AREVA

10 CFR 70.5

August 18, 2009

AES-O-NRC-09-00017-0

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

AREVA Enrichment Services LLC
Eagle Rock Enrichment Facility
NRC Docket No: 70-7015

Subject: Supplement to Eagle Rock Enrichment Facility License Application - Depth to Groundwater Measurements from the Monitoring Wells on the Site for the Proposed Eagle Rock Enrichment Facility.

AREVA Enrichment Services LLC (AES) hereby submits a supplement to Revision 1 of the Eagle Rock Enrichment Facility (EREF) License Application (Reference 1) to update depth to groundwater information based on measurements taken between June 27, 2008 and July 20, 2009. These measurements recorded depth to groundwater on five deep wells (GW-1, GW-2, GW-3, GW-4, and GW-5) and one shallow well (GW-4S) on the site for the proposed Eagle Rock Enrichment Facility.

This supplement also corrects information presented in ER Table 3.4-13, Chemical Analyses for the EREF Site Groundwater, page 1 of 9, Revision 1, ER Figure 3.4-12, Regional Groundwater Potentiometric Surface Map, Revision 1, and ER Figure 3.4-13, Site Groundwater Potentiometric Surface Map, Revision 1. For ER Table 3.4-13, the depth to water measurements presented for monitoring wells GW-1, GW-2, GW-3, GW-4, and GW-5 are shown as below ground surface (bgs) measurements; however, these measurements are actually the depth to groundwater from the top of the PVC well casings. Since the PVC well casings extend above ground surface, the length that the PVC well casing is above ground surface (for each well) should have been subtracted from the measured depths to determine the below ground surface (bgs) water depths. For ER Figure 3.4-12, the groundwater elevations presented for monitoring wells GW-1, GW-2, GW-3, GW-4, and GW-5, are incorrect. The elevations presented should have been the same as those presented in ER Figure 3.4-13. For ER Figure 3.4-13, the elevations in meters for the IDWR Observation Wells shown on ER Figure 3.4-13, Revision 1, differ from the elevations in meters shown for the same locations on ER Figure 3.4-12 due to differences in rounding. The elevations in meters for the IDWR Observation Wells shown on ER Figure 3.4-13, are updated to match the elevations in meters shown for the same locations on ER Figure 3.4-12, Revision 1.

NMSS01
NMSS

This information is provided in the form of markups to the EREF Environmental Report (Enclosure 2), Safety Analysis Report (Enclosure 3), and the Integrated Safety Analysis (ISA) Summary (Enclosure 4). A summary table providing the depth to groundwater measurements taken between June 27, 2008 and July 20, 2009 is provided in Enclosure 5.

The markups of the ISA Summary provided in Enclosure 4 contain security-related sensitive unclassified non-safeguards information (SUNSI). This information was identified as SUNSI by using the guidance in NRC Regulatory Issue Summary (RIS) 2005-31, "Control of Security-Related Sensitive Unclassified Non-Safeguards Information Handled by Individuals, Firms, and Entities Subject to NRC Regulation of the Use of Source, Byproduct, and Specific Nuclear Material." Enclosure 1 provides an affidavit supporting our request to withhold in accordance with 10 CFR 2.390(b).

The EREF License Application will be revised to include the markup pages of the EREF Environmental Report, Safety Analysis Report, and ISA Summary in Revision 2 of the EREF License Application to reflect the updates and corrections to the depth to groundwater data.

If you have any questions, please contact Mr. Jim Kay at 508-573-6554.

Respectfully,

George A. Harper
Vice President of Engineering and EPC Project Manager

References:

1) S. Shakir (AES) Letter to the U.S. Nuclear Regulatory Commission, Revision 1 to License Application for the Eagle Rock Enrichment Facility, dated April 23, 2009.

Enclosures:

1) Affidavit of George Harper
2) Markup pages for the EREF Environmental Report
3) Markup pages for the EREF Safety Analysis Report
4) Markup pages for the EREF ISA Summary
5) Summary Table providing the depth to groundwater measurements taken between June 27, 2008 and July 20, 2009.

Commitments:
The EREF License Application will be revised to include the markup pages of the EREF Environmental Report, Safety Analysis Report, and ISA Summary in Revision 2 of the EREF License Application to reflect the updates and corrections to the depth to groundwater data.

CC:
Breeda Reilly, U.S. NRC Senior Project Manager
Gloria Kulesa, U.S. NRC Senior Project Manager

a) I am the Vice President of Engineering and EPC Project Manager for the AREVA Enrichment Services LLC (AES), and as such have the responsibility of reviewing the proprietary and confidential information sought to be withheld from public disclosure in connection with our application to construct and operate a uranium enrichment facility. I am authorized to apply for the withholding of such proprietary and confidential information from public disclosure on behalf of AES.

b) I am making this affidavit in conformance with the provisions of 10 CFR 2.390 of the regulations of the Nuclear Regulatory Commission (NRC), and in conjunction with AES's request for withholding, which is accompanied by this affidavit.

c) I have knowledge of the criteria used by AES in designating information as proprietary or confidential.

d) By this submittal, AES seeks to protect from disclosure certain security-related sensitive unclassified non-safeguards information (SUNSI) contained in the markups of the Integrated Safety Analysis Summary (Enclosure 4).

This affidavit discusses the bases for withholding certain portions of this submittal, as indicated therein, from public disclosure.

e) Pursuant to the provisions of 10 CFR 2.390(b)(4), the following is furnished for consideration by the NRC in determining whether the proprietary information sought to be protected should be withheld from public disclosure.

1. The markups of the ISA Summary provided in Enclosure 4 contain security-related sensitive unclassified non-safeguards information (SUNSI). This information was identified as SUNSI by using the guidance in NRC Regulatory Issue Summary (RIS) 2005-31, "Control of Security-Related Sensitive Unclassified Non-Safeguards Information Handled by Individuals, Firms, and Entities Subject to NRC Regulation of the Use of Source, Byproduct, and Specific Nuclear Material."

2. The information sought to be withheld is being provided to the NRC in confidence, and, under the provisions of 10 CFR 2.390, it is to be received in confidence by the NRC.

3. The information sought to be withheld is not available in public sources, to the best of AES's knowledge and belief.

For all of the reasons discussed above, AES requests that the identified proprietary information be withheld from public disclosure.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 17, 2009.

Mr. George Harper
Vice President of Engineering and EPC Project Manager
AREVA Enrichment Services, LLC
400 Donald Lynch Boulevard
Marlborough, MA 01752

Maureen L. Lyons
Notary Public

ENCLOSURE 2

Markup Pages

EREF Environmental Report

3.4.14.2 Reservoir Operating Rules

The proposed facility will not make use of any reservoir.

3.4.14.3 Annual Yield and Dependability

The proposed facility will not take or discharge process water to any local water body; thus, it will not affect water storage in any water body.

3.4.14.4 Inflow/Outflow/Storage Variations

The proposed facility will not take or discharge process water to any local water body; thus, it will not affect water storage in any water body.

3.4.14.5 Net Loss, Including Evaporation and Seepage

The proposed facility will not take or discharge process water to any local water body; thus, it will not affect water storage in any water body. Discharge of treated effluent from the Domestic Sanitary Sewage Treatment Plant will be to the Cylinder Storage Pads Stormwater Retention Basins, which will be lined. The retention basins will be designed so that evaporation is the sole discharge route. The annual evaporation potential is 117.73 cm (46.35 in).

3.4.14.6 Current Patterns

The proposed facility will not take or discharge process water to local water bodies or the ground surface; thus, there will be no change in current patterns.

3.4.14.7 Temperature Distribution

The proposed facility will not take or discharge process wastewater or non-contact cooling water to any local water body; thus, it will not affect water temperature in any water body.

3.4.15 Groundwater Characteristics

The groundwater characteristics for the area of the proposed EREF site are discussed in the following sections.

3.4.15.1 Regional Hydrology

The groundwater system underlying the SRP in the vicinity of the proposed facility is referred to as the Eastern Snake River Plain (ESRP) aquifer (Whitehead, 1992). The ESRP Aquifer consists predominantly of flood basalt lava flows with intermittent interbeds of unconsolidated sediments (Whitehead, 1992) (Whitehead, 1994b) as discussed in ER Section 3.3, Geology and Soils. The geologic units comprising the aquifer are primarily lava flows of the Snake River Group basalts (Qb) and the upper part of the Idaho Group (Bruneau Formation) (Ackerman, 2006) (Smith, 2004). The basalt units are variable in thickness and generally discontinuous in lateral extent. Sedimentary interbeds exist between some of the basalts and are of variable thickness and lateral extent (Ackerman, 2006) (Smith, 2004). At the site, the groundwater surface is encountered at depths between ~~201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ 199.5 m (654.4 ft) and 219.4 m (719.9 ft) below ground surface (bgs). The saturated thickness of the ESRP Aquifer is shown on Figure 3.4-8,

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Boreholes GW-1 and GW-4 were geophysically logged prior to their completion as monitoring wells. GW-1 was logged to a depth of 223 m (730 ft), which included approximately 208.6 m (684.3 ft) of unsaturated conditions and approximately 9 m (30 ft) of saturated conditions, below the static water level. Partially completed Well GW-4S was logged to a depth of 168 m (550 ft) bgs in unsaturated conditions. Downhole geophysics included caliper, natural gamma, normal electrical resistivity, point resistance, induction resistivity, and optical tools. Following the geophysical logging of GW-1, eight hydrologic packer tests were conducted that covered the range of observed geologic character (e.g., dense to fractured) observed in the core and geophysical tests. The depth to groundwater in the on-site wells ranges between ~~201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ 199.5 m (654.4 ft) and 219.4 m (719.9 ft) below ground surface (bgs), depending on location.

There are four primary features of the sediments and bedrock underlying the proposed site that can dramatically affect the flow of fluids in the vadose zone and groundwater in the saturated zone (Cecil, 1991):

1. Low permeability sedimentary interbeds
2. Alteration in the baked zones at flow tops
3. Dense, unfractured massive basalt
4. Sedimentary and chemical infilling of fractures

A minimum of three well-developed sedimentary interbeds from 1.2 to 2.4 m (4.0 to 8.0 ft) thick were clearly observed in the core collected from GW-1. Similar sedimentary interbeds in GW-4 were inferred from the geophysical logging of that hole. The drilling log for Lava Well-3 suggested the presence of at least two or possibly three sedimentary interbeds. Sedimentary layers were encountered in the core of GW-1 at 18.3, 59.4, and 122.5 m (60.0, 195.0, and 402.0 ft) bgs, and, in GW-4 the sedimentary interbeds were inferred from the geophysical logs at 19.7, 61.9, and 102.2 m (64.6, 203.0, and 334.4 ft) bgs. The geophysical logging conducted with the acoustic televiewer (OPTV) and natural gamma measurements in GW-1 and GW-4 also revealed the presence of sedimentary interbeds. In addition, these interbeds also were qualitatively identified in the conductivity logs. A cross section of the subsurface stratigraphy is shown in Figure 3.3-17, GW-1 Lithologic Log - Summary.

The sedimentary interbeds represent periods of volcanic quiescence and are likely to be laterally continuous for at least several hundred meters (hundreds to thousands of feet), but may have thin or absent areas at the topographic highs of the paleo-ground surface, similar to what is presently observed for the surface terrain. No evidence of sediment interbeds was observed below about 121.9 m (400.0 ft) to the total depth of GW-1 at 222.5 m (730.0 ft) bgs. Several zones containing scoria, cinder, red oxidation, increased vesicles, and changes in fracturing indicating flow tops were also observed. In GW-1, the individual lava flows increase in thickness with depth from 15.2 m (50.0 ft) near the top to over 91.4 m (300.0 ft) near the bottom. The individual flows were also marked by the presence of sediment infillings (e.g., clay) in the fractures. The zones beneath the flow tops where baking from the overlying lava flows would have occurred in combination with sediment infillings likely have lower permeability than the base of the overlying flows.

Most of the basalt bedrock is fractured to some degree with Rock Quality Data (RQD) values typically ranging between 50% and 100%. Some intervals are completely fractured with RQDs of 0% to 25%. The flow interiors are evident by thick, massive zones of basalt with few or no fractures (RQD at or near 100%). The flow interiors typically contain narrow vertical fractures, whereas the flow tops and bottoms typically contain both large vertical and horizontal fractures. The massive zones observed in GW-1 and GW-4 ranged up to 3 m (10 ft) or more in thickness.

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Additional data on depths to groundwater measured for the site monitoring wells between June 27, 2008 and July 20, 2009 (measured weekly through January 2009, then monthly through July 2009) indicate that the depth to water occurs between 199.5 m (654.4 ft) and 219.4 m (719.9 ft).

Data on groundwater elevations measured for the site monitoring wells have been compiled into two maps of the potentiometric groundwater surface. Figure 3.4-12, Regional Groundwater Potentiometric Surface Map, shows the site groundwater data in conjunction with data from observation wells located in the vicinity of the EREF. Figure 3.4-13, Site Groundwater Potentiometric Surface Map, shows a closer view of the site groundwater elevation data. The data shown in these figures indicate that the depth to water occurs between ~~201.5 and 220.2 m (661.1 and 721.9 ft)~~ bgs at the site. Based on these elevations, the direction of groundwater flow across the site is from the northeast to the southwest. This direction is consistent with the regional groundwater flow direction, which is to the southwest toward Thousand Springs, approximately 322 km (200 mi) southwest of the site. Based on ground surface elevations and the depths to water observed in GW-5 and GW-1, the hydraulic gradient likely is about 1.5 m (4.9 ft) of difference in water levels over 2,260 m (7,420 ft) between the two wells. This difference in water levels is equivalent to a gradient of approximately 0.0007 m/m (0.0007 ft/ft).

Two field testing methods were utilized to estimate the horizontal permeability of the subsurface materials: borehole constant head tests (packer tests) and one multi-well aquifer pumping test. Eight packer tests were conducted in borehole GW-1 over 1.5 to 3.0 m (5.0 to 10.0 ft) intervals from 7.6 to 190.5 m (25.0 to 625.0 ft) bgs within the vadose zone. The testing was conducted on intervals of fractured bedrock, massive bedrock, and sedimentary interbeds to estimate the full range of hydraulic conductivities. The results of the packer tests indicated hydraulic conductivities as follows (the values in parentheses indicate the number of tests performed in that rock or sediment type):

on July 22, 2008

200.7 and 219.3 m (658.4 and 719.5 ft)

- Fractured bedrock (five): greater than 9.0E-04 cm/s (3.0E-05 ft/s)
- Soil layers (two): 2.0E-06 cm/s (6.6E-08 ft/s)
- Massive (relatively unfractured) bedrock (one): 2.0E-08 cm/s (6.6E-10 ft/s)

The tests that were performed in the fractured bedrock provide a measure of the lower bound for the highest hydraulic conductivities in the formation because no head pressure was developed during those tests. No head pressure conditions occur when the formation accepts more water than the test pump can deliver, which is an indication of high hydraulic conductivities. If more water could have been delivered to the packed off interval, then a higher hydraulic conductivity might have been measured. Data for the sedimentary interbeds and intervals of massive basaltic bedrock are indicative of low hydraulic conductivities. The sedimentary interbeds and massive basalt layers will significantly impede water movement or may cause lateral flow below the water table or may cause perching above the water table.

An aquifer pumping test was conducted using the existing agricultural (irrigation) well, Lava Well-3, as the pump well and nearby monitoring well GW-5 as an observation well. Three phases to the pumping test occurred:

1. Pre-test monitoring – three days
2. Constant rate pumping test – three days
3. Recovery test – one day

The test was conducted by pumping the agricultural well, Lava Well-3, and measuring the resulting drawdown and barometric pressure changes in GW-5. The pumping well (Lava Well-3) is a large diameter irrigation well originally installed in the 1970s. The well is currently fitted with a pump capable of pumping 15.9 m^3/min (4,200.0 gal/min). The observation well GW-5 is a 10.2-cm (4.0-inch) PVC monitoring well screened from 215.2 to 227.4 m (706.0 to 746.0 ft) bgs, partially penetrating the aquifer.

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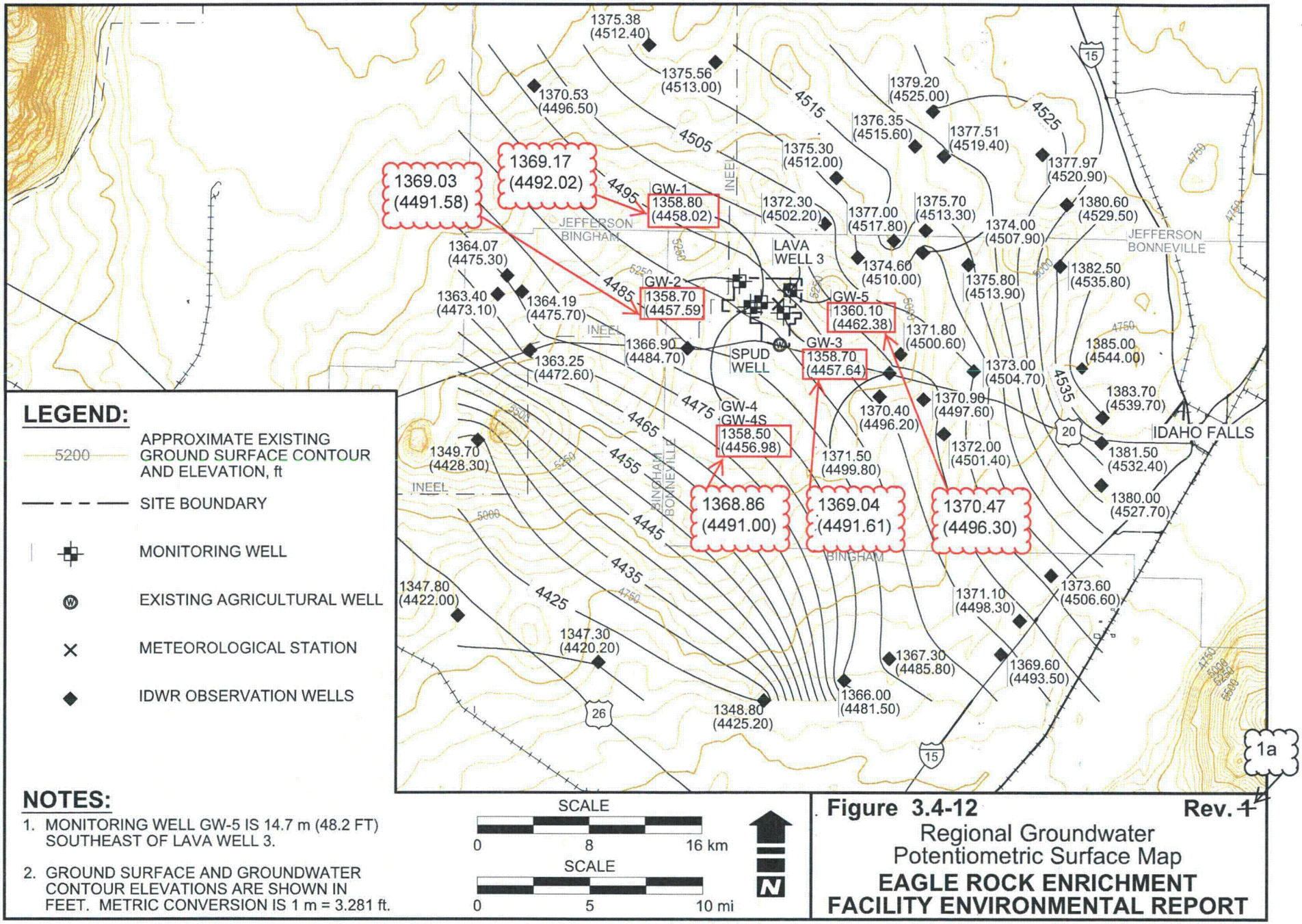
Table 3.4-13 Chemical Analyses for the EREF Site Groundwater

(Page 1 of 9)

Well Name	Lava Well 3	Spud Well	GW-3	GW-5	Spud Well	Lava Well 3	GW-1	GW-4	GW-2	RL (mg/L, or as noted)	EPA MCL[1] (mg/L, or as noted)
Sample Name	LAVA 3-01	SPUD-1	GW-03-01	GW-05-01	SPUD WELL-01	LAVA 3-01	GW-01-01	GW-4-01	GW-2-01		
Sample Date	03/25/08	03/25/08	05/20/08	06/19/08	06/19/08	06/19/08	07/07/08	07/09/08	07/10/08		
Analyte	(mg/L, or as noted)	(mg/L, or as noted)	(mg/L, or as noted)	(mg/L, or as noted)	(mg/L, or as noted)	(mg/L, or as noted)	(mg/L, or as noted)	(mg/L, or as noted)	(mg/L, or as noted)		
Field Parameters											
pH (s.u.)	6.73	7.8	7.52	7.70	7.94	7.74	7.83	8.43	8.11	-	6.5 to 8.5 [4]
Temp °C (°F)	9.4 (48.9)	6.6 (43.9)	12.3 (54.1)	12.7 (54.9)	11.8 (53.2)	12.0 (53.6)	13.1 (55.6)	13.2 (55.8)	13.7 (56.7)	-	NS
Electrical Conductivity µS/cm (µmhos/cm)	NM	NM	358 (358)	350 (350)	425 (425)	345 (345)	302 (302)	294 (294)	285 (285)	-	NS
Depth to water m (ft) (BGS[2])	217.9 (715)	NM	~~208.9 (685.3)~~	~~220.0 (721.9)~~	NM	NM	~~208.6 (684.3)~~	~~201.5 (661.1)~~	~~202.9 (665.7)~~	-	
Lab Parameters											
Dissolved											
Aluminum	<0.08 [3]	<0.08 [3]	<0.08 [3]	<0.08 [3]	<0.08 [3]	<0.08 [3]	<0.08 [3]	<0.08 [3]	<0.08 [3]	0.08	0.05 - 0.2 [4]
Antimony	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.006
Arsenic	<0.003	<0.003	<0.003	<0.003	0.00303	<0.003	<0.003	<0.003	<0.003	0.003	0.01
Barium	0.0103	0.0149	0.0115	0.0113	0.0138	0.0101	0.0074	0.0098	0.0103	0.002	2
Beryllium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.004
Boron	0.063	0.065	0.061	0.059	0.065	0.061	0.049	0.052	0.044	0.04	NS
Cadmium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.005
Calcium	40.0	49.7	40.6	38.1	46.4	37.2	32.1	32.8	29.2	0.04	NS
Chromium	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.006	0.1
Cobalt	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.006	NS
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	1.3 [5]
Iron	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.06	0.3 [4]
Lead	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	0.0075	0.015 [5]
Magnesium	11.4	14.1	11.8	11.3	13.8	11.0	9.44	9.75	8.79	0.06	NS
Manganese	<0.004	0.0075	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0048	0.004	0.05 [4]
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.002
Molybdenum	<0.008	0.0089	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.008	NS

208.3 (683.3) 219.2 (719.1) 207.8 (681.9) 200.7 (658.4) 202.1 (662.9) 1a



LEGEND:

- 5200 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, ft
- SITE BOUNDARY
- MONITORING WELL
- EXISTING AGRICULTURAL WELL
- METEOROLOGICAL STATION
- IDWR OBSERVATION WELLS

NOTES:

1. MONITORING WELL GW-5 IS 14.7 m (48.2 FT) SOUTHEAST OF LAVA WELL 3.
2. GROUND SURFACE AND GROUNDWATER CONTOUR ELEVATIONS ARE SHOWN IN FEET. METRIC CONVERSION IS 1 m = 3.281 ft.

SCALE
0 8 16 km

SCALE
0 5 10 mi

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Figure 3.4-12 **Rev. 1**

Regional Groundwater Potentiometric Surface Map

EAGLE ROCK ENRICHMENT FACILITY ENVIRONMENTAL REPORT

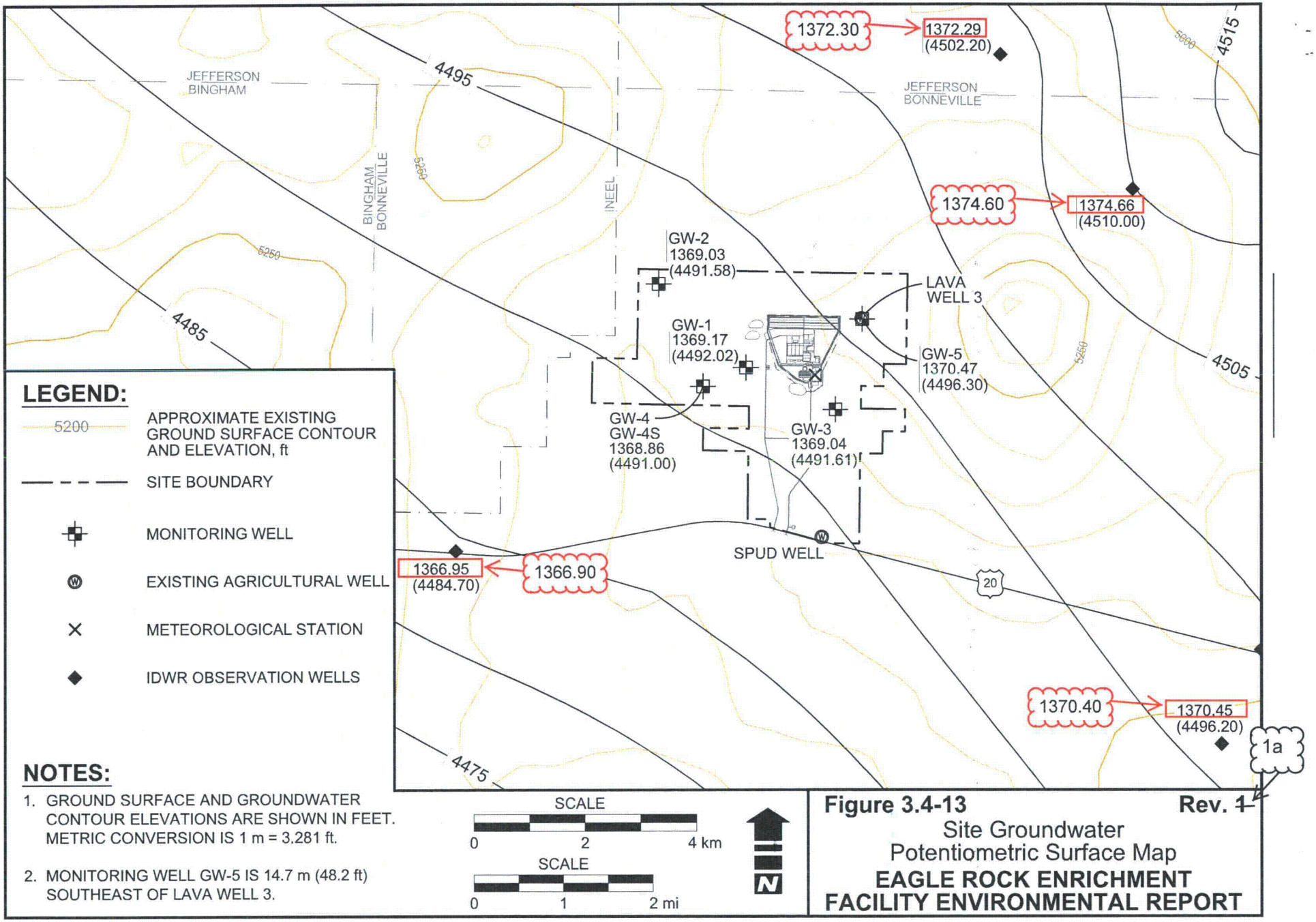

Figure 3.4-13 **Rev. 1**

Site Groundwater Potentiometric Surface Map

EAGLE ROCK ENRICHMENT FACILITY ENVIRONMENTAL REPORT

4.4 WATER RESOURCES IMPACTS

199.5 m (654.4 ft) and 219.4 m (719.9 ft)

The water resources at the proposed Eagle Rock Enrichment Facility (EREF) site are discussed in Section 3.4, Water Resources. ER Section 3.4.1, Surface Hydrology, indicates that there are no permanent surface water features and although intermittent stream drainages exist, they have not been observed to carry water. ER Section 3.4.15, Groundwater Characteristics, indicates that groundwater exists at the site in quantity and is of high quality in this portion of the Eastern Snake River Plain (ESRP). The depth to groundwater in wells on the proposed EREF site ranges between ~~201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ below the ground surface, depending on location. The ESRP Aquifer extends over much of southeastern Idaho and is a major water source for drinking and irrigation water in the region. The area of the site has a semi-arid climate with low precipitation rates and high evapotranspiration rates. Soils are thin and the vertical conductivity of the underlying bedrock is high. Although minimal, there is the potential for impacts to groundwater. Impacts to surface water are expected to be minimal to nonexistent. The pathways for planned and potential releases are discussed below.

Permits related to water that may be applicable to site construction and EREF operation are described in ER Section 1.3, Applicable Regulatory Requirements, Permits and Required Consultation. These permits address various potential discharges to water and prescribe mitigation needed to maintain state water quality standards and avoid degradation to water resources at or near the site. These permits include:

- *A National Pollutant Discharge Elimination System (NPDES) General Permit for Industrial Stormwater:* The NPDES General Permit for Industrial Stormwater regulates point source discharges of stormwater runoff from industrial and commercial facilities to waters of the United States. In Idaho, the NPDES permit program is administered by the EPA, Region 10 (IDEQ, 2008a). AES will file a Notice of Intent (NOI) for coverage under the Multi-Section General Permit with the EPA, Washington, D.C., at least 60 days prior to the initiation of EREF operations.
- *NPDES General Permit for Construction Stormwater:* The construction of the proposed EREF will involve the disturbance of 240 ha (592 acres). Because this disturbance area is more than 0.4 ha (1 acre), a NPDES Construction General Permit from the EPA Region 10 and an oversight review by the Idaho Department of Environmental Quality (IDEQ) are required. AES will develop a Storm Water Pollution Prevention Plan (SWPPP) and file a NOI with the EPA, Washington, D.C., at least 60 days prior to the commencement of construction activities. (IDEQ, 2008a)
- *NPDES Individual Permit for Point Sources.* The Clean Water Act (CWA) authorizes the EPA to regulate point sources that discharge pollutants into surface waters of the United States through the NPDES permit program. In Idaho, the NPDES permit program is administered by the EPA Region 10. An applicant may apply for either an individual or a general NPDES permit. An individual permit is specifically tailored to an individual facility, and a general permit covers multiple facilities with a specific category, such as stormwater discharges (IDEQ, 2008c). Because the EREF will discharge treated domestic sanitary wastewaters to lined retention basins, an Individual NPDES permit will not be required as there will be no discharge of wastewaters to surface or groundwaters.
- *Section 401 Certification:* Under Section 401 of the federal Clean Water Act, states can review and approve, condition, or deny all federal permits or licenses that might result in a discharge to State waters, including wetlands (IDEQ, 2008b). The purpose of this review is to ensure that the given project conforms to applicable state water criteria. By letter dated October 10, 2008, the USACE notified AES of its determination that there are no

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4.4.3 Hydrological System Alterations

199.5 m (654.4 ft) and 219.4 m (719.9 ft)

Excavation and placement of fill for construction of the proposed EREF will result in a final site grade between 1,573 m (5,160 ft) and 1,585 m (5,200 ft). An approximate total of 778,700 m^3 (1,018,500 yd^3) of cut material from the site will be used as fill. Approximately 59 ha (145 acres) of the site will be raised with soil fill and 88 ha (218 acres) will be excavated down to that elevation. This earthwork will not require alteration or filling of surface water features on the site.

No alterations to groundwater systems will occur due to facility construction. The construction will involve the excavation and placement of fills at the surface, but these activities are not expected to affect the groundwater system, which is located at depths ~~from 201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ below ground surface. Runoff controls will be in place both during construction as part of BMPs and during operation to prevent uncontrolled releases of water. These control systems are described above in ER Sections 4.4, Water Resources Impacts, and 4.4.1, Receiving Waters. The potential for water or other liquids from spills or pipeline leaks to introduce sufficient amounts of liquid to saturate the top soil and bedrock surfaces to cause significant migration of contaminants downward to the groundwater system, is considered unlikely.

4.4.4 Hydrological System Impacts

The proposed EREF will obtain its water supply from on-site wells. Rates of water usage consumption are summarized in Table 3.4-2, Anticipated Normal Plant Water Consumption and Table 3.4-3, Anticipated Peak Plant Water Consumption. The ESRP Aquifer that underlies the proposed EREF is extremely productive (Garabedian, 1992). For example, typical well yields for most seasonally pumped agricultural wells in the ESRP Aquifer range from 3.4 m^3/min (900.0 gal/min) to 12.5 m^3/min (3,300.0 gal/min) and experience less than 6.1 m (20.0 ft) of drawdown (Garabedian, 1992). In comparison, the normal and peak potable water requirements for operation of the EREF are expected to be approximately 0.05 m^3/min (12.5 gal/min) and 2.8 m^3/min (739 gal/min), respectively. In consideration of the productivity of the ESRP Aquifer and high rates of normal water usage for irrigation, the amounts of water used at the proposed EREF are not expected to cause significant impacts to the site hydrologic systems.

Control of surface water runoff will be required for the EREF construction activities and will be covered by the NPDES Construction General Permit. As a result, no significant impacts are expected to either surface or groundwater bodies. Control of impacts from construction runoff is discussed below in ER Section 4.4.7, Control of Impacts to Water Quality.

The volume of water discharged into the ground from the Site Stormwater Detention Basin is expected to be minimal, as evapotranspiration is expected to be the dominant natural influence on standing water.

4.4.5 Ground and Surface Water Use

The proposed EREF will obtain its water supply from on-site wells. Anticipated normal plant water consumption and peak plant water requirements are provided in ER Table 3.4-2, Anticipated Normal Plant Water Consumption, and ER Table 3.4-3, Anticipated Peak Plant Water Consumption, respectively. No surface water sources will be used and there will be no liquid effluent discharges from plant operations. Treated sanitary effluents and stormwater runoff will be to engineered retention and detention basins.

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ENCLOSURE 3

Markup Pages

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months after the winter thaw when strong frontal systems pass through the ESRP and during the summer months when thunderstorms are near. During the daylight hours under conditions of strong winds, the concentration of dust sharply decreases with height up to 21 m (70 ft) above grade level.

1.3.4 Hydrology

199.5 m (654.4 ft) and 219.4 m (719.9 ft)

Much of the information included in this section was obtained from prior studies, including extensive subsurface investigations for the Department of Energy Idaho National Laboratory (INL), which is located immediately west of the proposed site, as well as regional studies conducted by the U.S. Geologic Survey and the State of Idaho. Literature searches were conducted to obtain additional reference material. This information is supplemented by subsurface investigations conducted at the EREF site.

The proposed EREF site contains no surface water bodies. There are a few small drainage features in the southeastern and southwestern areas of the proposed site. These drainages likely originated from natural erosional processes but now primarily conduct minor amounts of water from irrigated areas.

The Snake River is located about 32 km (20 mi) to the east of the proposed facility. The Snake River Plain (SRP) aquifer is the predominant water bearing unit in the area. At the site, groundwater is encountered at depths between ~~201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ below ground surface (bgs). This SRP aquifer covers about 26,000 km^2 (10,039 mi^2) with a thickness ranging between 91 m (300 ft) and 396 m (1,299 ft) thick (Smith, 2004). The water volume in the aquifer is estimated at 100 billion m^3 (3.53E+12 ft^3) (Smith, 2004).

1.3.4.1 Characteristics of Nearby Rivers, Streams, and Other Bodies of Water

The proposed facility is located in an area with no surface water bodies. The predominant regional direction of groundwater flow is from the northeast to southwest (Smith, 2004) (Whitehead, 1994). The closest surface water bodies are the Snake River and the Market Lake Wildlife Management Area (WMA). These two surface water bodies are located about 32 km (20 mi) to the east and northeast of the site, respectively.

1.3.4.2 Depth to Groundwater Table

Site-specific subsurface investigations occurred at the proposed EREF site between May and July 2008. Five deep monitoring wells were installed at the proposed site. One shallow well was also completed. These monitoring wells on the proposed site are distributed to allow monitoring of the ground water elevations, evaluation of regional groundwater flow direction, and water quality at the EREF site. The wells are located in areas that are hydrologically upgradient, cross gradient, downgradient of the plant footprint, and within the downgradient edge of the facility footprint. The five deep wells provide adequate site-specific data to define the potentiometric surface of the groundwater, thereby providing data indicative of groundwater flow direction and gradient.

Groundwater was encountered at depths between ~~201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ below ground surface (bgs).

199.5 m (654.4 ft) and 219.4 m (719.9 ft)

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1.3.4.3 Groundwater Hydrology

199.5 m (654.4 ft) and 219.4 m (719.9 ft)

The groundwater system underlying the Snake River Plain (SRP) in the vicinity of the EREF is referred to as the ESRP aquifer. The ESRP Aquifer consists predominantly of flood basalt lava flows with intermittent interbeds of unconsolidated sediments. The geologic units comprising the aquifer are primarily lava flows of the Snake River Group basalts (Qb) and the upper part of the Idaho Group (Bruneau Formation). The basalt units are variable in thickness and generally discontinuous in lateral extent. Sedimentary interbeds exist between some of the basalts and are of variable thickness and lateral extent. At the site, groundwater is encountered at depths between ~~201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ below ground surface (bgs).

The ESRP Aquifer is unconfined over nearly all of its area through locally confined conditions may exist. The overlying unsaturated zone or vadose zone is spatially heterogeneous and ranges in thickness from 60 m (200 ft) to greater than 300 m (984 ft) and consists of unconsolidated alluvium and Snake River Group basalts (Qb). The saturated thickness of the aquifer is greatest in the central part of the ESRP and thins substantially to the west. Within the basalts, permeable zones are located mainly in the tops and bottoms of lava flows, which are typically fractured and porous, leading to high horizontal hydraulic conductivity. Vertical joint densities and presence of lower permeability sediment interbeds act to control vertical hydraulic conductivity. The interbeds may also act to locally confine limited portions of the aquifer. Overall, the fractured, porous, and complexly interconnected nature of the basaltic lava flows has resulted in high but heterogeneous and anisotropic horizontal conductivity and much lower vertical conductivity.

1.3.4.4 Characteristics of the Uppermost Aquifer

199.5 m (654.4 ft) and 219.4 m (719.9 ft)

The SRP aquifer is the predominant water bearing unit in the area. At the site, the groundwater surface is encountered at depths between ~~201.5 m (661.1 ft) and 220.0 m (721.9 ft)~~ below ground surface (bgs). This SRP aquifer covers about 26,000 km^2 (10,039 mi^2) with a thickness ranging between 91 m (300 ft) and 396 m (1,299 ft) thick (Smith, 2004). The water volume in the aquifer is estimated at 100 billion m^3 (3.53E+12 ft^3) (Smith, 2004). The SRP aquifer is a major economic resource in southern Idaho that is relied upon for both drinking water and irrigation (Garabedian, 1992) (Lindholm, 1996).

The proposed facility would use groundwater for both process and potable water requirements. No surface water would be used. The collection and storage of runoff from specific site areas would be controlled.

1.3.4.5 Design Basis Flood Events Used for Accident Analysis

The EREF site is located above the 100 or 500-year flood elevation (FEMA, 1981). The proposed facility is not located near any reservoirs, levees or surface waters that could cause flooding of the plant site. The proposed site is contained within the Idaho Falls watershed, HUC 17040201, with gradual average slopes of about 1.4%. The Natural Resources Conservation Service soil survey data summary indicates that soils typically have no potential for ponding (NRCS, 2008b). Any onsite precipitation will be subject to evapotranspiration or infiltration. Minor intermittent drainages originating within the site boundary do not connect to off-site resources or larger drainages. The largest surface water body southwest of the proposed site (along the topographical grade) is Lake Wolcott, approximately 120 km (75 mi) from the proposed site and the Snake River about 32 km (20 mi) east of the site. Therefore, no credible sources of river or upstream dam flooding exist at the site. No special design considerations for

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ENCLOSURE 5

Summary Table
Depth to Groundwater Measurements Taken Between
June 27, 2008 and July 20, 2009

EREF Depth to Groundwater Measurements Taken Between June 27, 2008 and July 20, 2009

Date	Barometric Pressure		GW-1 Depth to Ground Water		GW-2 Depth to Ground Water		GW-3 Depth to Ground Water		GW-4 Depth to Ground Water		GW-4S Depth to Ground Water	GW-5 Depth to Ground Water		Lava Well 3 Lava Well 3 Operating
	(in Hg)	(cm Hg)	(ft) BGS	(m) BGS	(ft) BGS	(m) BGS	(ft) BGS	(m) BGS	(ft) BGS	(m) BGS		(ft) BGS	(m) BGS	Y/N
6/27/2008	30.00	76.20	NM	NM	NM	NM	682.3	207.9	NM	NM	DRY	718.2	218.9	Y
7/3/2008	30.08	76.40	NM	NM	NM	NM	682.6	208.1	657.5	200.4	DRY	718.5	219.0	Y
7/10/2008	29.93	76.02	681.2	207.6	NM	NM	682.9	208.1	657.8	200.5	DRY	719.9	219.4	Y
7/17/2008	30.16	76.61	681.7	207.8	662.4	201.9	683.3	208.3	658.3	200.6	DRY	719.4	219.3	Y
7/22/2008	30.02	76.25	681.9	207.8	662.5	201.9	683.5	208.3	658.4	200.7	NM	719.5	219.3	Y
7/30/2008	30.20	76.71	682.1	207.9	662.8	202.0	683.8	208.4	658.7	200.8	NM	719.9	219.4	Y
8/8/2008	30.06	76.35	682.3	208.0	663.0	202.1	683.9	208.4	658.9	200.8	NM	719.3	219.3	N
8/13/2008	30.13	76.53	682.3	208.0	663.1	202.1	683.9	208.4	658.9	200.8	NM	719.4	219.3	N
8/21/2008	29.85	75.82	682.1	207.9	663.0	202.1	683.6	208.4	658.7	200.8	DRY	719.1	219.2	N
8/27/2008	29.92	76.00	682.1	207.9	663.1	202.1	683.6	208.4	658.7	200.8	DRY	719.1	219.2	N
9/4/2008	30.11	76.48	681.9	207.9	663.0	202.1	683.4	208.3	658.5	200.7	DRY	718.9	219.1	N
9/11/2008	30.14	76.56	681.8	207.8	662.9	202.0	683.3	208.3	658.4	200.7	DRY	719.3	219.2	Y
9/18/2008	30.16	76.61	681.6	207.7	662.7	202.0	683.0	208.2	658.2	200.6	DRY	718.4	219.0	N
9/26/2008	30.20	76.71	681.4	207.7	662.6	201.9	NM	NM	658.0	200.6	DRY	718.1	218.9	N
10/2/2008	30.06	76.35	681.1	207.6	662.3	201.9	682.5	208.0	657.7	200.5	DRY	718.6	219.0	Y
10/9/2008	29.89	75.92	680.7	207.5	661.7	201.7	682.1	207.9	657.4	200.4	DRY	717.5	218.7	N
10/16/2008	30.29	76.94	680.6	207.4	661.8	201.7	682.0	207.9	657.3	200.3	DRY	717.3	218.6	N
10/23/2008	30.36	77.11	680.1	207.3	661.5	201.6	681.5	207.7	656.8	200.2	DRY	716.8	218.5	N
10/30/2008	30.25	76.84	679.9	207.2	661.3	201.6	681.3	207.6	656.6	200.1	DRY	716.5	218.4	N
11/6/2008	30.38	77.17	679.7	207.2	661.0	201.5	681.0	207.6	656.4	200.1	DRY	716.3	218.3	N
11/14/2008	30.48	77.42	679.3	207.1	660.7	201.4	680.8	207.5	656.1	200.0	DRY	715.9	218.2	N
11/20/2008	30.27	76.89	678.9	206.9	660.2	201.2	680.3	207.4	655.6	199.8	DRY	715.4	218.1	N
11/26/2008	30.12	76.50	678.7	206.9	660.0	201.2	680.0	207.3	655.4	199.8	DRY	715.2	218.0	N
12/4/2008	30.32	77.01	678.6	206.8	659.9	201.1	680.0	207.3	655.3	199.7	DRY	715.0	217.9	N

EREF Depth to Groundwater Measurements Taken Between June 27, 2008 and July 20, 2009

12/10/2008	30.41	77.24	678.3	206.8	659.7	201.1	679.8	207.2	655.1	199.7	DRY	714.8	217.9	N
12/17/2008	30.02	76.25	678.1	206.7	659.4	201.0	679.5	207.1	654.9	199.6	DRY	714.5	217.8	N
1/5/2009	29.82	75.74	677.5	206.5	658.9	200.8	679.0	207.0	654.4	199.5	DRY	714.0	217.6	N
1/14/2009	30.41	77.24	678.3	206.7	659.0	200.8	679.2	207.0	654.5	199.5	DRY	714.1	217.6	N
1/21/2009	30.28	76.91	677.6	206.5	658.9	200.8	679.0	207.0	654.4	199.5	DRY	714.0	217.6	N
2/2/2009	30.44	77.32	677.6	206.5	658.9	200.8	679.1	207.0	654.4	199.5	DRY	714.0	217.6	N
3/26/2009	30.01	76.23	678.0	206.7	659.0	200.9	679.6	207.1	654.8	199.6	DRY	714.4	217.7	NM
4/21/2009	30.21	76.73	678.4	206.8	659.3	201.0	679.9	207.2	655.1	199.7	DRY	714.8	217.9	N
5/18/2009	30.13	76.53	678.8	206.9	659.7	201.1	680.3	207.4	655.5	199.8	DRY	715.3	218.0	N
6/24/2009	30.11	76.48	679.8	207.2	660.7	201.4	681.3	207.7	656.4	200.1	DRY	716.4	218.4	N
7/20/2009	30.16	76.61	680.6	207.5	661.5	201.6	682.2	207.9	657.3	200.3	DRY	718.2	218.9	Y

NM = Not measured
BGS = Below ground surface
DRY = Depth to water greater than depth of well
Shaded Box = Shallowest and deepest depths to groundwater