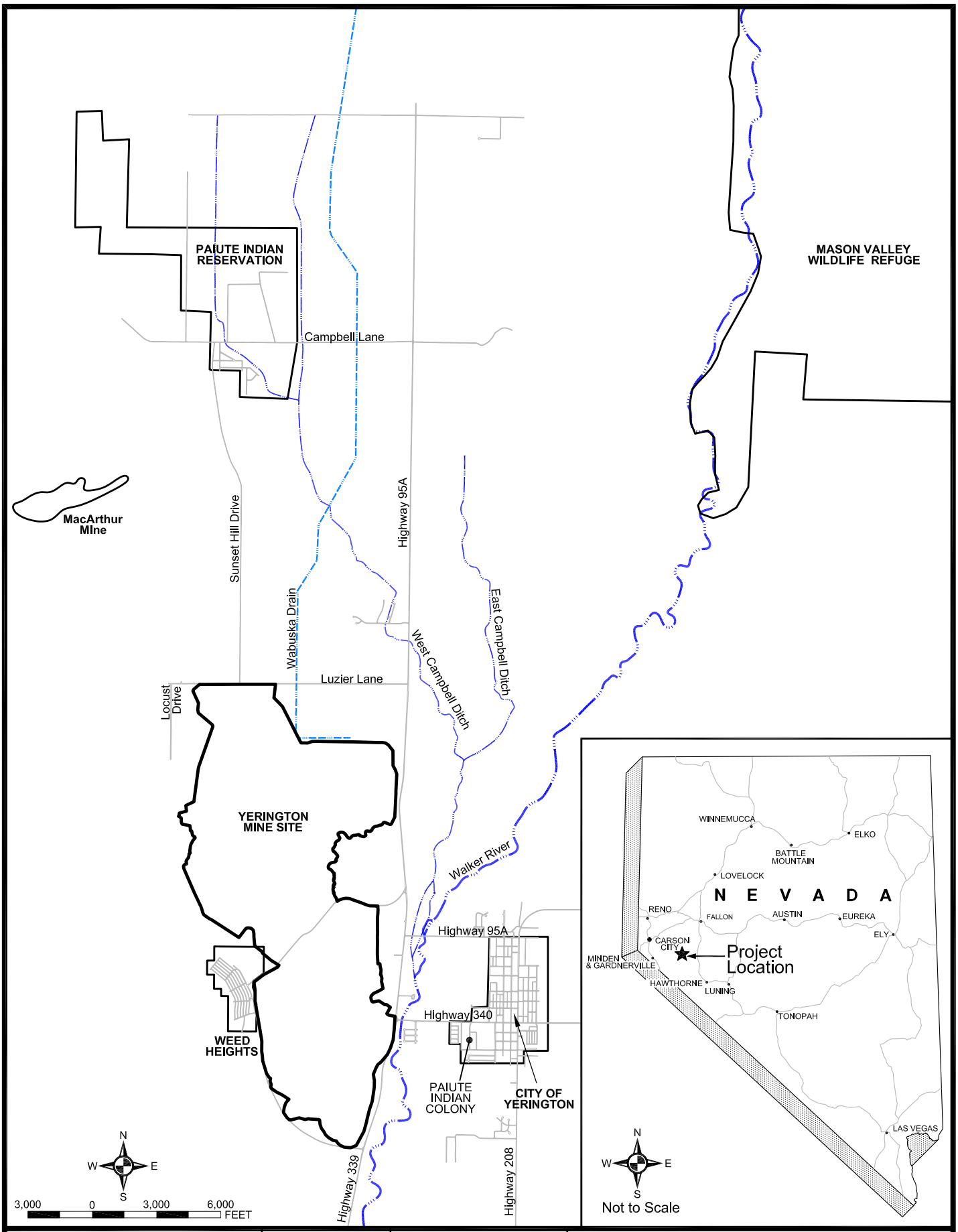
Figures



Brown AND Caldwell

Date: June 2010

Atlantic Richfield Company

Project: 138553

N W E S

0 3,000 6,000 FEET

Figure 1-1

Project Location

Jun 30, 2010 - 12:52pm rjohnson
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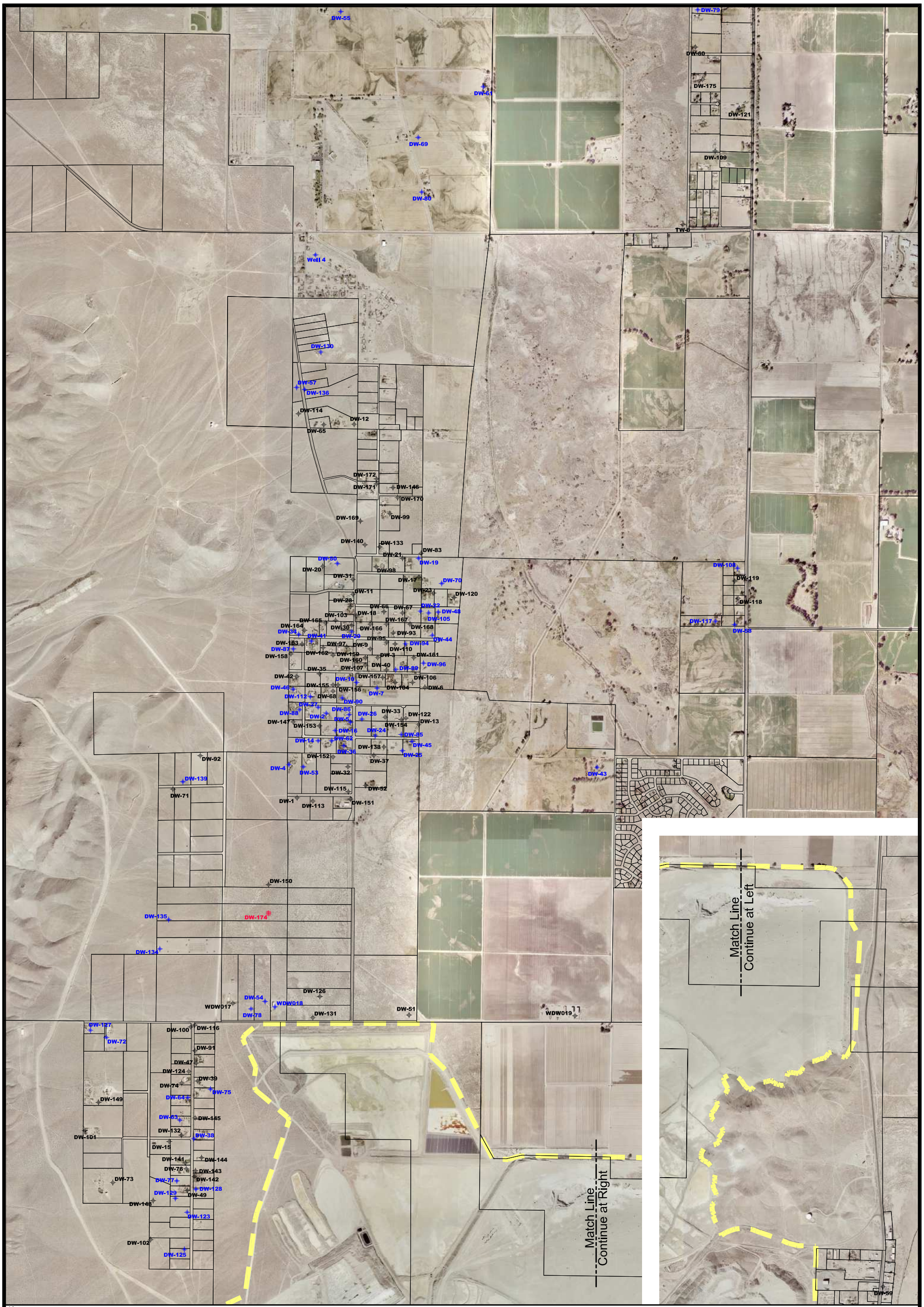

Notes:
1. Projection: Nevada State Plane, West Zone 1927 North American Datum (Feet)
2. Base photo taken October 3, 2001
3. Well WDW019 to be sampled during irrigation season

Explanation

DW-174 Domestic Well Location - Not Available

Site Boundary

DW-102 Domestic Well Location - Quarterly Sampling

DW-125 Domestic Well Location - Semi-Annual Sampling

Brown AND Caldwell

Date: June 2010

Atlantic Richfield Company

Project: 138553

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Figure 2-1

Domestic Well Locations

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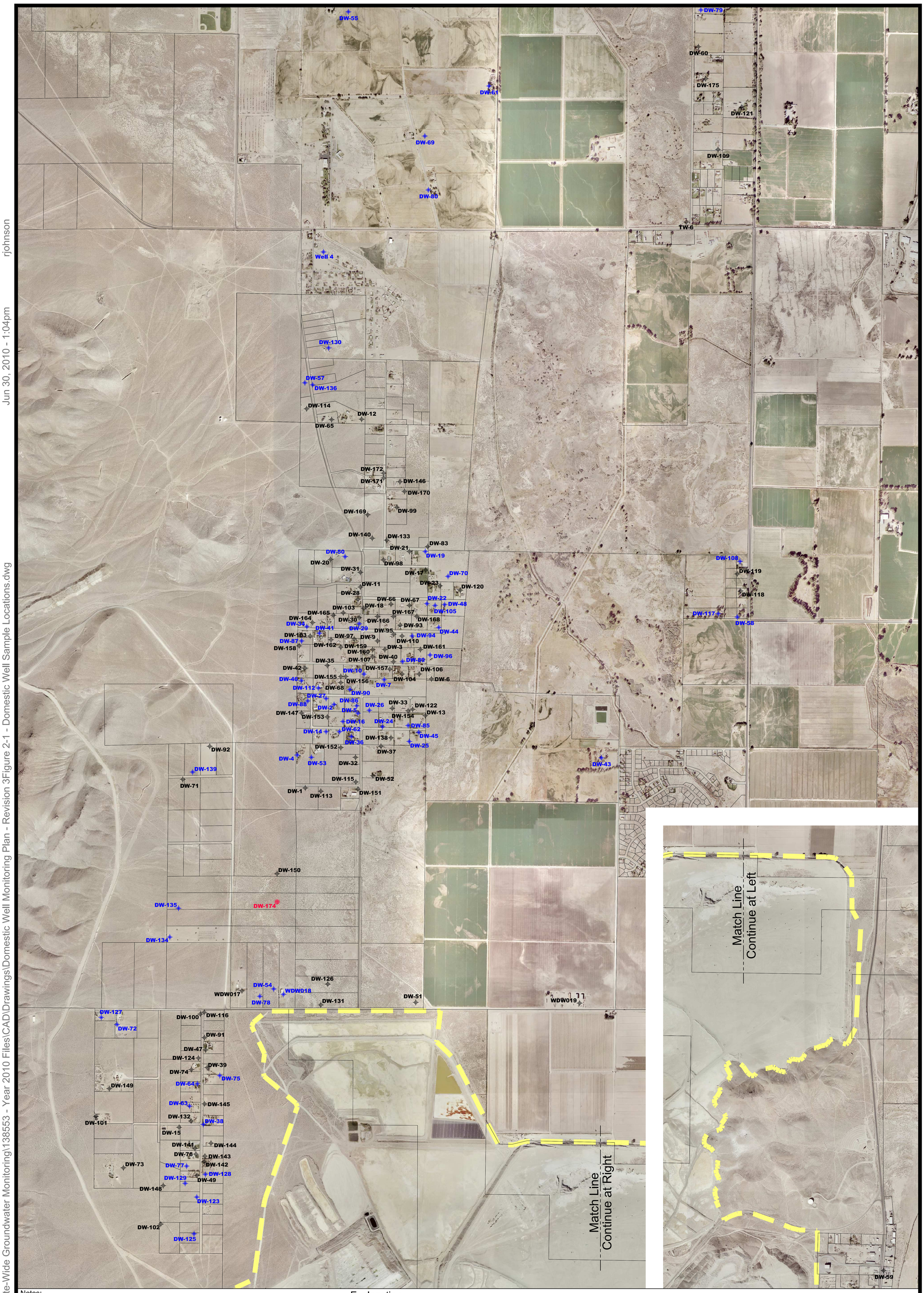

Notes:
1. Projection: Nevada State Plane, West Zone 1927 North American Datum (Feet)
2. Base photo taken October 3, 2001
3. Well WDW019 to be sampled during irrigation season

Explanation

- DW-174 — Domestic Well Location - Not Available
- Site Boundary
- DW-102 — Domestic Well Location - Quarterly Sampling
- DW-125 — Domestic Well Location - Semi-Annual Sampling

Brown AND Caldwell

Date: June 2010

Atlantic Richfield Company

Project: 138553

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Plate 1

Domestic Well Locations

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Jun 30, 2010 - 1:04pm

rjohnson

Appendix A

Document History

Table A-1. Domestic Well Monitoring Plan Document History		
Date	**Activity**	**Reference**
November 9, 2010	EPA letter to ARC requesting a DWMP	EPA, 2009
December 15, 2009	ARC submits the Draft DWMP to EPA	Brown and Caldwell, 2009a
January 4, 2010	YPT submits comments on the Draft DWMP to EPA	YPT, 2010a
January 22, 2010	ARC submits the *2009 Annual Domestic Well Monitoring Report* to EPA	Brown and Caldwell, 2010a
January 29, 2010	EPA provides comments on the Draft DWMP	EPA, 2010a
February 4, 2010	EPA provides comments on the Draft DWMP	EPA, 2010b
February 12, 2010	ARC submits the DWMP – Revision 1	Brown and Caldwell, 2010b
February 12, 2010	ARC submits responses to comments on the December 11, 2009 Draft DWMP	ARC, 2010a
February 18, 2010	EPA provides comments on the *2009 Annual Domestic Well Monitoring Report*	EPA, 2010c
March 2, 2010	YPT provides comments on the DWMP – Revision 1 to EPA	YPT, 2010b
March 9, 2010	EPA provides comments on the DWMP – Revision 1 to ARC	EPA, 2010d
March 17, 2010	ARC submits the DWMP – Revision 2 to the EPA	Brown and Caldwell, 2010c
March 17, 2010	ARC submits responses to comments on the DWMP – Revision 1	ARC, 2010b
March 30, 2010	EPA e-mail to ARC requesting additional language/rationale for the domestic well purge method	EPA, 2010e
March 31, 2010	ARC e-mail containing the proposed additional language to be included in the DWMP	ARC, 2010c
April 27, 2010	YPT comments on the DWMP – Revision 2 provided to EPA.	YPT, 2010c
June 15, 2010	EPA comments on the DWMP – Revision 2 provided to ARC	EPA, 2010f
July 2, 2010	ARC submits this DWMP – Revision 3	Brown and Caldwell, 2010d

ARC, 2010a, Letter to EPA Subject: Responses to EPA January 29 and February 4, 2010 Comments on the December 11, 2009 Draft Addendum to the Site-Wide Quality Assurrance Project Plan, Domestic Well Monitoring Plan for the Yerington Mine Site; Submittal of the Domestic Well Monitoring Plan – Revision 1; Administrative Order for Remedial Investigation and Feasibility Study, EPA Docket No. 9-2007-0005. February 12.

ARC, 2010b, Letter to EPA Subject: Responses to EPA Comments dated March 9, 2010 on the Addendum to the Site-Wide Quality Assurrance Project Plan, Domestic Well Monitoring Plan – Revision 1 (DWMP) dated February 12, 2010, and Submittal of the DWMP – Revision 2; Administrative Order for Remedial Investigation and Feasibility Study, EPA Docket No. 9-2007-0005. March 17.

ARC, 2010c, E-mail to EPA Subject: DWMP - Revision 2. March 31.

EPA, 2009, Letter to the Atlantic Richfield Company RE Domestic Well Monitoring Program. Anaconda/Yerington Mine Site. November 9, 2009.

Brown and Caldwell, 2009a, *Draft Addendum to the Site-Wide Quality Assurance Project Plan, Domestic Well Monitoring Plan, Yerington Mine Site, Lyon County, Nevada.* Prepared for the Atlantic Richfield Company. December 11, 2009.

Brown and Caldwell, 2010a, *2009 Annual Domestic Well Monitoring Report, Yerington Mine Site, Lyon County, Nevada.* Prepared for the Atlantic Richfield Company. January 22, 2010.

Brown and Caldwell, 2010b, *Addendum to the Site-Wide Quality Assurance Project Plan, Domestic Well Monitoring Plan – Revision 1, Yerington Mine Site, Lyon County, Nevada.* Prepared for the Atlantic Richfield Company. February 12, 2010.

Brown and Caldwell, 2010c, *Addendum to the Site-Wide Quality Assurance Project Plan, Domestic Well Monitoring Plan – Revision 2, Yerington Mine Site, Lyon County, Nevada.* Prepared for the Atlantic Richfield Company. March 17, 2010.

Brown and Caldwell, 2010d, *Addendum to the Site-Wide Quality Assurance Project Plan, Domestic Well Monitoring Plan – Revision 3, Yerington Mine Site, Lyon County, Nevada.* Prepared for the Atlantic Richfield Company. July 2, 2010.

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EPA, 2010b, Letter to the Atlantic Richfield Company RE: Response to Comments on Table 2-1 of the Draft Addendum to the Site-Wide Quality Assurrance Project Plan, Domestic Well Monitoring Program, Yerington Mine Site (12/11/2009). February 4, 2010.

EPA, 2010c, Letter to the Atlantic Richfield Company RE: Comments on the 2009 Annual Domestic Well Monitoring Report (January 22, 2010). February 18, 2010.

EPA, 2010d, Letter to the Atlantic Richfield Company RE: Comments on the Addendum to the Site-Wide Quality Assurance Project Plan, Domestic Well Monitoring Program – Revision 1, Yerington Mine Site (2/12/2010). March 9, 2010.

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YPT, 2010a, Letter to the EPA RE: Draft QAPP Addendum, Domestic Well Monitoring Plan December 11, 2009, Yerington Mine Site, Lyon County, Nevada. January 4.

YPT, 2010b, Letter to the EPA RE: Draft QAPP Addendum, Domestic Well Monitoring Plan, February 12, 2010, Yerington Mine Site, Lyon Conty, Nevada. March 2, 2010.

YPT, 2010c, Letter to the EPA RE: Addendum to the Site-Wide QAPP, Domestic Well Monitoring Plan – Revision 2, March 17, 2010, Yerington Mine Site, Lyon County, Nevada. April 27.

Appendix B

Domestic Well Sampling SOPs

SOP-25
Domestic Well Groundwater Sample Collection

Yerington Mine Site
Standard Operating Procedure

Date: February 12, 2010

SOP-25
DOMESTIC WELL SAMPLE COLLECTION

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1.0 OBJECTIVES

The primary objective of this standard operating procedure (SOP) is to establish a uniform method for collecting water samples from domestic, commercial, and irrigation wells (herein after referred to as "domestic" wells), and to reduce the potential variability associated with purging and sampling.

2.0 SCOPE AND APPLICABILITY

This SOP will be used to support field domestic well sampling activities associated with the Yerington mine site (Site). Domestic well sampling involves two primary operations: 1) to the extent practicable, purging stagnant water from a domestic well system in a consistent manner that ideally reflects typical domestic well use, and 2) the collection of a water sample from the domestic well.

3.0 REQUIRED MATERIALS

Materials required for collecting water samples from domestic well systems at the Site are minimal given that samples are to be discharged from a spigot on the water supply line located outside of the residence directly into sample bottles without the use of additional equipment. The materials anticipated to be needed are as follows:

- Personal protection equipment (as required by the Site Health and Safety Plan)
- Domestic Well Field Sample Form
- Permanent marking pens
- Field logbook
- Resealable plastic bags
- Chain-of-Custody (COC) forms
- Shipping labels
- Shipping coolers and ice

4.0 RESPONSIBILITIES

The *Project Manager*, or designee, will have the responsibility to oversee and ensure that groundwater purging and sampling procedures are implemented in accordance this SOP and other relevant project- or Site-specific planning documents.

Field personnel will be responsible for understanding and implementation of this SOP during domestic well sampling activities as well as obtaining the appropriate field logbooks, forms, and records necessary to complete the field activities.

5.0 METHODS

5.1 Access Agreements from Domestic Well Owner(s)

Before a water sample can be collected from a domestic well system for the first time, a written access agreement between the well owner(s) and ARC will be required. For each domestic well proposed for sampling for the first time, the contact information (name, mailing address, phone number(s)) of the well owner(s) will be identified using information available at county/local agencies. Once a well owner(s) has been identified, an access agreement to allow sampling of the domestic well will be sent to the well owner(s) by certified mail at least 30 days in advance of the proposed initial sampling date. It will be explicitly noted in the agreement that domestic well samples will be collected from the water supply line outside of the residence (ARC contractors will not enter a residence under any circumstances to collect a water sample).

If the domestic well owner(s) and/or residents do not respond to the mailing approximately two weeks after sending the proposed agreement, contact will be attempted by other means (mailing, phone call, direct contact, etc.). If contact with the well owner(s) is unsuccessful after another two weeks has elapsed, additional attempts may be attempted as appropriate. Completed access agreements will be maintained for the duration of the agreement in the project file at Brown and Caldwell's Carson City office.

ARC will keep EPA informed of access agreement status during this process (i.e., after the first two weeks following the initial mailing and after the second alternative attempt at contact). Under no circumstances will a water sample be collected from a domestic well system without having a valid written access agreement in place. This may limit the actual number of domestic wells sampled during a sampling event compared to wells summarized in Table 2-1, or additional wells identified after EPA approval of this DWMP. ARC plans to discuss the status of access agreements prior to the start of the March 2010 and subsequent sampling events.

5.2 General Considerations

Sampling of domestic wells involves two primary operations. These include the purging of stagnant water from the well followed by the collection of a sample. Good communication is essential to the ultimate success of a domestic well sampling project. This includes communication within the project team, as well as communication with the client and analytical laboratory, when establishing project objectives.

Good communication with the project team, laboratory, client, and, if appropriate, regulatory agencies, includes complete project-specific planning documents such as field sampling plans (FSPs), quality assurance project plans (QAPPs), and scope of work (SOW) documents for subcontracted laboratories. Plans should include detailed information with respect to Site-specific requirements, with reference to SOPs wherever possible, and risk criteria that will be used to assess the data. The QAPP and laboratory SOW (of which the QAPP can be part) should contain detailed information on what is expected from the laboratory regarding the methods to be used, required analytical detection limits, quality assurance (QA) measures, and deliverables (especially electronic deliverable formats).

In addition to good communication, the project plans should consider sampling equipment, equipment decontamination, sampling sequence, and field quality assurance/quality control (QA/QC) samples. These are described in the following sections.

5.2.1 Sampling Equipment

During previous domestic well sampling events at the Site, water samples from domestic well systems were typically discharged directly into the appropriate sample containers from a spigot on the water supply line located outside of the residence. To help ensure comparability of historic and new data, the same sampling method will be followed for future sampling events and samples shall be collected from the same sample location each time, as conditions allow. Therefore, it is not anticipated that specific equipment for sampling of domestic wells will be used.

5.2.2 Equipment Decontamination

The sampling procedure does not require use of equipment at multiple domestic well sampling locations. Consequently, there is no equipment that requires decontamination between sampling locations.

5.2.3 Sequence of Sampling

The sequence in which domestic wells are sampled is not relevant from a chemical composition standpoint because sampling equipment that would need decontaminated between multiple sampling locations is not used, and access to the wells is controlled in part by the availability of a residence to provide access to field personnel to sample the respective well on a specific day.

5.2.4 Field QA/QC Methods

To assess the accuracy and precision of the field methods and laboratory analytical procedures, quality assurance/quality control (QA/QC) samples are collected during the sampling program according to the project Work Plan. QA/QC samples may be labeled with QA/QC identification numbers or fictitious identification numbers if blind submittal is desired, and are sent to the laboratory with the other samples for analyses. The frequency, types, and locations of QA/QC samples are specified in the project QAPP or Work Plan. Examples of QA samples anticipated to be collected during domestic well sampling include field blanks, duplicate samples, and matrix spike/matrix spike duplicate (MS/MSD) samples.

5.3 Planning

The analytical requirements and schedule must be well defined and clearly communicated to the analytical laboratory, project management, and regulatory agencies before conducting the field work. Written communication is encouraged, in particular to document requirements for specific analytical methods, detection limits, and other special needs. Written communication should include a detailed FSP and/or SOW that includes the Site QAPP requirements.

5.3.1 Preparatory Office Activities

Materials and sample bottles should be organized in the office before embarking on a field sampling project to the extent practicable. The time spent in the field should be spent on sample collection. General preparatory activities to be completed in the office are as follows.

Land Owner Notification and Communication

Written notification of intent to sample will be sent to the land owners/occupants no sooner than two weeks before the scheduled sampling event. The notification will include the range of sampling event dates that personnel may be on the property. As needed, some well owners/occupants may be contacted by phone. The sampling procedure may be discussed with the land owner/occupant, but the results of previous analyses will not be discussed. Opinions about the Site will not be discussed with the land owner/occupant. The client has a fact sheet that lists what facts may be discussed with land owners/occupants. Topics not included on the fact sheet will be avoided. If necessary, the land owner/occupant will be provided with the client's phone number to contact for more information.

Analytical Parameter Identification and Laboratory Notification

The proposed list of chemical parameters to be analyzed by the laboratory will be reviewed and updated as required by the client and/or regulatory agency. The analytical laboratory will be notified at least three weeks before the first date of the anticipated sampling event. This will allow the lab sufficient time to plan for the anticipated workload and also to ship the sample bottles.

Sample Containers and Preservatives

The appropriate sample containers and associated preservatives will be supplied by the laboratory that will be responsible for the analyses. Sample containers should be organized and inventoried several days before initiation of the sampling program to provide sufficient time to rectify problems, should they occur. Whenever possible, pre-printed sample labels should be created before mobilization. Sample containers with acid preservatives should not be more than six months old and should have been stored in a clean secure location. Some preservatives may have an even shorter shelf life.

5.3.2 Preparatory Field Activities

Prior to starting daily sampling activities, field personnel should gather a sufficient quantity of sample containers, field supplies, COCs, labels, and coolers with ice for the day's planned activities.

Upon arrival at a well location, the occupant should be notified that well purging and sampling activities will occur. If the occupant is at home, a copy of the "Domestic Well Testing Program" flyer should be provided, and if they are not home the flyer should be left at the front door indicating the well ID and date and time the sample was collected. Also, the condition of the well casing and water supply line(s) should be observed before purging/sampling. If observed, signs of damage should be documented. Prior to the first sampling event at each well, the following documentation activities will be performed: 1) directions to the property/residence; 2) a detailed written description, photograph and, if needed, a diagram of the selected well sampling point location; and 3) a detailed written description, photograph and, if needed, a diagram of the well purge water discharge location.

5.4 Purging And Sampling Procedures

This section provides a description of the procedures to be used for domestic well sampling. These activities are described in more detail in the following sections. Many of these steps have record-keeping components which are discussed in Section 5.5.

5.4.1 Well Purging

Domestic wells must be purged before the collection of water samples by opening the spigot and allowing the water to run for approximately five minutes (or at least 25 gallons have been purged). A spigot closest to the well should be used for purging and sampling to minimize the amount of piping and reduce purge time, however, an alternate spigot requested by the homeowner may be used as long as it meets the requirements. A spigot should be located that does not draw water from a water softener tank, in-line filter, or other treatment system. The water should be drawn directly from the well. Purge water will be directed onto the ground, onto landscaping in the general area of the sampled well, or to an area specified by the domestic well owner or resident.

Purging Instructions:

1) Following written or verbal pre-notification of the landowner, arrive at the location and immediately knock on the front door to see if anyone is home and to announce your presence. A copy of the "Domestic Well Testing Program" flyer should be provided. There is no reason to enter the home.
2) Go to the "*preferred sample location"* as identified on previous field sampling records (i.e. the outside spigot closest to the well).
3) Remove the hose from the spigot. If necessary, the hose may be left on the spigot for purging, but it must be removed before sampling.
4) Turn on the spigot.
5) Allow water to run through the spigot for approximately five minutes or until approximately 25 gallons of water has discharged. Direct the purge water onto the ground, onto landscaping in the general area of the well, or to an area specified by the domestic well owner or resident.
6) Ensure that the spigot or other well components is returned to its pre-sampling condition.

5.4.2 Groundwater Sampling

It is important that wells be sampled as soon as possible after purging. Sampling a domestic well requires minimal equipment since the domestic water supply system includes a pump and pressurization tank that delivers a reliable sample stream under pressure.

Required Equipment:

- Sample bottles and new nitrile gloves.

Sampling Instructions:

1) When approximately five minutes have elapsed or at least 25 gallons have been purged, the domestic water supply system is ready to be sampled.
2) If left on during purging, remove the hose from the spigot.
3) Don a new pair of nitrile gloves.
4) Collect the samples by filling the required containers directly from the spigot. The valve on the spigot should be turned almost to the closed position to provide a low sampling flow rate that is as laminar as possible. The lip of the sample container should not be allowed to touch the spigot.
5) Bottles should be filled as outlined in project-specific planning documents.
6) Turn off spigot and re-attach hose.
7) Complete the field documentation including field log book, field sampling form, chain of custody and sample labels.
8) Place samples in chilled sample cooler (if required) until they are returned to the field office and prepared for shipment.

5.4.3 Field Measurements

It is anticipated that field parameters will not be measured during purging and sampling of domestic wells.

5.5 FIELD RECORDS

Accurate field records must be maintained to document domestic well sampling activities. These records include technical field data, sample identification labels, and COC information for each sample. These records are described in detail in the following sections, and discussed in the Field Documentation and Sampling Handling SOPs (SOP-03 and SOP-01).

Specifically for domestic well sampling, information will be recorded on a "Domestic Well Field Sampling Form"(Attachment A). This form should include, at a minimum, the following information:

- Well identification
- Preferred sample location
- Actual sample location
- Sample Date
- Sampler
- Purging time
- Sampling time
- Analytes requested

- QA/QC sample collected
- General observations (sample description, weather conditions, etc.)

Data and other information should be entered using black indelible ink and should be written legibly. Entry errors should be crossed out with a single line and initialed by the person making the correction.

5.6 SAMPLE SHIPMENT

Shipment of samples to an analytical laboratory is usually required upon completion of sample collection. Proper packaging is necessary to protect the sample containers, to maintain the samples at or below a temperature of 4°C, and to comply with the applicable transportation regulations. Consistent with the requirements of Revision 5 of the Site-Wide Quality Assurance Project Plan (Environmental Standards, Inc. [ESI} and Brown and Caldwell, 2009), each cooler containing samples that require temperature preservations will contain a temperature blank. See the Sampling Handling and Management SOP (SOP-01r1) for further details.

6.0 ATTACHMENTS

Attachment A – Domestic Well Field Sampling Form

ATTACHMENT A
DOMESTIC WELL FIELD SAMPLING FORM

Yerington Mine Site
Domestic Well Field Sample Form

Well ID: _____ Sampling Group: _____

Sample Date: _____

Sampler: _____

Preferred Sample Point Description:	Actual Sample Point Description:

Purge Time: Time On: _____

Time Off: _____

Total Purge Time: _____

Sample Time: _____ Sample Filtered: ☐ No ☐ Yes

Analysis Requested:

____ Uranium only (bottled water program)

____ Metals

____ Anion/Cation + Water Chem

____ TOC

____ Radiochem

QC Sample Collected:

____ Duplicate

____ Field Blank

____ MS/MSD

General Observations/Comments:

_____

_____

_____

Appendix C

Domestic Well Sampling Work Risk Assessment

Job Risk Assessment (WRA-02-2)

Document Control No.: *WRA-02-2*	**Date Assessment Completed:** 8/28/2009	**Location:** Yerington Mine Site
Job Name: Domestic Well Sampling	**Job Description:** Collect water sample from pre-existing domestic wells in project area by sampling from outside hose tap located near the well head. No pumping or water quality equipment is required.	**Risk Assessment Leader:** Penny Bassett **Risk Assessment Team:** Royanne Barringer, Briana Wright **SIMOPS:** ☐ Yes ☑ No **Designated PIC:**

Work Plan (List Job Steps) List the jobs required to complete the project scope in the sequence they are carried out.	Any tools or heavy equipment needed? If YES, What Type	Is this a SIMOP? If YES, Include in Mitigation Plan.	Do any of the *Golden Rules of Safety* apply? If YES, Which of the 8?	Which of the 8 energy or biological root sources could possibly be involved in this job?	**What** would be the result of exposure to a biological or energy source? (e.g., Bites, Slips, trips, falls, exposures, electrocution, injury, death, etc.); and **How, where, or when** could an uncontrolled release or unwanted contact with a biological or energy source occur? **Note:** Humans are biological sources, and their physical abilities, competency, and training should also be considered here.	Environmental Impacts Could there be a release to the air, soil or water, and or, will a waste be generated? If YES, What?	Pre-Mitigation Risk Evaluation: Frequency	Pre-Mitigation Risk Evaluation: Consequence	Pre-Mitigation Risk Evaluation: Likelihood	Pre-Mitigation Risk Evaluation: Risk Score	Permit(s) Required? If YES, What kind?	Energy / Biological / Waste Management Plan List control measures required to eliminate, control, or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental Impact. **Hierarchy of Controls:** Elimination, Substitution, Isolation, Engineering/ Administrative, PPE	Who is responsible for Hazard Mitigation? Name or Title	Post-Mitigation Risk Evaluation: Frequency	Post-Mitigation Risk Evaluation: Consequence	Post-Mitigation Risk Evaluation: Likelihood	Post-Mitigation Risk Evaluation: Risk Score
A. Load sampling supplies and drive to sampling location - Sample bottles - Cooler - Paperwork (COC, labels)	**Yes** Work truck	**No**	**Yes** Driving Safety	Motion Gravity	**Motion**… Walking trip/slip hazards. Driving hazard on public roads include potential collision or loss of control. Trip distance is short and at neighborhood speed so the hazard is less significant. Unsecured loads in pickup truck bed can shift and cause property damage or fly out of moving vehicle. **Gravity**… Lifting heavy items may cause back or other injury. Access in/out of truck be by climbing on tailgate could result in fall, sprain.	**No**	Frequent Exposure	Serious Consequence	Unusual but possible	**Substantial Risk**	**No**	**Motion**… Maintain good housekeeping in supplies storage and loading area, remove tripping hazards. Ensure items are securely stored to prevent movement during transport. **Gravity**… Use safe lifting techniques and get help for heavy/awkward lifts. Workers should use 3-point contact when getting in/out of truck bed and organize supplies to minimize need to enter.	Sample Technician	Frequent Exposure	Important Consequence	Remotely possible	**Minimal Risk**
B. Notify homeowner of intent to sample - Call in advance - Knock on door	**No**	**No**	**No**	Biological	**Biological**… Aggressive dogs could attack or bite. Homeowner could be resistant to visitors on the property.	**No**	Occasional Exposure	Serious Consequence	Conceivable but unlikely	**Minimal Risk**	**No**	**Biological**… Call homeowner in advance to schedule a time for the sampling, ask if they have dogs and ask them to be restrained during the visit. Do not enter property without prior approval from homeowner.	Sample Technician	Occasional Exposure	Notable Consequence	Conceivable but unlikely	**Minimal Risk**
C. Turn on tap, purge water (~20 gallons), fill sample containers	**No**	**No**	**No**	Chemical Biological Motion	**Chemical**… Contact with nitric acid preservative in sample bottle could cause 1st or 2nd degree burn to skin or eye. **Biological**… Tap sample location may be in area where spiders, bees, snakes, livestock could be present. **Motion**… Turning handles on well spigots located in tight spaces might present a threat to hands or fingers especially if the handles are initially difficult to start rotating.	**No**	Occasional Exposure	Serious Consequence	Unusual but possible	**Low Risk**	**No**	**Chemical**… Nitrile gloves and safety glasses should be worn when handling open or unopened bottles. Bottles should be stored and transported to keep them in an upright position. **Biological**… Inspect sample location and find alternate tap location if there is an identified hazard. Ask homeowner to restrain or move animals or livestock. **Motion**... Wear leather or nitrile gloves to protect hands if tap is in a hard to reach location or other hazards nearby (i.e. insects)	Sample Technician	Occasional Exposure	Important Consequence	Remotely possible	**Minimal Risk**
D. Pack and ship samples	**No**	**No**	**No**	Motion Gravity	**Motion**… Potential for back strain from awkward body position leaning over coolers while packing. **Gravity**… Large coolers can weigh >70 pounds if fully packed resulting in heavy awkward lift and possible back injury.	**No**	Occasional Exposure	Important Consequence	Unusual but possible	**Low Risk**	**No**	**Motion**… Place coolers at waist height on a work table rather than on ground, this will provide more comfortable body position. **Gravity**… Use rolling table or hand cart to carry packed coolers from packing area to truck to keep heavy load at one level and avoid need to lift. Limit number of samples in a cooler to <50 lbs, request smaller coolers from lab if necessary.	Sample Technician	Occasional Exposure	Important Consequence	Remotely possible	**Minimal Risk**