LMS/SRE-SRW/S09923

# Verification Monitoring Report for the Slick Rock, Colorado, Processing Sites

April 2013

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# Abbreviations

| | |
|---|---|
| ACL | alternate concentration limit |
| amsl | above mean sea level |
| BTEX | benzene, toluene, ethylbenzene, and xylenes |
| CDPHE | Colorado Department of Public Health and Environment |
| CFR | *Code of Federal Regulations* |
| COPC | constituent of potential concern |
| DOE | U.S. Department of Energy |
| EPA | U.S. Environmental Protection Agency |
| ft | feet |
| GCAP | Groundwater Compliance Action Plan |
| mg/L | milligrams per liter |
| *n* | number of samples or data points |
| NRC | U.S. Nuclear Regulatory Commission |
| pCi/L | picocuries per liter |
| Ra-226 | radium-226 |
| Ra-228 | radium-228 |
| SDWA | Safe Drinking Water Act |
| SDWA MCL | maximum contaminant level (EPA Safe Drinking Water Act) |
| SOWP | Site Observational Work Plan |
| SRE | Slick Rock East |
| SRW | Slick Rock West |
| UMTRCA | Uranium Mill Tailings Radiation Control Act |
| UMTRCA MCL | maximum concentration limit (listed in 40 CFR 192, Table 1 to Subpart A) |
| VMR | Verification Monitoring Report |

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# Executive Summary

The Slick Rock, Colorado, Processing Sites consist of two former uranium-ore processing facilities, the Slick Rock East (SRE) site and the Slick Rock West (SRW) site. The sites, managed by the U.S. Department of Energy, are located along the Dolores River in San Miguel County. Surface remediation of the two sites was completed in 1996. The purpose of this Verification Monitoring Report is to evaluate groundwater and surface water monitoring data collected since 2000 and to assess the status of the compliance strategy for groundwater cleanup. The proposed compliance strategy for the Slick Rock sites is natural flushing combined with institutional controls and compliance monitoring, as documented in the *Draft Final Groundwater Compliance Action Plan* (GCAP) for the site (DOE 2006). The U.S. Nuclear Regulatory Commission (NRC) has not yet concurred with this plan.

Constituents of potential concern (COPCs) at the two sites are uranium, selenium, manganese, molybdenum, and nitrate. Selenium and uranium are the only COPCs common to both the SRE and SRW sites. Concentrations of several other constituents, including benzene, toluene, ethylbenzene, and xylenes (BTEX); and radium (radium-226 and radium-228), are elevated only at a single SRW well. To assess the status of compliance, COPC concentrations are compared to maximum concentration limits (MCLs) established under the Uranium Mill Tailings Radiation Control Act (UMTRCA) or, for constituents without UMTRCA MCLs, alternative benchmark values. Because selenium concentrations at SRW are not expected to decrease to levels below the UMTRCA MCL within the 100-year natural flushing time frame, a human-health risk-based alternate concentration limit of 0.18 milligram per liter was proposed for the SRW site (DOE 2006).

At the SRE site, the current monitoring network consists of eight monitoring wells and three surface water locations. Uranium and selenium are the only constituents currently monitored at SRE, as levels of other constituents have been below respective benchmarks. While uranium is monitored at all SRE well locations, selenium is monitored at only two wells (0305 and 0307) given lack of elevated concentrations at remaining SRE locations. Uranium concentrations are highest in the central portion of the SRE site, just downgradient of the historical tailings boundary. Selenium, elevated above the benchmark value at only one well, is not considered a major contaminant at the SRE site.

Nine wells and four surface water locations are currently monitored at the SRW site. Uranium, selenium, manganese, molybdenum, and nitrate levels are elevated within the site's historical tailings boundary. Concentrations of molybdenum, selenium, and uranium remain elevated in wells in this area, and no downward trending is apparent. However, decreases are apparent for manganese and nitrate in SRW wells. Surface water is not significantly affected by site contamination at either the SRE site or the SRW site.

Although the 100-year time frame established in 40 CFR 192 does not commence until NRC approves the GCAP, data collected to date indicate that uranium, molybdenum, and selenium (SRW only) are not attenuating as initially predicted in previous groundwater modeling. In fact, contaminant trends for these constituents have been relatively stable. Exceptions are selenium at the SRE site and manganese and nitrate at SRW. It is recommended that annual verification monitoring of groundwater from designated monitoring wells and surface water locations continue until groundwater contaminant concentrations in all site wells stabilize or decline.

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# 1.0 Introduction

The Slick Rock, Colorado, Processing Site consists of two former uranium-ore processing facilities, referred to as the Slick Rock East (SRE) site (formerly the North Continent site) and, approximately 1 mile downstream from SRE, the Slick Rock West (SRW) site (formerly the Union Carbide site). The Slick Rock processing sites, managed by the U.S. Department of Energy (DOE), are located along the Dolores River in San Miguel County (Figure 1 and Figure 2). Surface remediation of the two sites was completed in 1996.

## 1.1 Purpose of Report

The purpose of this Verification Monitoring Report (VMR) is to evaluate groundwater and surface water monitoring data collected at the Slick Rock processing sites since 2000 and to assess the status of the compliance strategy for groundwater cleanup.

## 1.2 Compliance Strategy

The proposed compliance strategy for the Slick Rock sites is natural flushing combined with institutional controls and compliance monitoring as stated in the *Draft Final Groundwater Compliance Action Plan for the Slick Rock, Colorado, UMTRA Project Sites* (GCAP; DOE 2006). The GCAP states that public health will be protected during the natural flushing process through institutional controls, which will restrict access to contaminated alluvial groundwater. The institutional controls to be used for the Slick Rock sites are environmental covenants between the State of Colorado, represented by the Colorado Department of Public Health and Environment (CDPHE), and the landowner, Umetco Minerals Corporation. The environmental covenants are still pending for the Slick Rock sites, and the U.S. Nuclear Regulatory Commission (NRC) has not yet concurred with the GCAP.

Constituents of potential concern (COPCs) at the Slick Rock sites are manganese, molybdenum, nitrate, selenium, and uranium. Several other COPCs, including benzene, toluene, ethylbenzene, and xylenes (collectively referred to as BTEX), radium-226 (Ra-226), and radium-228 (Ra-228), are limited to a single SRW alluvial well (0319). Selenium and uranium are the only COPCs common to both the SRE and SRW sites.

To assess the status of compliance, COPC concentrations are compared to the benchmark values listed in Table 1. Groundwater benchmarks for molybdenum, nitrate, selenium (SRE only), and uranium are the maximum concentration limits established under the Uranium Mill Tailings Radiation Control Act (UMTRCA MCLs), as codified in Title 40 *Code of Federal Regulations* Part 192 (40 CFR 192). At SRW, benchmarks for BTEX and combined Ra-226+228 (analytes for well 0319 only) are maximum contaminant levels established under the U.S. Environmental Protection Agency (EPA) Safe Drinking Water Act (SDWA MCLs). The benchmark for manganese is the maximum background (upgradient) concentration measured at the site. Except for selenium in SRW wells, groundwater modeling conducted for the Site Observational Work Plan (SOWP; DOE 2002) predicted that natural flushing for all COPCs would be completed within the 100 year regulatory time frame established in 40 CFR 192. Because selenium concentrations at SRW were not expected to decrease to levels below the 0.01 milligram per liter (mg/L) UMTRCA MCL within 100 years, a human-health risk-based alternate concentration limit (ACL) of 0.18 mg/L was proposed for the SRW site (DOE 2006).

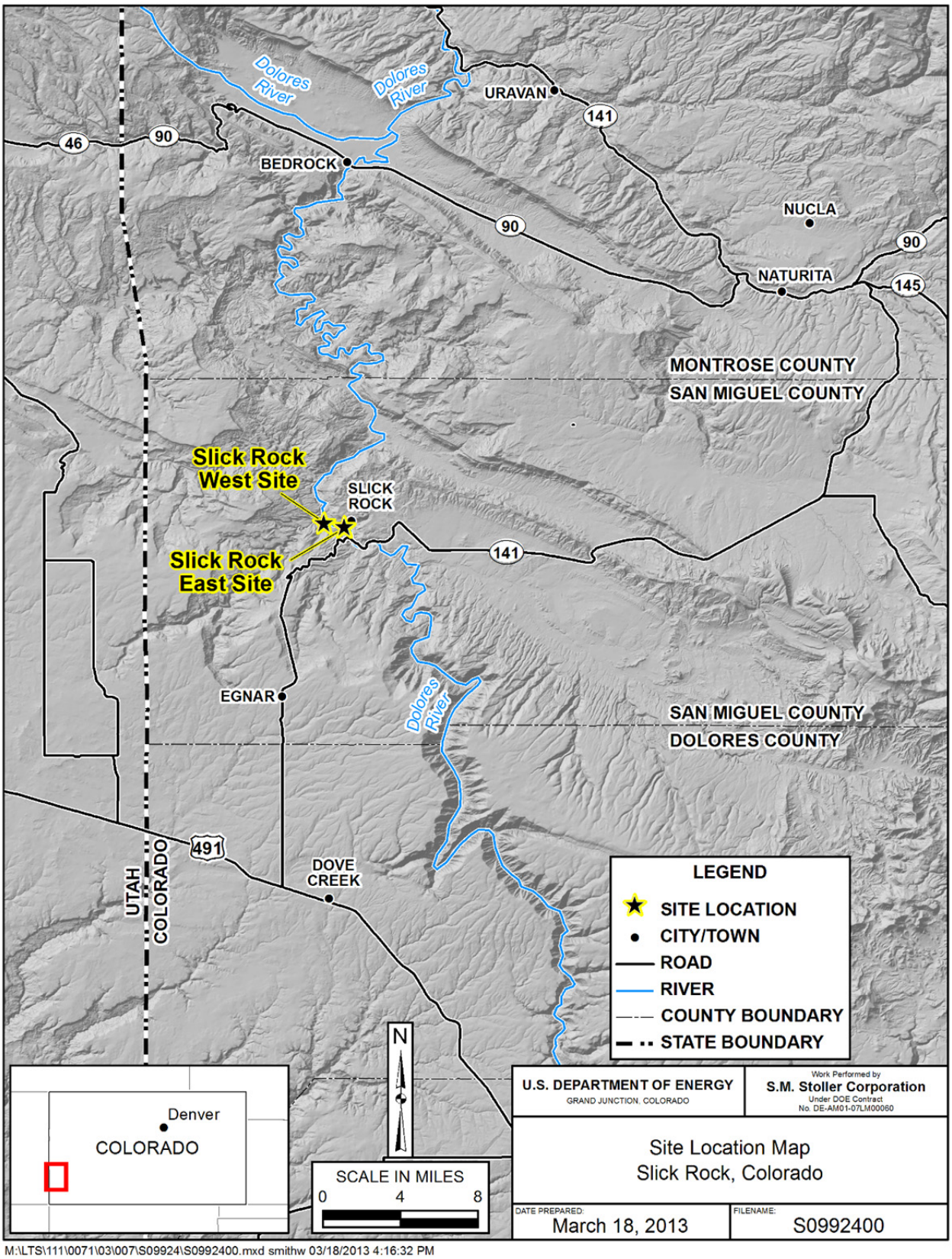


*Figure 1. Slick Rock, Colorado, Processing Sites Location Map*

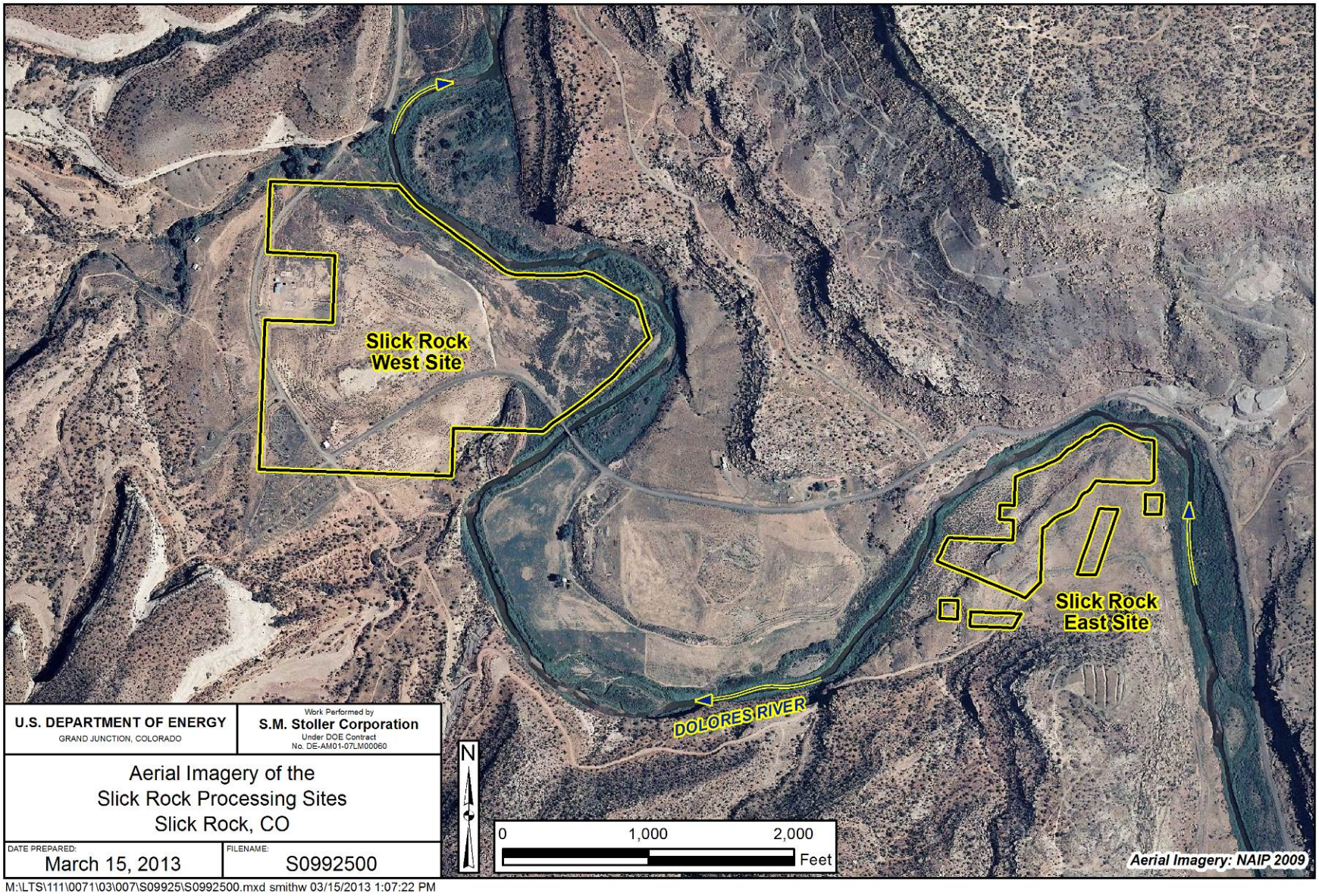


*Figure 2. Aerial Photograph of the Slick Rock, Colorado, Processing Sites*

*Table 1. Groundwater Benchmarks for COPCs at the Slick Rock East and West Sites*

| COPC[a] | Benchmark | Basis for Benchmark | Applicable Site | Applicable Wells[b] | Comment |
|---|---|---|---|---|---|
| Uranium | 0.044 mg/L | UMTRCA MCL | SRE, SRW | All wells except SRW wells 0317 and 0319 | The 0.044 mg/L standard is equivalent to the uranium standard of 30 pCi/L in 40 CFR 192. |
| Selenium | SRE: 0.01 mg/L SRW: 0.18 mg/L[c] | SRE: UMTRCA MCL SRW: Proposed ACL (DOE 2002) | SRE, SRW | SRE wells 0305 and 0307 All SRW wells | The UMTRCA MCL is less than the 0.05 mg/L SDWA MCL. |
| Manganese | 4.2 mg/L | Maximum background | SRW | All SRW wells except 0317 and 0319 | Maximum concentration measured at well 0300 in August 2001.[d] |
| Molybdenum | 0.10 mg/L | UMTRCA MCL | SRW | All SRW wells except 0319 | |
| Nitrate as $NO_3$ | 44.3 mg/L | UMTRCA MCL | SRW | All SRW wells except 0317 and 0319 | The 44.3 mg/L standard is equivalent to the nitrate as nitrogen standard of 10 mg/L in 40 CFR 192. |
| Radium-226 + Radium-228 (Ra-226 + Ra-228) | 5 pCi/L | UMTRCA MCL | SRW | SRW well 0319 | Analysis for radium in other SRW wells was discontinued after 2001 (given levels below 5 pCi/L). |
| Benzene | 0.005 mg/L | SDWA MCL | SRW | SRW well 0319 | |
| Toluene | 1 mg/L | SDWA MCL | SRW | SRW well 0319 | |
| Ethylbenzene | 0.7 mg/L | SDWA MCL | SRW | SRW well 0319 | The 0.7 mg/L SDWA MCL has never been exceeded. |
| Xylenes | 10 mg/L | SDWA MCL | SRW | SRW well 0319 | The 10 mg/L SDWA MCL has never been exceeded. |

[a] Constituents are listed in order of prevalence at the Slick Rock sites. For example, uranium is most prevalent at both sites, whereas Ra-226 and Ra-228 are limited to the immediate vicinity of SRW well 0319.

[b] Applicable wells are only those currently monitored. For historical results, refer to the SOWP (DOE 2002) and previous VMRs.

[c] This proposed ACL for selenium was established in the SOWP (DOE 2002) based on the EPA human health Risk Table. Although the proposed ACL remains at 0.18 mg/L as established in the SOWP, EPA revised the risk-based value to 0.078 mg/L in November 2011. The EPA Risk Table (http://www.epa.gov/reg3hscd/risk/human/rb-concentration_table/Generic_Tables/index.htm [refer to tapwater screening level in the Summary Table]) was accessed in March 2013, and the most recent update was in November 2012.

[d] The GCAP cited a maximum background value for manganese of 3.5 mg/L, which was the first (September 2000) measurement in background well 0300, not the highest measurement.

**Abbreviations**

mg/L = milligrams per liter
pCi/L = picocuries per liter

# 2.0 Site Conditions

## 2.1 Hydrogeology

The hydrostratigraphic units at the Slick Rock sites are, in descending stratigraphic order, the Dolores River alluvium (Quaternary), the Salt Wash Member of the Morrison Formation, the Summerville Formation, the Entrada Sandstone, and the Navajo Sandstone (all Jurassic). Although both sites overlie the Dolores River alluvium, not all other units are present at both sites.

The Dolores River alluvium, the only unit known to be affected by site-related contamination, contains the uppermost aquifer. The alluvial aquifer is unconfined and consists of unconsolidated material, primarily silty sands and silty sandy gravels with an occasional interbedded clay lens. The alluvium ranges from 15 to 20 feet (ft) in thickness and is laterally restricted by bedrock that forms the walls of the Dolores River canyon. In addition, the Dolores River floodplain is discontinuous and pinches out in areas where the river meets the canyon wall. Depth to groundwater in the alluvial aquifer ranges from 7 to 15 ft below ground surface. Groundwater flow generally follows the downstream direction of the Dolores River, which is the main recharge source for the alluvial aquifer.

At the SRE site, the Salt Wash Member of the Morrison Formation and the Summerville Formation underlie the Dolores River alluvium. Because these formations have an abundance of fine-grained, low-permeability units, they are considered aquitards that prevent contaminated groundwater in the alluvial aquifer from moving downward into deeper aquifers (DOE 2002).

At the SRW site, Entrada Sandstone, ranging from 40 to 60 ft in thickness in the floodplain area, underlies the Dolores River alluvium. The Entrada aquifer is unconfined near the top of the unit (in contact with the alluvial aquifer), and it may be semiconfined near the bottom (in partial contact with the underlying Navajo aquifer). In wells completed in the Navajo Sandstone, which is approximately 180 ft thick in the Slick Rock area floodplain (DOE 2002), groundwater has an upward vertical gradient with respect to water in the overlying Entrada. Because of this, the Navajo aquifer discharges upward. The Entrada aquifer receives recharge from upgradient infiltration of precipitation, creating artesian pressure. Entrada groundwater has a slight upward vertical gradient with respect to water in the overlying alluvial aquifer, and hydraulic conductivity in the alluvial aquifer is two orders of magnitude greater than that of the Entrada. These conditions inhibit groundwater from flowing downward from the alluvial aquifer into underlying aquifers.

## 2.2 Groundwater Quality

### 2.2.1 SRE Site

Alluvial groundwater beneath the SRE site was contaminated as a result of former uranium-ore processing activities. This contamination is limited to the alluvial aquifer at the SRE site (Section 2.1) and consists only of uranium and selenium (DOE 2002). In the alluvial aquifer, uranium concentrations in wells 0303 and 0305 (wells with the highest uranium concentrations) have averaged approximately 1 mg/L, exceeding the 0.044 mg/L UMTRCA MCL.

Selenium is not considered a major contaminant at the SRE site, as it has been elevated in only one well (0305). Since 2006, concentrations in well 0305 have remained at about 0.02 mg/L. Although this is twice the UMTRCA groundwater standard of 0.01 mg/L, concentrations have always been below the SDWA primary drinking water standard of 0.05 mg/L.

### 2.2.2 SRW Site

Former uranium-ore processing activities also contaminated the groundwater beneath the SRW site. COPCs in the alluvial aquifer at the SRW site are manganese, molybdenum, nitrate, selenium, uranium, Ra-226, Ra-228, and BTEX. Contaminant plumes in the alluvial aquifer are limited to the site, and Ra-226, Ra-228, and BTEX contamination is isolated to the region of one well (0319). The primary COPCs in the alluvial aquifer are molybdenum, nitrate, selenium, and uranium (refer to Section 4.0 for contaminant distributions and trends).

## 2.3 Surface Water Quality

The Dolores River is the only perennial surface water feature in the vicinity of the Slick Rock sites. As discussed in Section 4.3, results from surface water sampling have demonstrated minimal impact to the Dolores River from site contamination.[1]

## 2.4 Remediation Activities

Surface remediation at the Slick Rock sites began in 1995 and was completed in 1996. Uranium mill tailings and other residual radioactive materials associated with the former milling operations were relocated to the Slick Rock disposal cell (formerly the Burro Canyon disposal cell), approximately 5 miles east of the Slick Rock processing sites. The sites were regraded with onsite material, and subsequent revegetation efforts have been successful.

## 2.5 Land and Water Use

Umetco Minerals Corporation currently owns the SRE and SRW sites. The SRE site is not fenced and is used for livestock grazing. The majority of the SRW site is enclosed with a barbed-wire fence. Land between the two sites is privately owned, and land use includes irrigated alfalfa fields, livestock grazing, and gravel-mining operations. Water used to irrigate the alfalfa is pumped from the Dolores River. There is no current use of alluvial groundwater beneath the former processing sites. There are also no known uses of groundwater from the Entrada Sandstone in the area near the SRE and SRW sites. Groundwater for domestic or agricultural use in the Slick Rock area is primarily supplied by the Navajo Sandstone aquifer. Historically, wells completed in the Navajo Sandstone provided water for the milling operations and for the mill community at the SRW site.

[1] This stream segment (Segment 1) of the Lower Dolores River Basin is classified as Aquatic Life Cold 1, Recreation E, Water Supply, and Agriculture, and the classifications with the most restrictive water quality standards apply (CDPHE 2012).

# 3.0 Monitoring Program

Monitoring at the Slick Rock processing site is to be performed annually for the first 10 years following NRC concurrence with the GCAP (DOE 2006). Annual monitoring has been performed at the site since 2003 (more frequent monitoring occurred between 2000 and 2002), although the NRC has not yet concurred with the GCAP. This section describes the monitoring programs for the SRE and SRW sites.

## 3.1 SRE Site

At the SRE site, the current monitoring network consists of eight monitoring wells and three surface water locations (Table 2 and Figure 3). Sampling at two monitoring wells, 0310 and 0312, resumed in 2005 (after a 3-year hiatus) to better characterize the extent of uranium contamination detected in well 0311. The farthest downstream SRE surface water location (0700) was also established at that time.

*Table 2. Monitoring Program at the SRE Site*

| ID | Matrix | Location[a] | Rationale | Analytes |
|---|---|---|---|---|
| 0300 | Groundwater | Upgradient | Upgradient (background) monitoring location for both SRE and SRW sites.[b] | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0303 | Groundwater | Onsite | Hot spot for uranium. | Uranium |
| 0305 | Groundwater | Onsite | Hot spot for uranium; selenium above the UMTRCA MCL. | Selenium and uranium |
| 0307 | Groundwater | Onsite | Downgradient of hot spots, monitor plume migration. | Selenium and uranium |
| 0309 | Groundwater | Onsite | Farthest downgradient well onsite. | Uranium |
| 0310 | Groundwater | Offsite (across the Dolores River) | Monitor migration of uranium between the SRE and SRW sites. | Uranium |
| 0311 | Groundwater | Offsite, downgradient | Adjacent to and north of well 0310. | Uranium |
| 0312 | Groundwater | Offsite, downgradient | Adjacent to and north of well 0311. | Uranium |
| 0696 | Surface Water | Upstream | Surface water background (inlet area). | Uranium |
| 0692 | Surface Water | Adjacent to site | Location where the centroid of the uranium plume was predicted to intersect the river. | Uranium |
| 0700 | Surface Water | Downstream | Established in 2005; located about 100 ft southwest of well 0309. | Uranium |

[a] The sampling locations in this table are listed first in order of matrix, and then by general flow direction (upgradient or upstream locations are listed first).

[b] In 2010, sampling resumed at upgradient well 0300 to reestablish a groundwater background location for the SRE and SRW sites. This well has not been sampled since then, but sampling of well 0300 will resume in 2013.

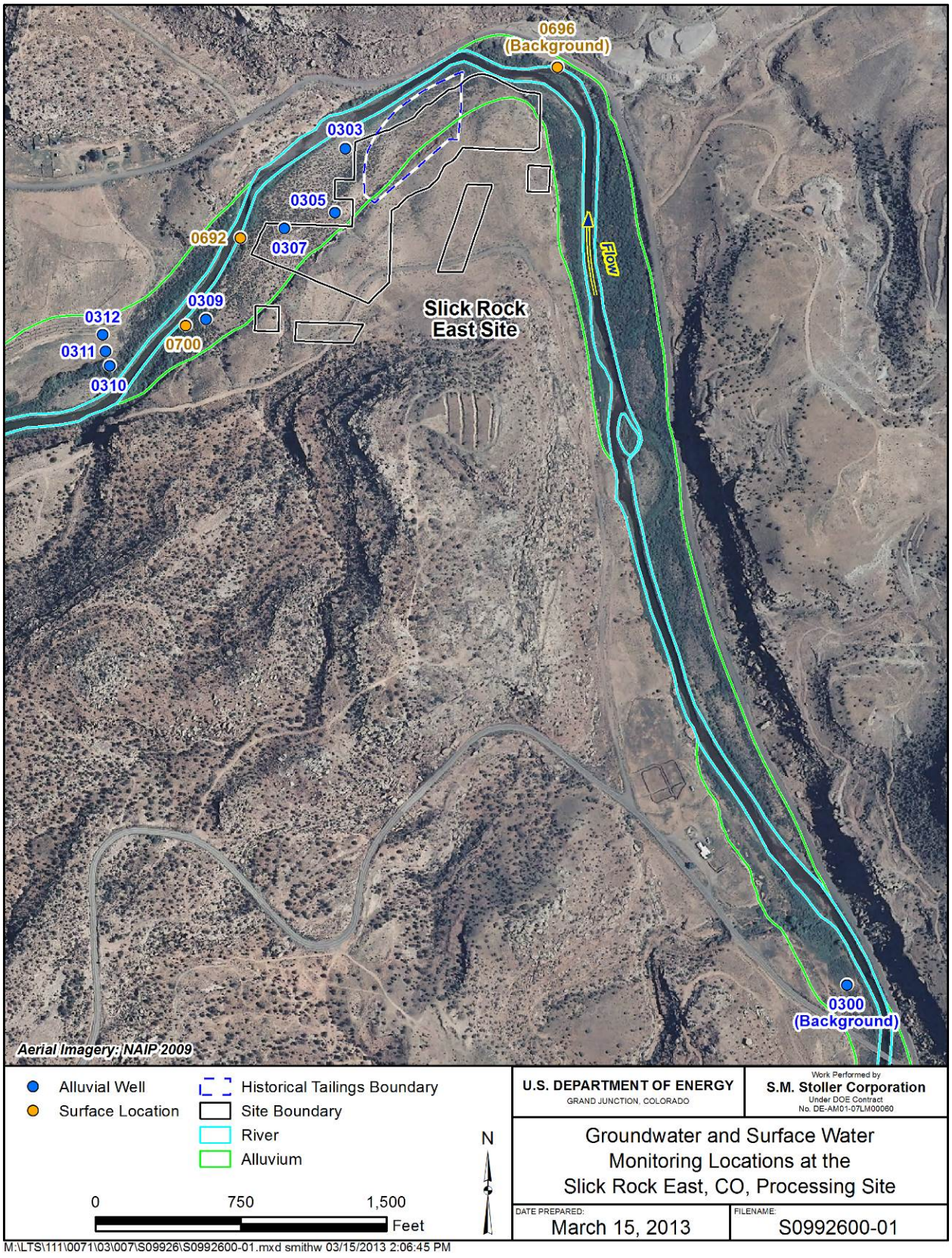


*Figure 3. Groundwater and Surface Water Monitoring Locations at the Slick Rock East Site*

## 3.2 SRW Site

At the SRW site, the monitoring network consists of nine monitoring wells and four surface water locations (Table 3 and Figure 4). In 2010, three new wells were installed at the SRW site: 0318A, 0339, and 0340. Well 0318A replaced damaged well 0318, and wells 0339 and 0340 were installed to better characterize selenium contamination at the site.

*Table 3. Monitoring Program at the SRW Site*

| ID | Matrix | Location[a] | Rationale | Analytes |
|---|---|---|---|---|
| 0317 | Groundwater | Onsite | Entrada Sandstone well—molybdenum exceeds UMTRCA MCL. | Molybdenum and selenium[b] |
| 0318/ 0318A | Groundwater | Onsite | Area of highest measured concentrations for several COPCs. Well 0318A was installed in September 2010 to replace former well 0318. | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0339 | Groundwater | Onsite | Installed in September 2010 to better characterize the extent of elevated selenium in the eastern area of the former tailings pile. | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0340 | Groundwater | Onsite | Installed in September 2010 (same rationale as that for well 0339 above). | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0508 | Groundwater | Onsite | High selenium, nitrate, molybdenum, and uranium. | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0510 | Groundwater | Onsite | Edge of former tailings pile, high COPC concentrations. | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0319 | Groundwater | Onsite | Hot spot for BTEX and radium. | BTEX, radium (Ra-226, Ra-228), and selenium[b] |
| 0320 | Groundwater | Onsite | Farthest downgradient well onsite; monitor plume movement. | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0684 | Groundwater | Offsite | Farthest downgradient well; purpose is to verify that contaminants are not migrating offsite. | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0693 | Surface Water | Upstream | Upstream SRW surface water location (but downstream of SRE). | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0347 | Surface Water | Adjacent to site | Predicted location where the centroid of the selenium plume intersects the river; potential point of exposure for selenium (DOE 2006). | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0349 | Surface Water | Adjacent to site | Predicted location where the centroids of contaminant plumes intersect the river. Potential point of exposure. | Manganese, molybdenum, nitrate, selenium, and uranium |
| 0694 | Surface Water | Downstream | Potential for contaminant plumes to discharge to the river at this location. | Manganese, molybdenum, nitrate, selenium, and uranium |

[a] The sampling locations in this table are listed first in order of matrix, and then by general flow direction (upgradient or upstream are listed first).

[b] In Entrada well 0317 and alluvial well 0319, monitoring for selenium resumed in 2010 after an 8-year hiatus.

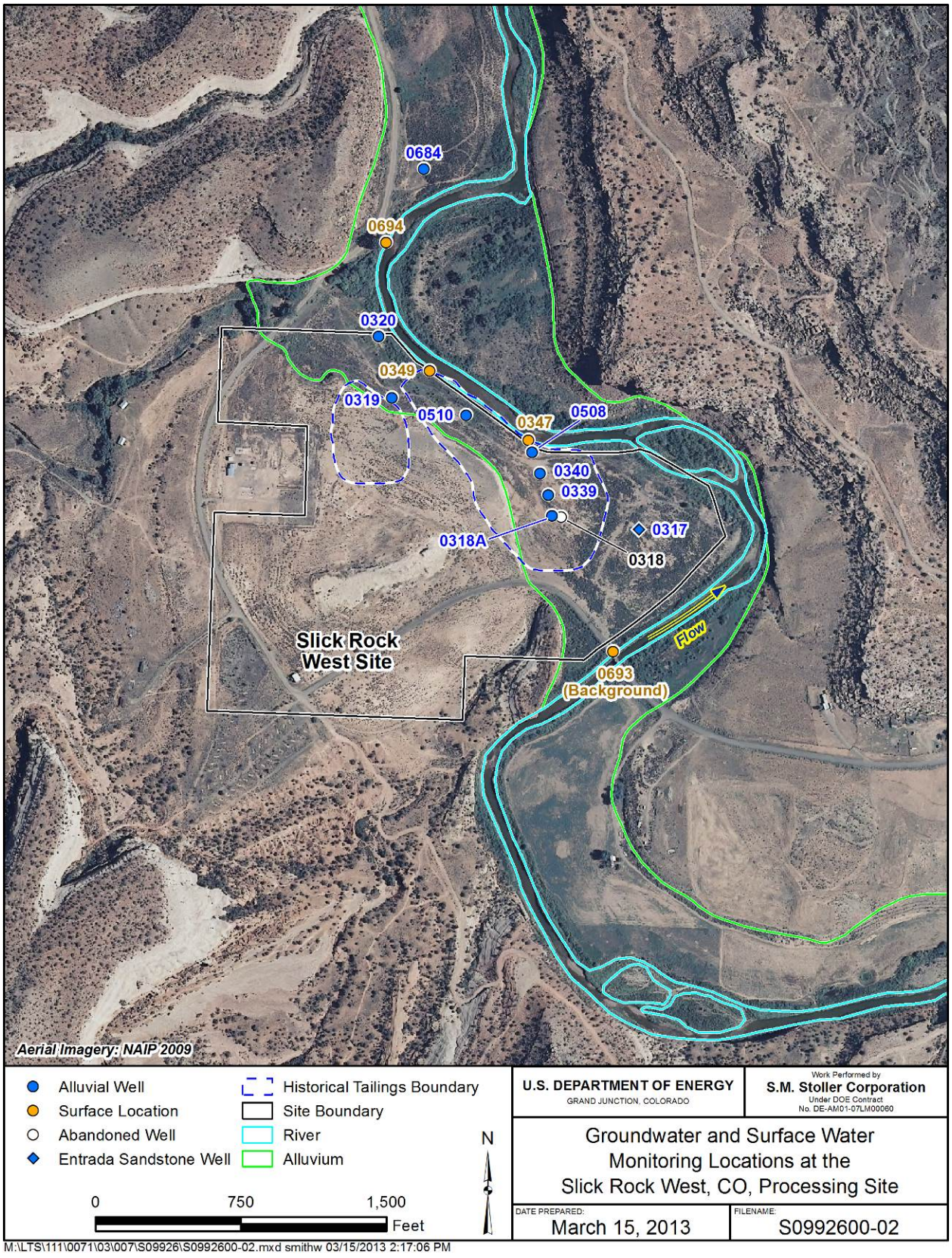


*Figure 4. Groundwater and Surface Water Monitoring Locations at the Slick Rock West Site*

# 4.0 Results of 2012 Monitoring

This section documents the results of groundwater and surface water monitoring conducted in 2012 for the SRE and SRW sites. Detailed analytical results are provided in Appendixes A and B for groundwater and surface water, respectively. Appendix C includes supporting static water level data and hydrographs. Additional information, including a data quality assessment and time-concentration graphs for all analytes and monitoring locations, is provided in the corresponding Data Validation Package (DOE 2012a).

## 4.1 SRE Site Groundwater Monitoring Results

Uranium and selenium are the only constituents currently monitored at SRE, as levels of other constituents have been below respective benchmarks. While uranium is monitored at all SRE well locations, selenium is monitored at only two wells, 0305 and 0307. Recent and historical trends observed for each of these constituents are discussed below.

### SRE Uranium

The box plots in Figure 5 show the historical distribution of uranium in currently active SRE wells, ordered from left to right by direction of groundwater flow (upgradient to downgradient). Corresponding time-concentration plots are provided in Figures 6 and 7. Figure 8 maps the results of the most recent (September 2012) sampling.


*Figure 5. Box Plot of Uranium in SRE Wells*

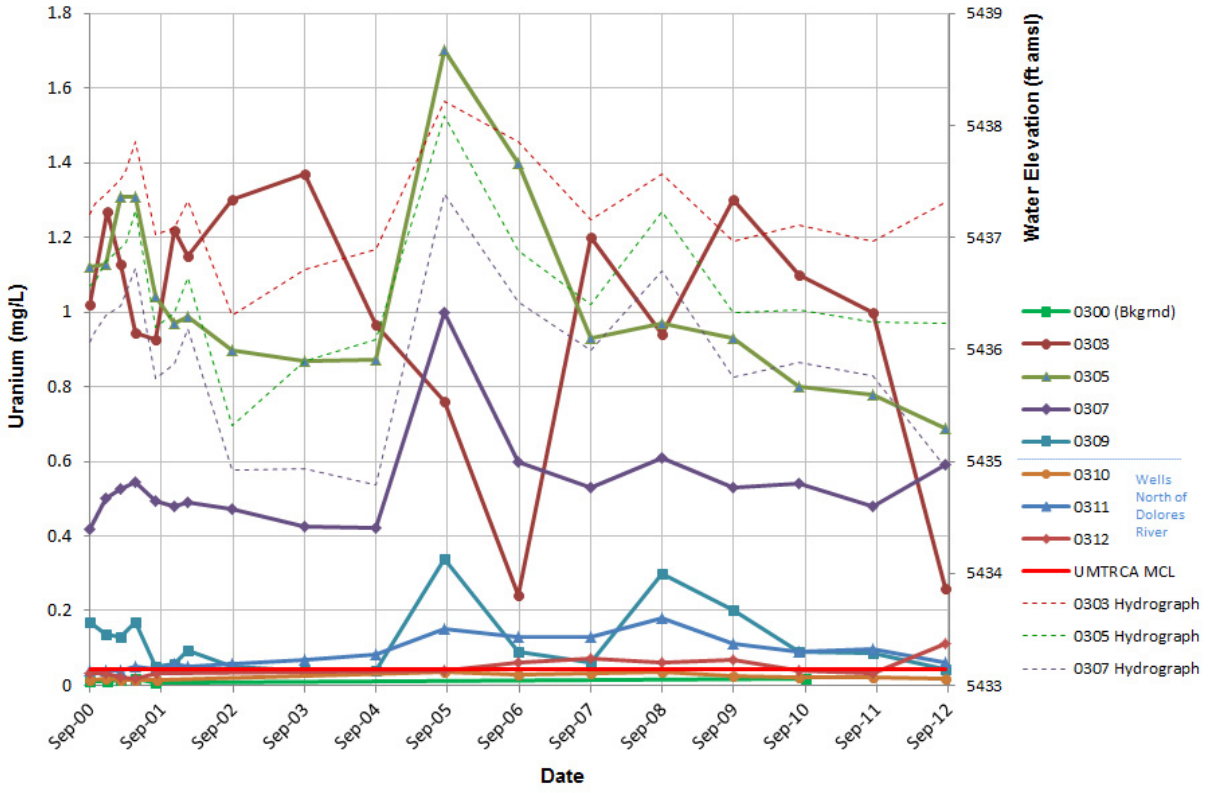


*Figure 6. Uranium Concentrations Versus Time in SRE Wells*

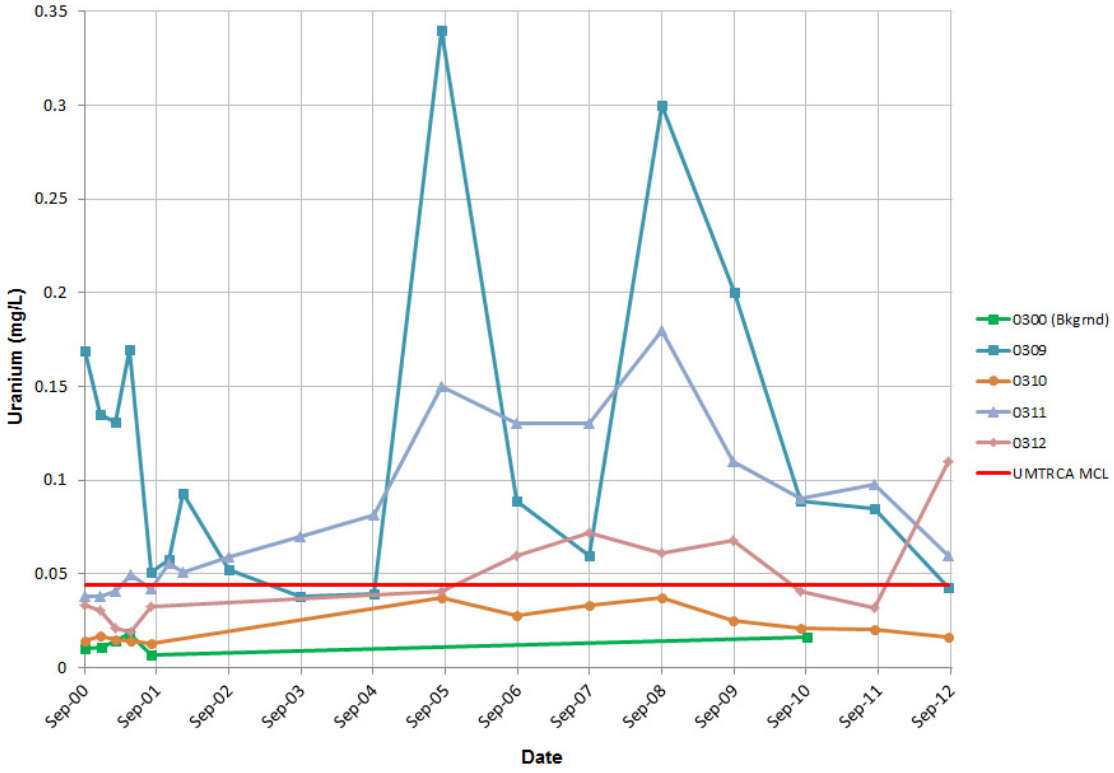


*Figure 7. Zoom View of Uranium Results for SRE Wells 0309, 0310, 0311, and 0312*

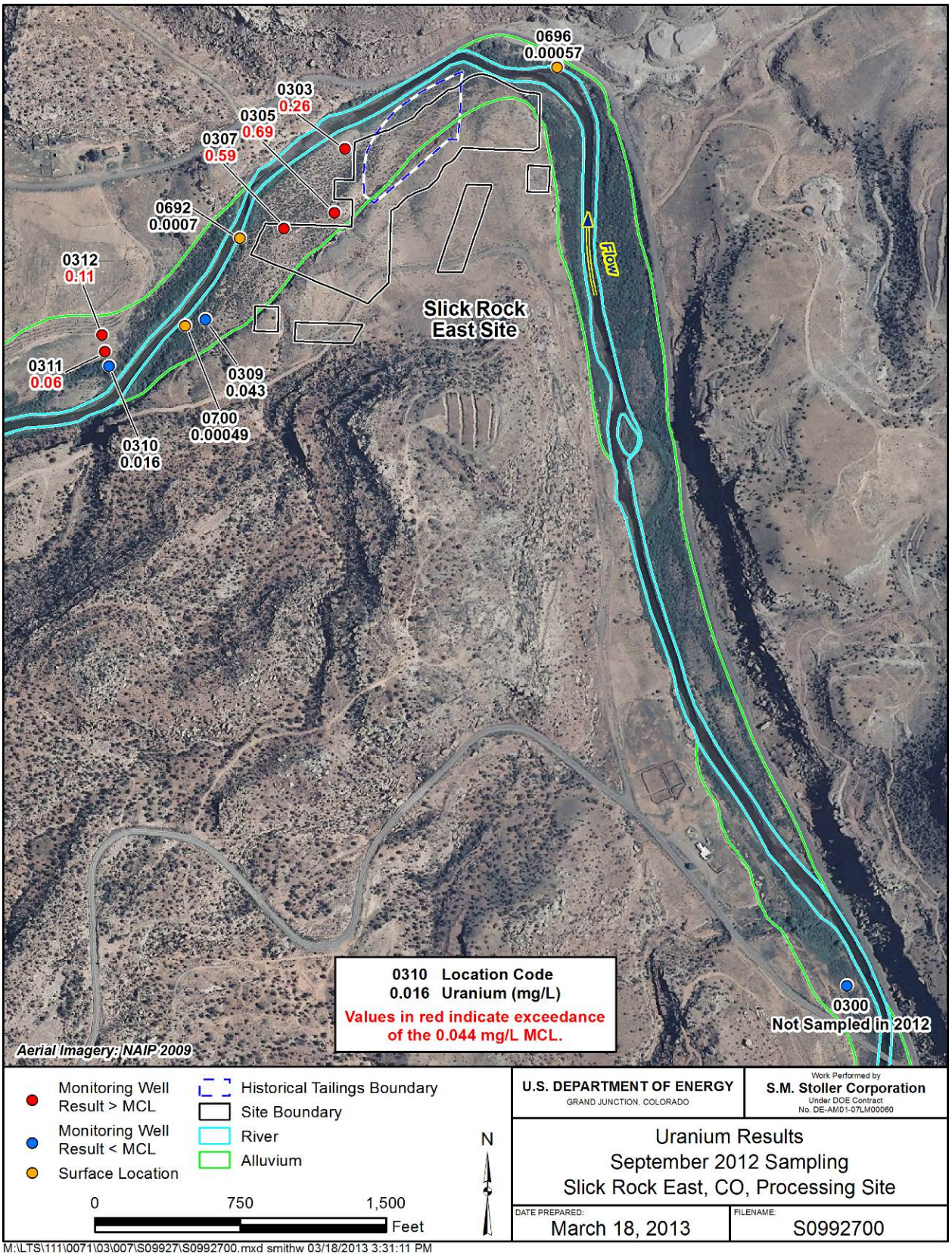


*Figure 8. Uranium Distribution at SRE Monitoring Locations: September 2012 Sampling*

As has been the case historically, uranium concentrations are highest—ranging up to about 1.7 mg/L—in SRE wells 0303, 0305, and 0307, located in the central portion of the SRE site just downgradient of the historical tailings boundary. Uranium concentrations in these wells and in well 0309 have also been the most variable. As shown in Figure 6, the wide fluctuations in uranium concentrations may be at least partially attributable to changes in water levels. While uranium concentrations in wells 0305 and 0307 appear to vary directly with water levels, the opposite trend is apparent for well 0303. For the last (September 2012) sampling round, uranium concentrations in well 0303 decreased to 0.26 mg/L, close to the historical minimum concentration (0.24 mg/L).

North of the Dolores River, uranium concentrations in alluvial wells 0311 and 0312 have been slightly elevated relative to the UMTRCA MCL, and concentrations in well 0310 have not exceeded this standard (Figure 7). Uranium concentrations increased significantly between 2001 and 2008 in well 0311 but have since declined. Conversely, the last measurement in well 0312, 0.11 mg/L, is a historical maximum for that well. Although the cause of the elevated uranium in wells 0311 and 0312 is not clear, these findings might reflect contamination from the numerous uranium mining operations north of the Dolores River. Overall, no consistent attenuation of uranium concentrations over time (e.g., attributable to natural flushing) is apparent in SRE wells.

**SRE Selenium**

Selenium is not considered a major contaminant at the SRE site because concentrations have been elevated in only one well, 0305. Figure 9 plots selenium concentrations in this well, nearby well 0307, and background well 0300, the only SRE wells currently monitored for this analyte. Selenium concentrations in well 0305 have ranged from 0.014 mg/L (latest measurement) to 0.046 mg/L and appear to be gradually declining. Although historically exceeding the 0.01 mg/L UMTRCA MCL, all results have been below the 0.05 mg/L SDWA primary drinking water standard (SDWA MCL).

Similar to results for upgradient (background) well 0300, selenium concentrations in well 0307 have for the most part been consistently below or just slightly above detection limit values (most <0.0003 mg/L), well below the UMTRCA MCL. The latest result, 0.003 mg/L, is the historical maximum, about 10 times higher than previous results.

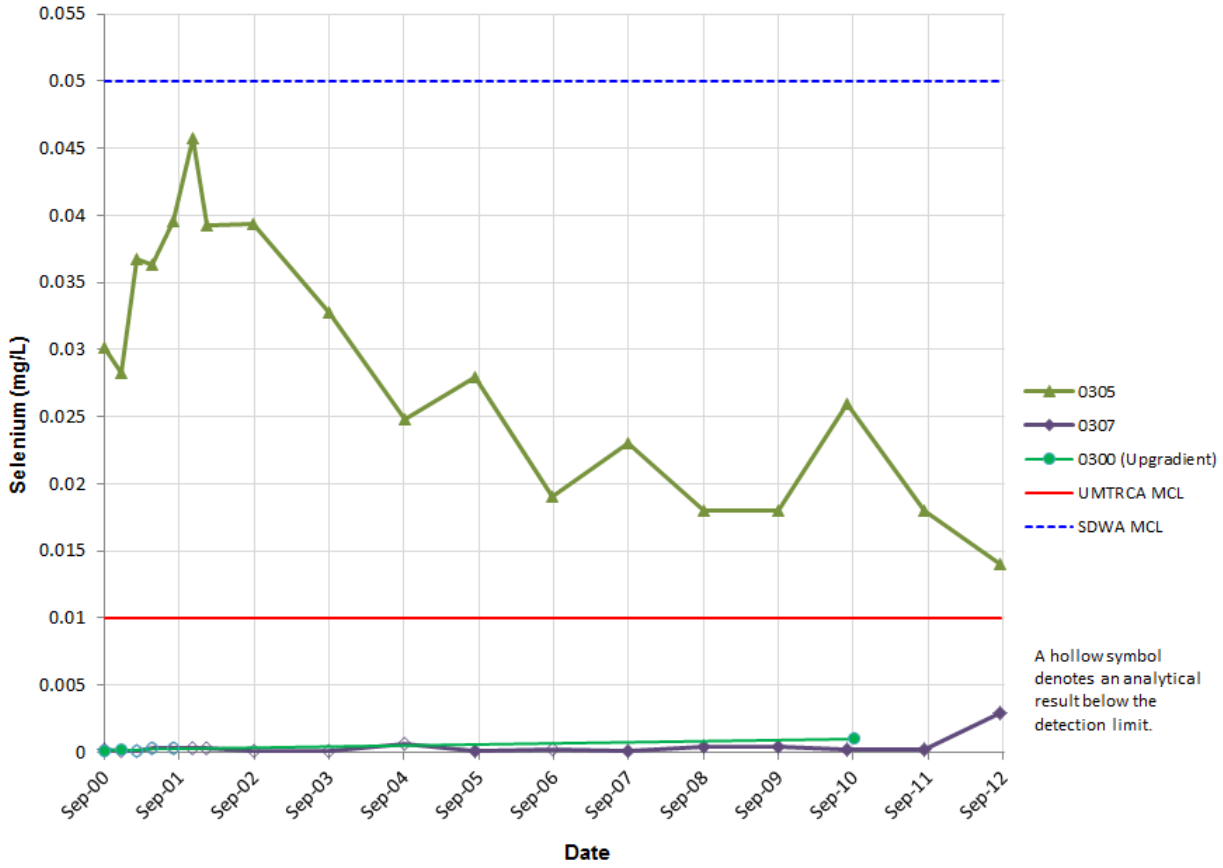


*Figure 9. Selenium Concentration Versus Time in SRE Wells 0305 and 0307*

## 4.2 SRW Site Groundwater Monitoring Results

The two COPCs common to both the SRW site and SRE site are uranium and selenium. Other constituents monitored at the SRW site include manganese, molybdenum, and nitrate. BTEX and Ra-226/Ra-228 are monitored at a single SRW well, 0319, as this is the only location where these constituents have been elevated. As an overview, Figure 10 provides box plot diagrams for the primary SRW COPCs (those monitored at more than one well), illustrating the differences in their spatial distributions. For example, whereas uranium concentrations are highest in central SRW wells (0340, 0508, 0510), coinciding with the portion of the former tailings area closest to the Dolores River, selenium has been most elevated in the area around former well 0318, the southern portion of the former tailings area.

Anomalous increases in molybdenum and selenium concentrations in well 0318 were the catalyst for installation of three new SRW alluvial wells in 2010—0318A, 0339, and 0340; locations are shown in Figure 4. Well 0318A was installed to replace well 0318, which was damaged and is no longer sampled (note the wide fluctuation in COPC concentrations in Figure 10). Wells 0339 and 0340 were installed to better understand the distribution and movement of selenium in the alluvial aquifer in this area.

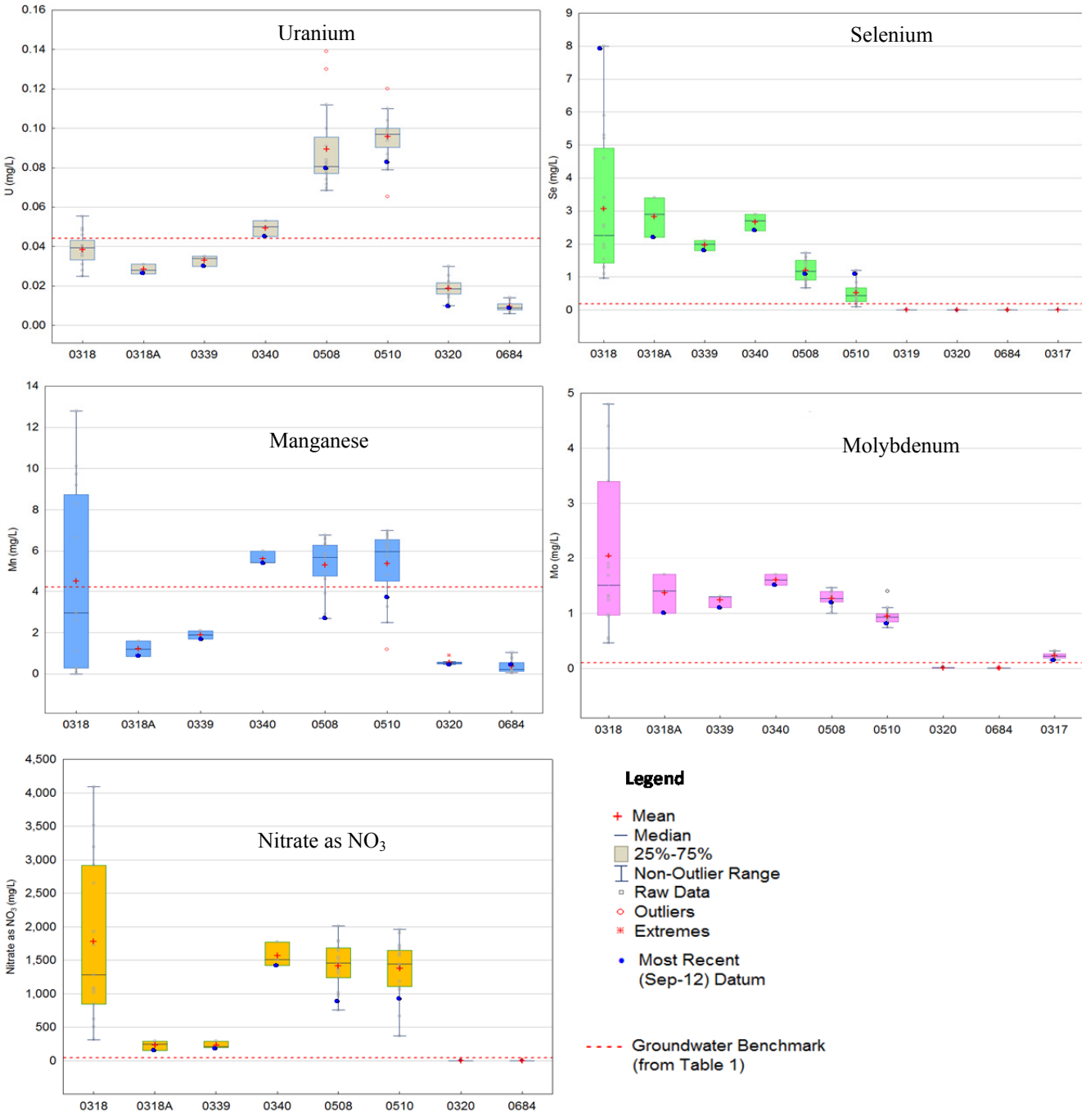


*Figure 10. Box Plots of Historical COPC Concentrations at SRW Wells*

*Data plotted are since February 2000. In each plot, wells are ordered according to the general direction of groundwater flow (upgradient to downgradient). Since 2002, samples collected from Entrada well 0317 have been analyzed only for selenium and molybdenum; this well appears in the rightmost portion of the box plots for these constituents. BTEX and radium (Ra-226+228) are excluded from this plot because these constituents are only monitored in SRW well 0319. For some wells (e.g., well 0320), the most recent results are not apparent due to tight low-concentration distributions (see legend).*

## SRW Uranium

Uranium concentrations have consistently exceeded the 0.044 mg/L UMTRCA MCL in only two SRW wells—wells 0508 and 0510, located within the historical tailings boundary. For the most recent sampling, the uranium concentration in both wells was about double the UMTRCA MCL (0.08 mg/L). No trending is apparent, as evident in Figure 11.

Uranium concentrations in former well 0318 had been below the standard since August 2001, and then stabilized at about 0.03 mg/L between 2007 and 2010, when it was abandoned. For the last three sampling periods, uranium concentrations in collocated well 0318A (replacing well 0318) have also been about 0.03 mg/L. Uranium concentrations in recently installed well 0340 have slightly exceeded the UMTRCA MCL, although just barely as of the last sampling in September 2012 (0.045 mg/L). Uranium concentrations in remaining SRW wells, including recently installed well 0339, have been below 0.04 mg/L. Figure 12 maps the most recent (September 2012) uranium results for all SRW well, as well as Dolores River surface water monitoring results (discussed in Section 4.3).

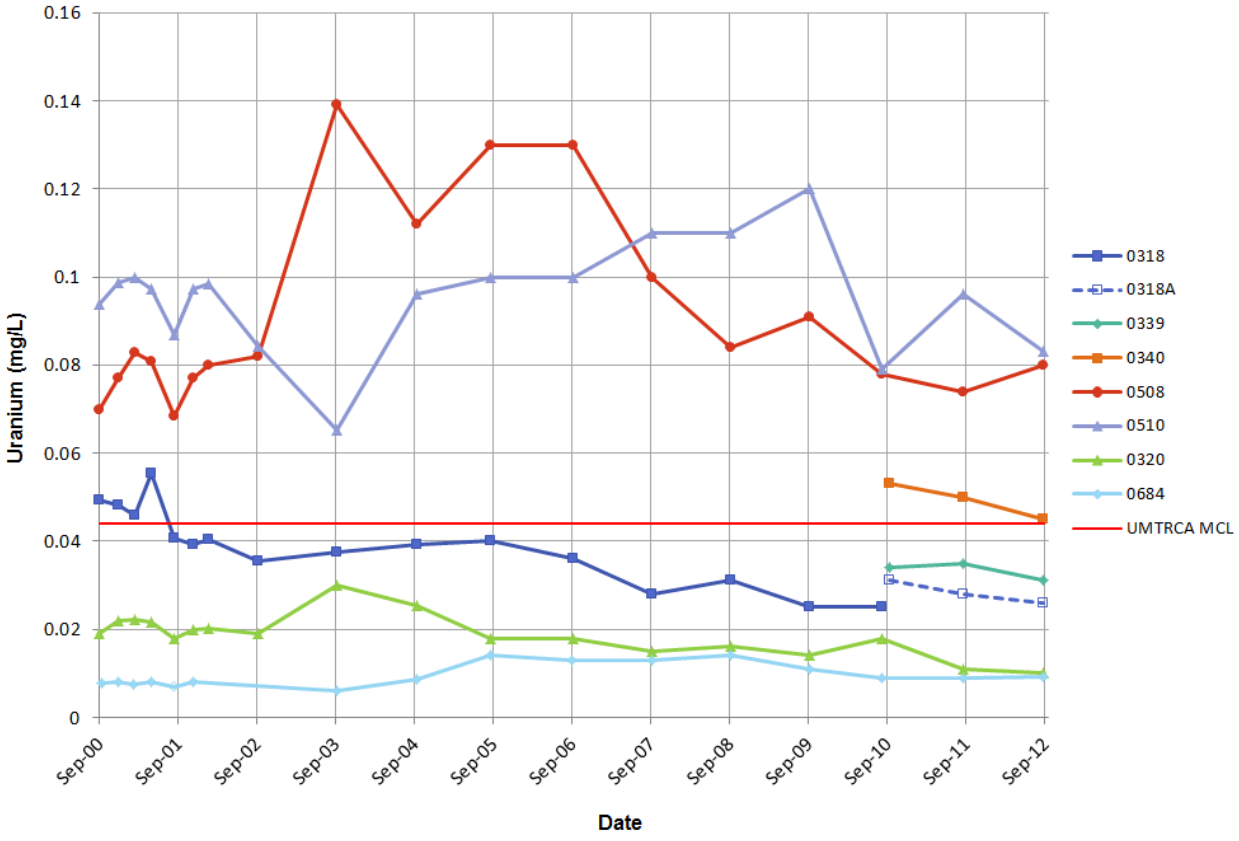


*Figure 11. Uranium Concentrations Versus Time in SRW Monitoring Wells*
*Wells in legend are listed in order of downgradient flow direction.*

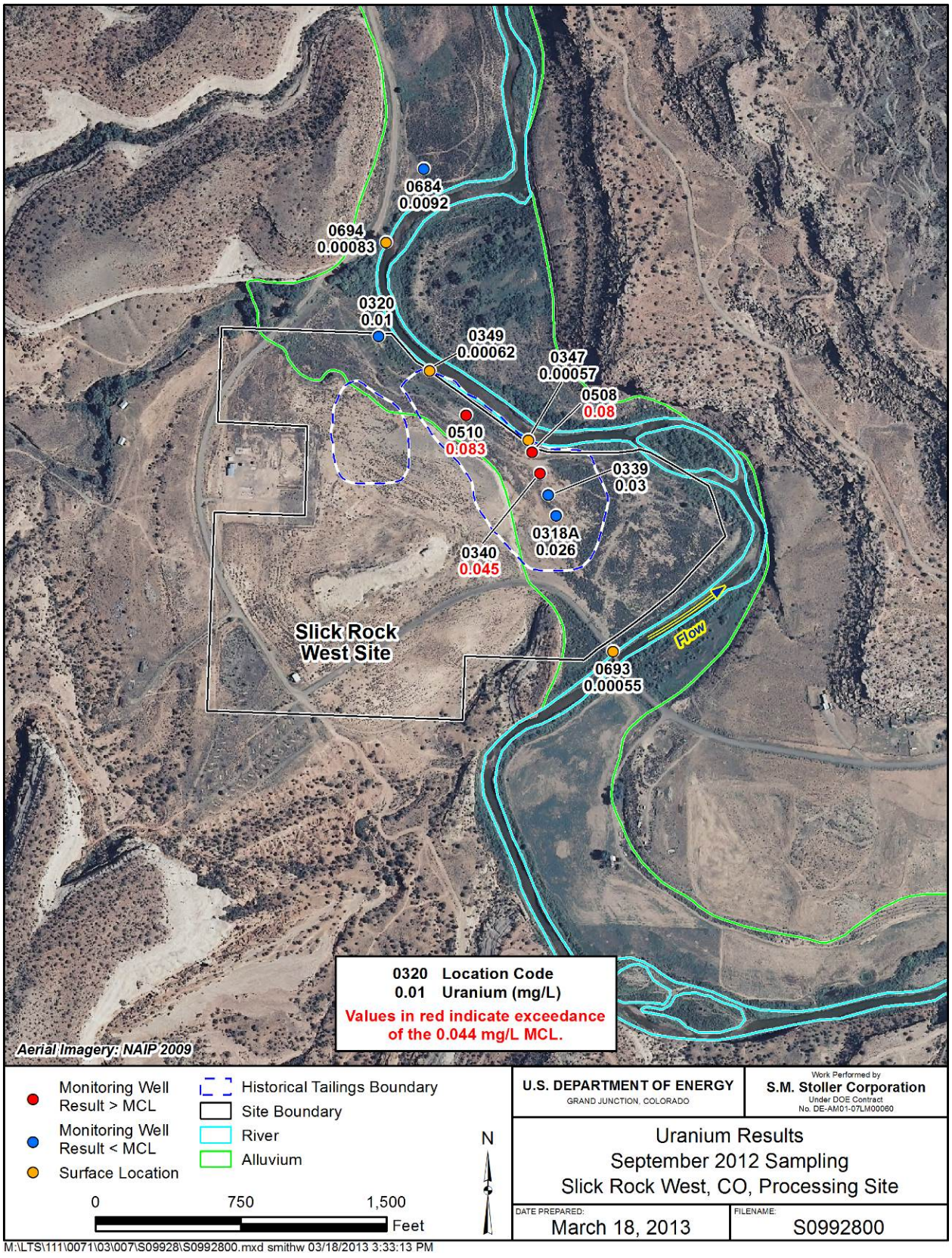


*Figure 12. Uranium Distribution at Slick Rock West Site, September 2012*

## SRW Selenium

Like uranium, selenium has been historically elevated in SRW alluvial wells 0318/0318A, 0508, and 0510 within the historical tailings area (Figure 10), as well as in more recently installed wells 0339 and 0340. In all remaining SRW wells, selenium has been below the UMTRCA MCL of 0.01 mg/L. Selenium levels in wells 0508 and 0510 have averaged about 1 mg/L and, although fluctuating (more so in well 0510), no trending is apparent (Figure 13). The marked increase in selenium concentrations in former well 0318 between 2004 and 2008 (peaking at 8 mg/L) is likely due to accumulation of sediment within the damaged well. In September 2010, the selenium level in replacement well 0318A (2.9 mg/L) was half that measured in the collocated (later abandoned) well 0318. Selenium concentrations in wells 0339 and 0340 have been comparable to those measured in well 0318A. Figure 14 maps the most recent (September 2012) monitoring results for selenium at SRW.

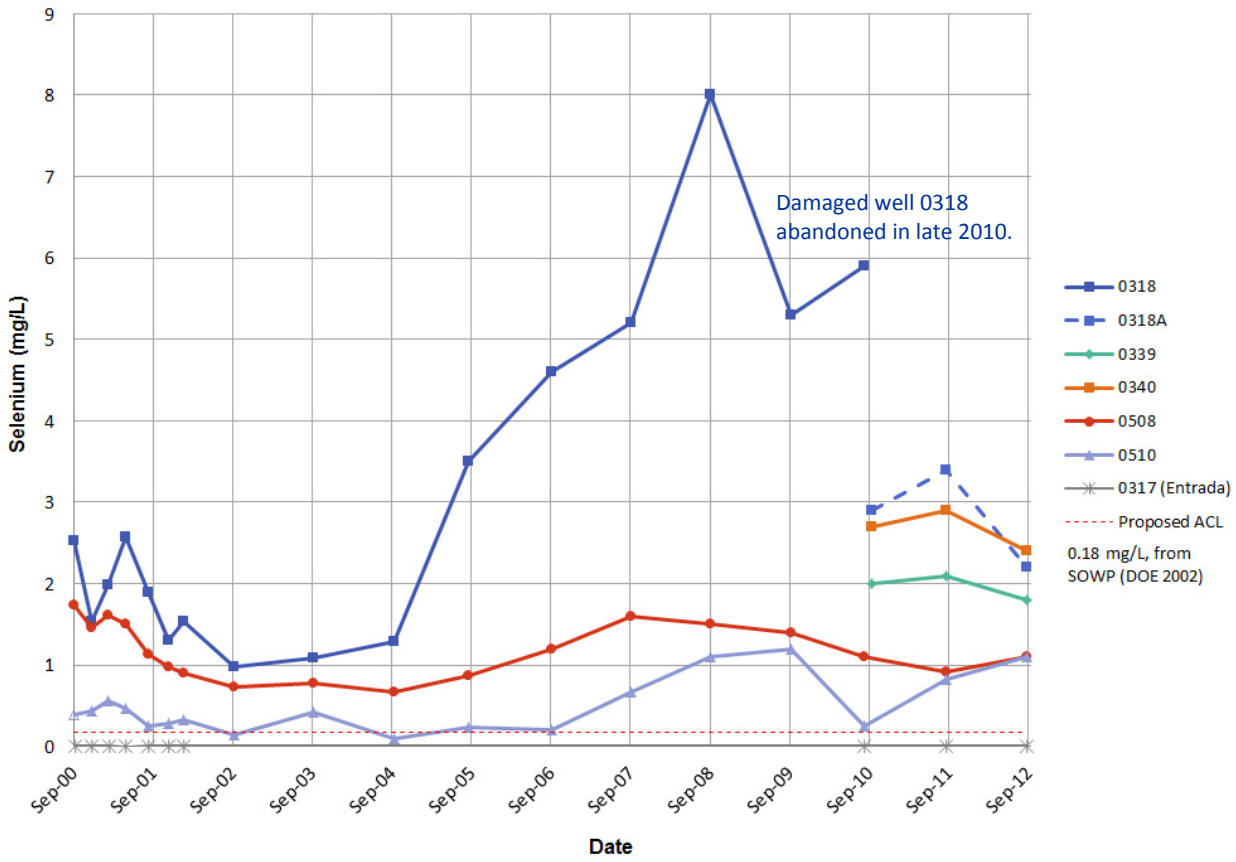


*Figure 13. Selenium Concentration Versus Time in SRW Wells with Elevated Selenium*

*This plot excludes Entrada well 0317 and alluvial wells 0319, 0320, and 0684 given historically low concentrations below the 0.01 mg/L UMTRCA MCL. Selenium concentrations in farthest downgradient wells 0320 and 0684 have been consistently <0.001 mg/L.*[2]

[2] Installation of the new wells in 2010 prompted DOE to reinstate monitoring for selenium at Entrada well 0317 and alluvial well 0319 (previously only sampled for BTEX and radium), mainly to verify the extent of the selenium plume. In the last 3 years, selenium concentrations in these wells have been consistent with results from 2000 through 2002 (all <0.007 mg/L) and below the UMTRCA MCL. Therefore, discontinuing monitoring at wells 0317 and 0319 is again recommended.

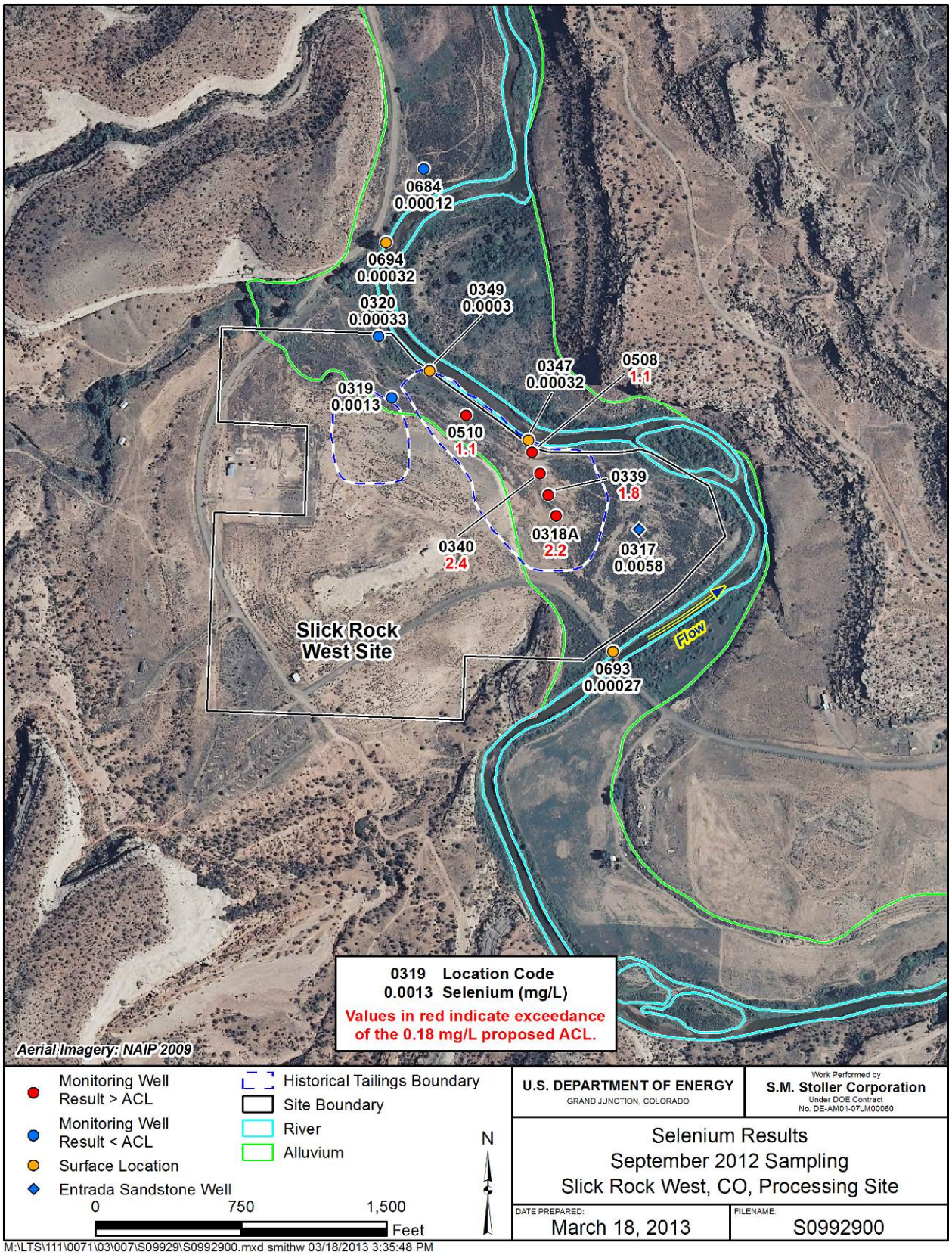


*Figure 14. Selenium Distribution at Slick Rock West Site, September 2012*

## Manganese

Manganese is one of the few Slick Rock processing site analytes for which declines in groundwater concentrations are apparent. Relative distributions of this constituent in SRW wells are similar to those observed for uranium, in that the highest concentrations have been detected in wells 0508 and 0510, as well as the more recently installed well 0340 (Figure 10). However, as shown in Figure 15, due to gradual (not always steady) declines in wells 0318/0318A, 0508, and 0510, as of September 2012, the only measurement above the 4.2 mg/L benchmark was in well 0340. Since installation in 2010, manganese concentrations in this well have ranged between 5 and 6 mg/L, just slightly above the maximum background concentration.

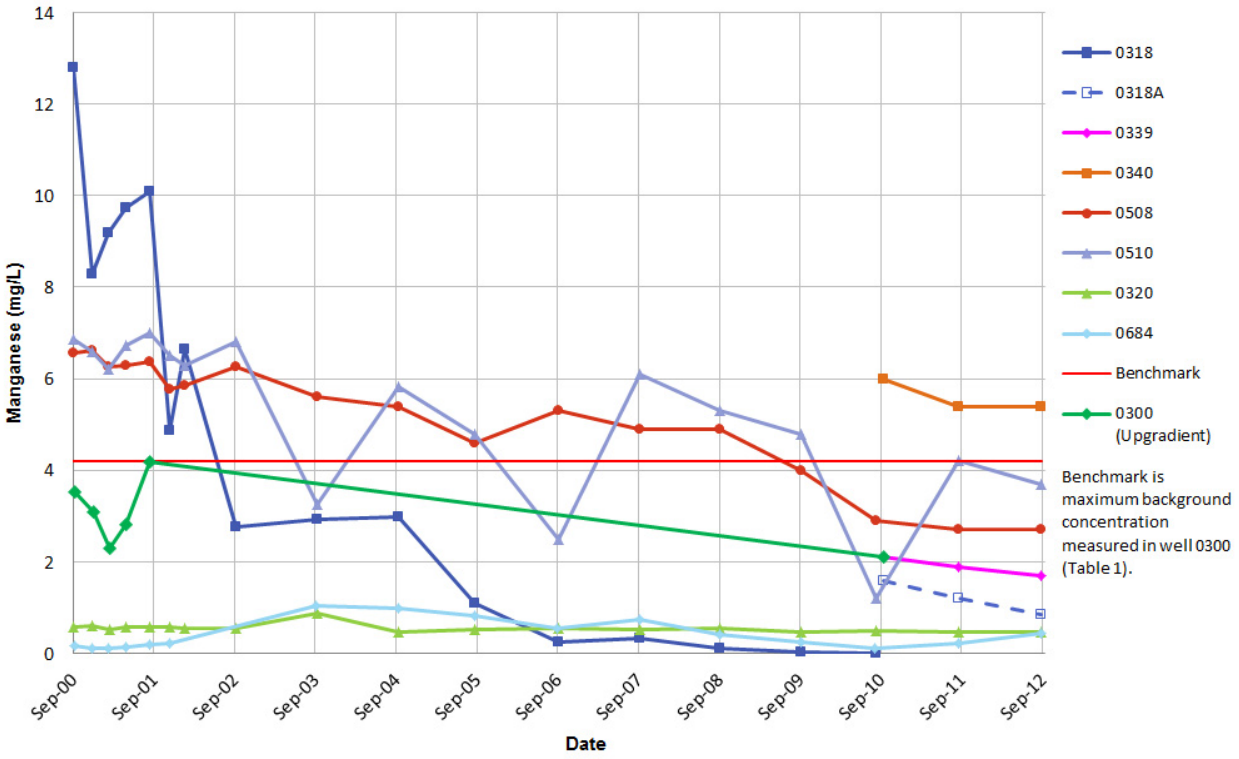


*Figure 15. Manganese Concentrations Versus Time at the SRW Site*

## Molybdenum

Whereas manganese trends in SRW wells have paralleled those for uranium, molybdenum distributions have been more similar to those observed for selenium. Like selenium, molybdenum has been elevated in all SRW wells except those farthest downgradient (0320 and 0684). Figure 16 plots molybdenum concentrations over time at SRW wells where molybdenum is elevated. As was the case for selenium, molybdenum concentrations in former well 0318 increased significantly between 2005 and 2008. As discussed previously, this well has since been abandoned due to damage and was replaced by collocated well 0318A.

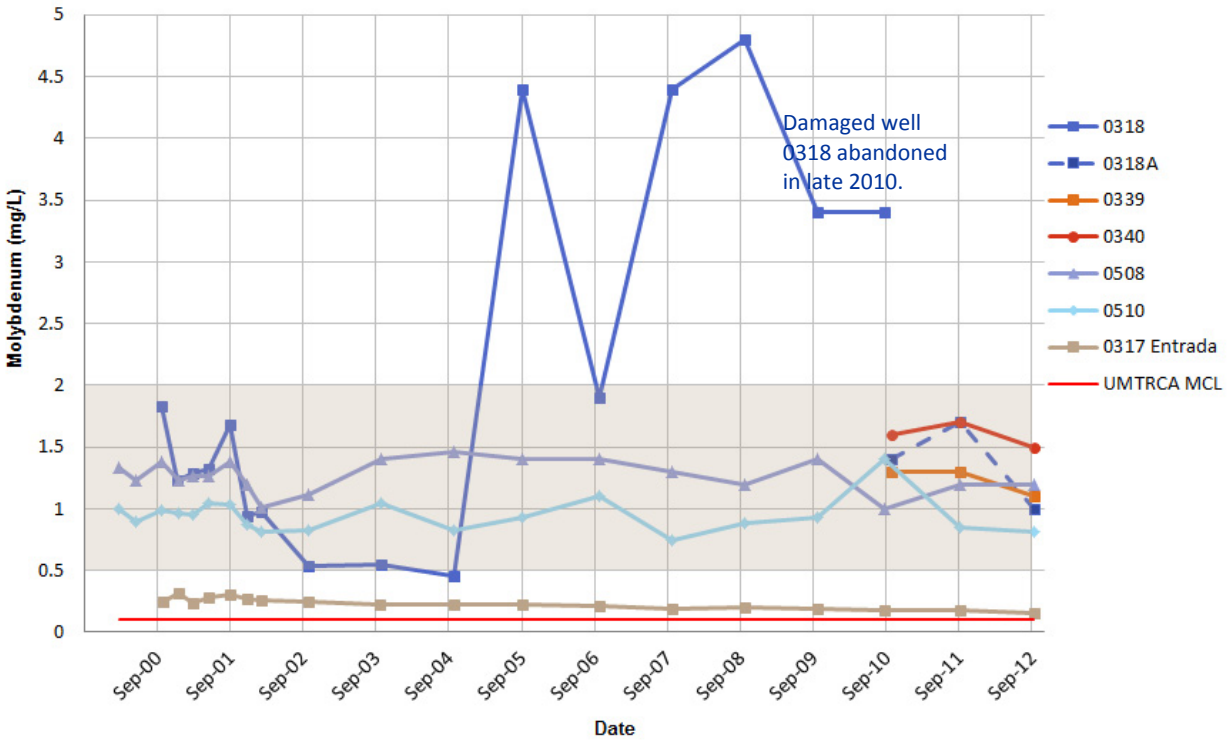


*Figure 16. Molybdenum Concentration Versus Time at the SRW Site*

*Shaded band highlights range of steady, non-trending molybdenum concentrations in most SRW wells (0.5–1.75 mg/L). This plot excludes results for farther downgradient SRW alluvial wells 0320 and 0684, which have historically had low concentrations (less than 0.02 mg/L), below the 0.1 mg/L UMTRCA MCL.*

Although molybdenum concentrations are lower in well 0318A, they are still more than an order of magnitude above the 0.1 mg/L UMTRCA MCL. Concentrations of molybdenum have generally been between about 1 and 1.75 mg/L in wells 0508 and 0510 and in samples from the newer wells 0339 and 0340. No upward or downward trends are apparent. Molybdenum concentrations in Entrada Sandstone well 0317 also exceed the UMTRCA MCL, but only slightly. Although not apparent in Figure 16 (given the scale), levels do appear to be trending slightly downward: from the maximum of 0.32 mg/L in December 2000 to the current minimum of 0.15 mg/L in September 2012. Wells 0320 and 0684, although monitored in 2011, are not shown in Figure 16 because molybdenum concentrations have always been well below the UMTRCA MCL and are not trending.

## Nitrate

Figure 17 shows nitrate concentrations over time at currently monitored SRW wells where this constituent has been elevated. Data from wells 0320 and 0684 are not shown because levels have been well below the 44.3 UMTRCA MCL (for nitrate as $NO_3$). Although nitrate concentrations have been variable, concentrations in all wells appear to be trending downward over time. Nonetheless, nitrate concentrations are still well above the MCL in SRW wells 0508 and 0510 (886–930 mg/L) and in the more recently installed well 0340 (1418 mg/L). Concentrations in wells 0318A and 0339 are much lower (151–195 mg/L), but still above the MCL.

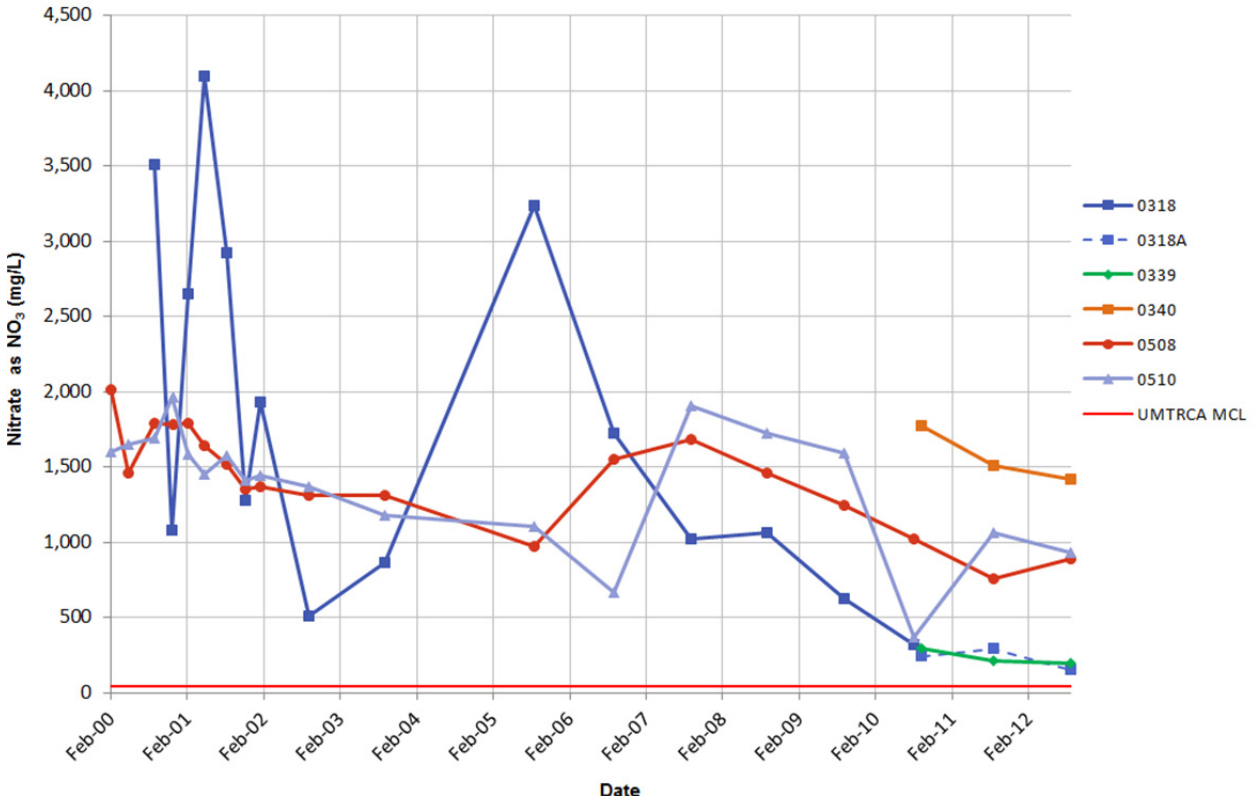


*Figure 17. Nitrate (as $NO_3$) Concentrations Versus Time in SRW Wells with Elevated Concentrations*

*This plot excludes results for farther downgradient SRW alluvial wells 0320 and 0684 given historically low concentrations (<0.02 mg/L), below the 44.3 mg/L UMTRCA MCL.*

## BTEX (Well 0319)

During site characterization activities conducted for the SOWP (DOE 2002), a localized aromatic hydrocarbon plume was identified in the area of alluvial well 0319, where nonaqueous phase liquid had been identified. This is the only SRW well currently monitored for BTEX[3]. Corresponding time-trends are plotted in Figure 18. Benzene concentrations reached a peak in May 2001 (19.8 mg/L) and have fluctuated over time, with an overall decline. Similar fluctuations are apparent for toluene, the other constituent (in addition to benzene) that exceeds its SDWA MCL. The SDWA MCLs are drinking water standards, and exceeding these benchmarks presents no known risks at the SRW site because there is no exposure to alluvial groundwater. The SDWA MCLs for ethylbenzene and xylenes have never been exceeded at the SRW site.

[3] During initial site characterization activities, nine other SRW wells were monitored for BTEX in addition to well 0319: 0320, 0326, and 0332–0338 (0332–0338 have since been decommissioned). In 2000–2001, elevated levels were detected in wells 0332 and 0333, located within 100 ft of well 0319 to the south and southwest. Because the maximum benzene concentration was in well 0319 (nearly 20 mg/L), this well is the focus of continued monitoring.

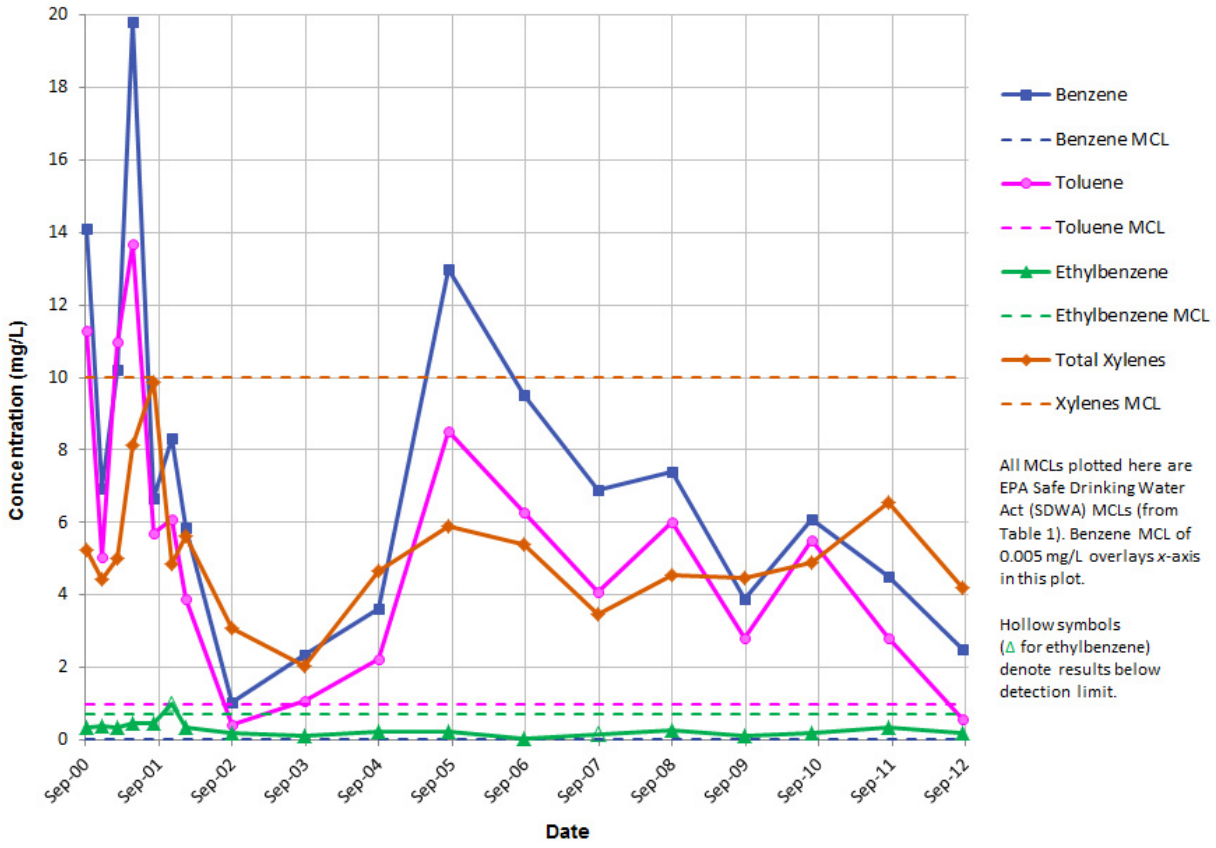


*Figure 18. BTEX Concentrations Versus Time in SRW Well 0319*

## Ra-226, Ra-228 (Well 0319)

Although radium (Ra-226 + Ra-228) has been detected in other wells, its presence above the 5 picocuries per liter (pCi/L) UMTRCA MCL has historically been limited to well 0319, coinciding with the BTEX hot spot. Figure 19, which plots Ra-226 and Ra-228 concentrations in well 0319 over time, shows that radium levels (Ra-226/228 combined) have been below the 5 pCi/L UMTRCA MCL since 2008. Based on these results, radium's localized presence is not considered a major concern at SRW. If concentrations continue to decline and remain below the 5 pCi/L benchmark, cessation of monitoring for this constituent may be justified.

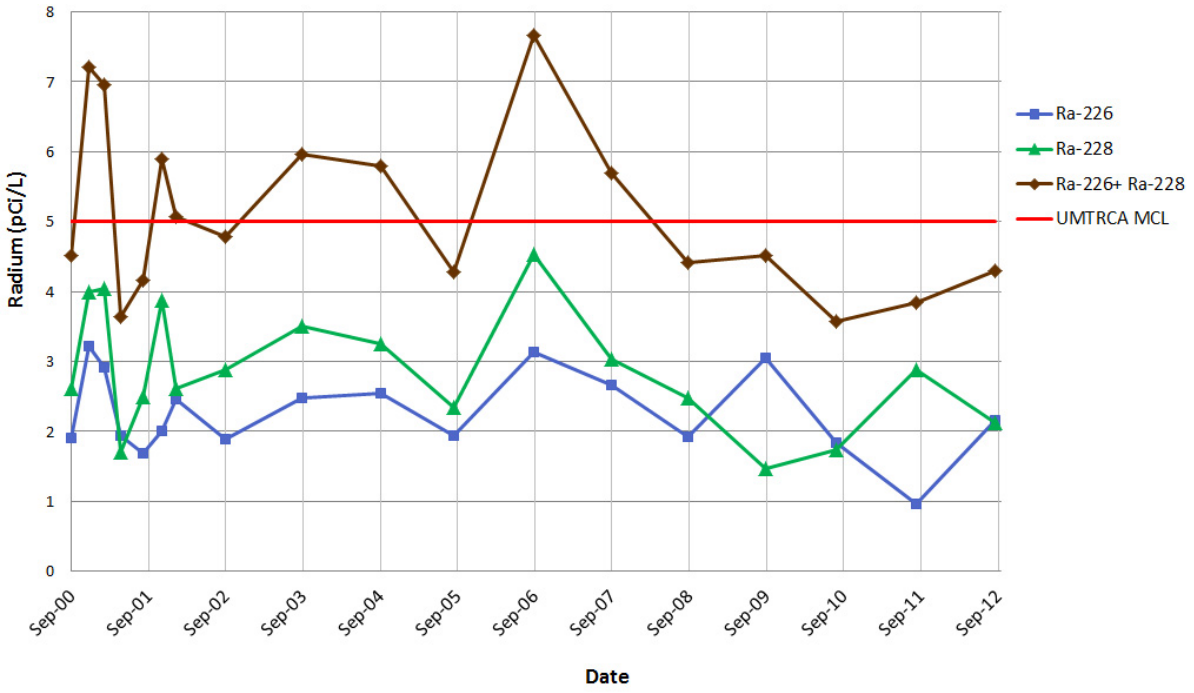


*Figure 19. Ra-226 + Ra-228 Concentrations in SRW Well 0319*

## 4.3 Surface Water Monitoring Results (Both SRE and SRW Sites)

Consistent with historical results, surface water sampling results for the 2012 monitoring period demonstrate essentially no impact to the Dolores River from historical milling activities at either the SRE or SRW sites. As shown in Table 4, no CDPHE water quality benchmarks were exceeded in 2012 except for manganese in SRW sample 0694 (0.055 mg/L), which slightly exceeds the 0.05 mg/L CDPHE benchmark. This most recent sample was highly turbid (1,000 Nephelometric Turbidity Units [NTU]), and, although filtered, the result is anomalous relative to historical observations.

*Table 4. Comparison of 2012 COPC Concentrations in the Dolores River to CDPHE Benchmarks*

| COPC | CDPHE Benchmark[a] (mg/L) | Dolores River Location | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | SRE Site | | | SRW Site | | | |
| | | 0696 Bkgd. | 0692 | 0700 | 0693 Bkgd. | 0347 | 0349 | 0694 |
| | | 2012 Result (mg/L) | | | | | | |
| Manganese[b] | 0.05 | – | – | – | 0.0037 | 0.0056 | 0.024 | 0.055 |
| Nitrate as $NO_3$ | 10 | – | – | – | <0.044 | <0.044 | <0.044 | 0.11 |
| Selenium | 0.0046 | – | – | – | 0.00027 | 0.00032 | 0.0003 | 0.00032 |
| Uranium | 0.0168–0.03[c] | 0.00057 | 0.0007 | 0.00049 | 0.00055 | 0.00057 | 0.00062 | 0.00083 |

[a] CDPHE 2012

[b] The standard listed for manganese is for chronic exposure.

[c] The uranium standard was more recently revised to a range of 0.0168–0.03 mg/L for this segment of river (update effective January 2013).

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# 5.0 Natural Flushing Assessment

In support of the SOWP for the Slick Rock site, a groundwater flow and transport model was developed to evaluate whether natural flushing would reduce concentrations of site COPCs to levels below UMTRCA or SDWA MCLs or alternative benchmarks in the alluvial aquifer within 100 years (DOE 2002, Section 5.3 and Appendix H). Because modeling predicted that site COPCs would be below benchmarks within 50 years, natural flushing was selected as a compliance strategy.

This section evaluates the status of natural flushing for both the SRE and SRW sites, plotting predicted versus actual concentrations for modeled constituents in the target wells (SRE well 0305 and SRW well 0508). The 2010 VMR (DOE 2011) provided a detailed trend analysis for additional SRE/SRW wells. That analysis was not updated for this VMR as conclusions are largely the same. Therefore, most of the discussion presented in this section reiterates conclusions drawn in preceding VMR reports (DOE 2010, 2011, 2012b).

## 5.1 SRE Site

Figure 20 plots uranium concentrations in SRE well 0305 versus groundwater model predictions. In this figure, as well as subsequent figures in this section, all predicted concentrations are labeled; only starting (2000) and most recent (2012) data points are labeled for actual measurements. This figure shows that uranium concentrations, although slightly decreasing, are not attenuating as rapidly as predicted. Actual concentrations, 0.7–1 mg/L in the last several years, are about an order of magnitude above predicted values. A natural flushing trend plot for selenium, the only other SRE COPC, is not provided because levels in well 0305 have stabilized at about 0.02 mg/L, close to the 0.01 mg/L UMTRCA MCL and below the 0.05 mg/L SDWA MCL (Figure 9).

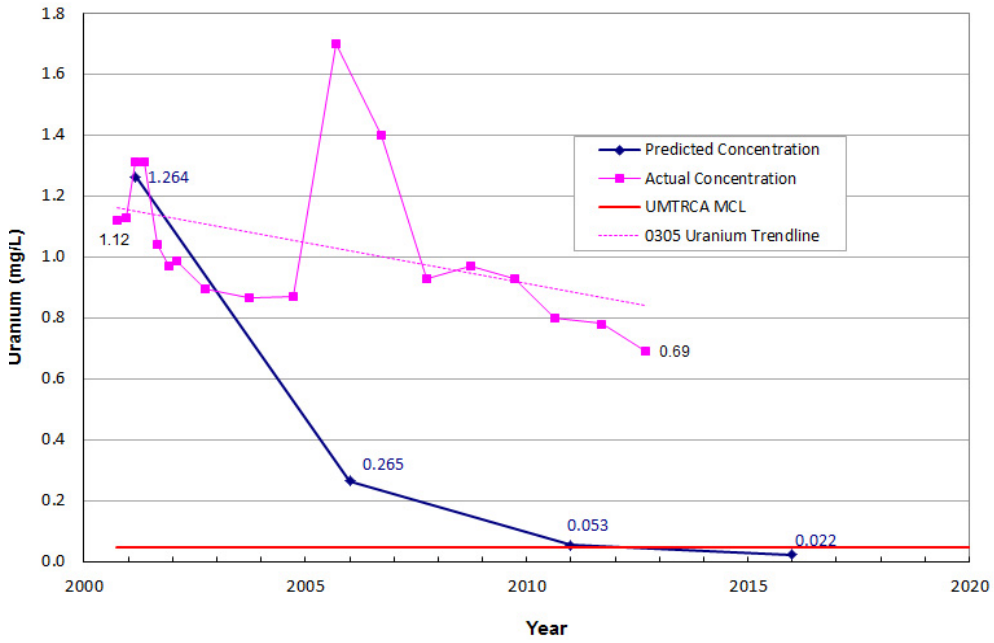


*Figure 20. Predicted Versus Actual Uranium Concentrations in SRE Well 0305*

## 5.2 SRW Site

Figures 21 through 25 plot concentrations of manganese, molybdenum, nitrate, selenium, and uranium in SRW well 0508 versus model predictions.

Manganese (Figure 21) is the only SRW constituent for which the actual trend agrees with the groundwater model prediction. In fact, as of the last reporting period, concentrations in well 0508 have decreased to below the 2011 predicted value. Results for the other constituents are not in close agreement with values predicted from the model. Molybdenum (Figure 22) has been stable at about 1.2 mg/L since 2000; similar lack of trending at other SRW wells is shown in Figure 16. As discussed previously (see Figure 17), although nitrate concentrations have decreased in SRW wells, including 0508, levels are still well above predicted values (Figure 23).

Despite a slight (decreasing) slope in the trend line, the fluctuations in selenium concentrations in well 0508 (Figure 24) preclude any meaningful assessment of trends. Decreasing selenium trends are not apparent in remaining SRW wells (Figure 13). Except for a period of slightly higher concentrations (2004–2007), uranium concentrations have stabilized at about 0.08 mg/L, basically equivalent to the initial (2000) measurement, about 8 times the predicted values shown in Figure 25.

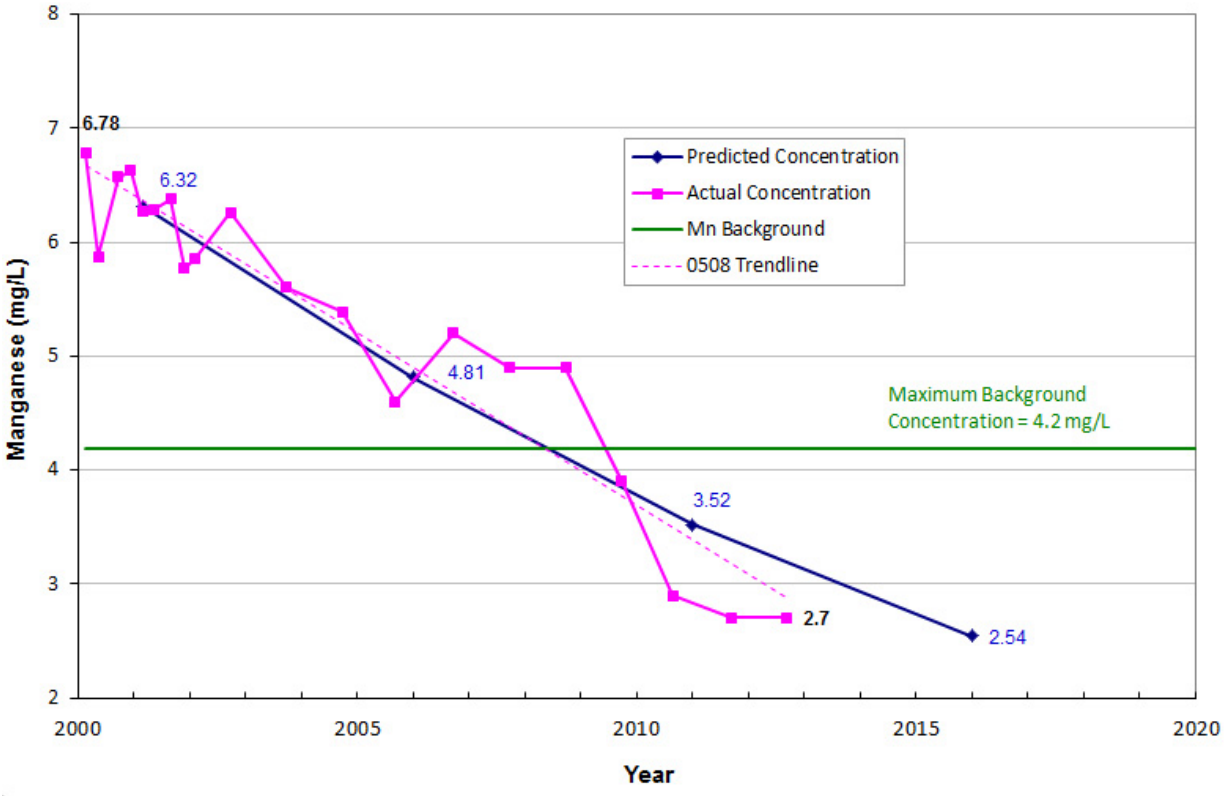


*Figure 21. Manganese Concentrations in SRW Well 0508 Versus Groundwater Model Predictions*

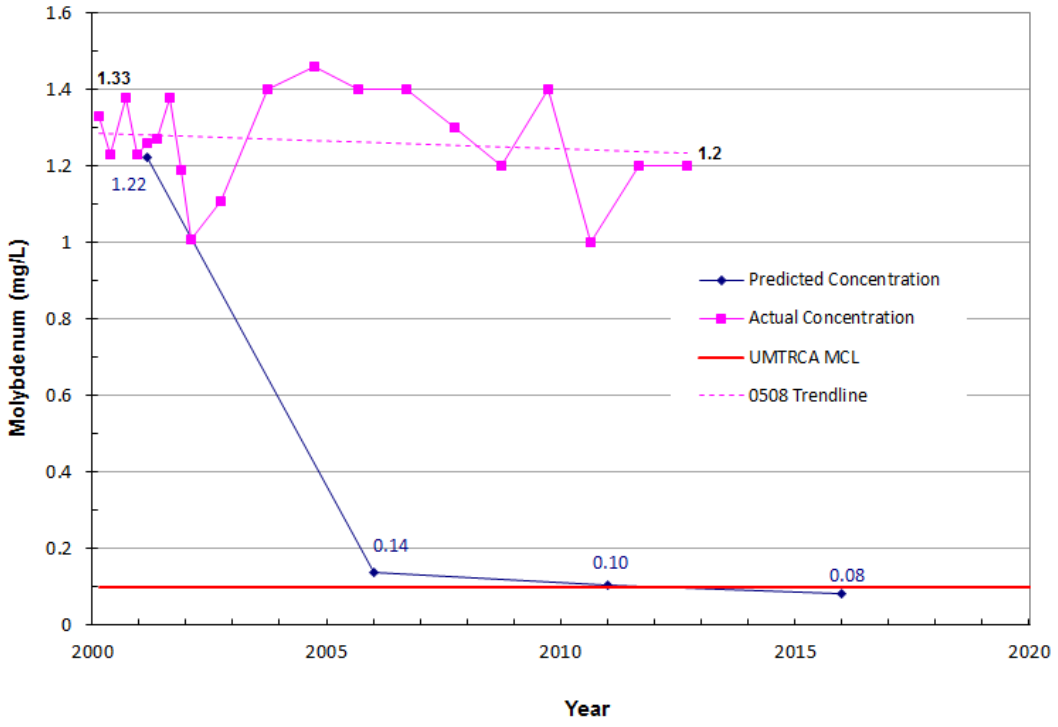


*Figure 22. Molybdenum Concentrations in SRW Well 0508 Versus Groundwater Model Predictions*

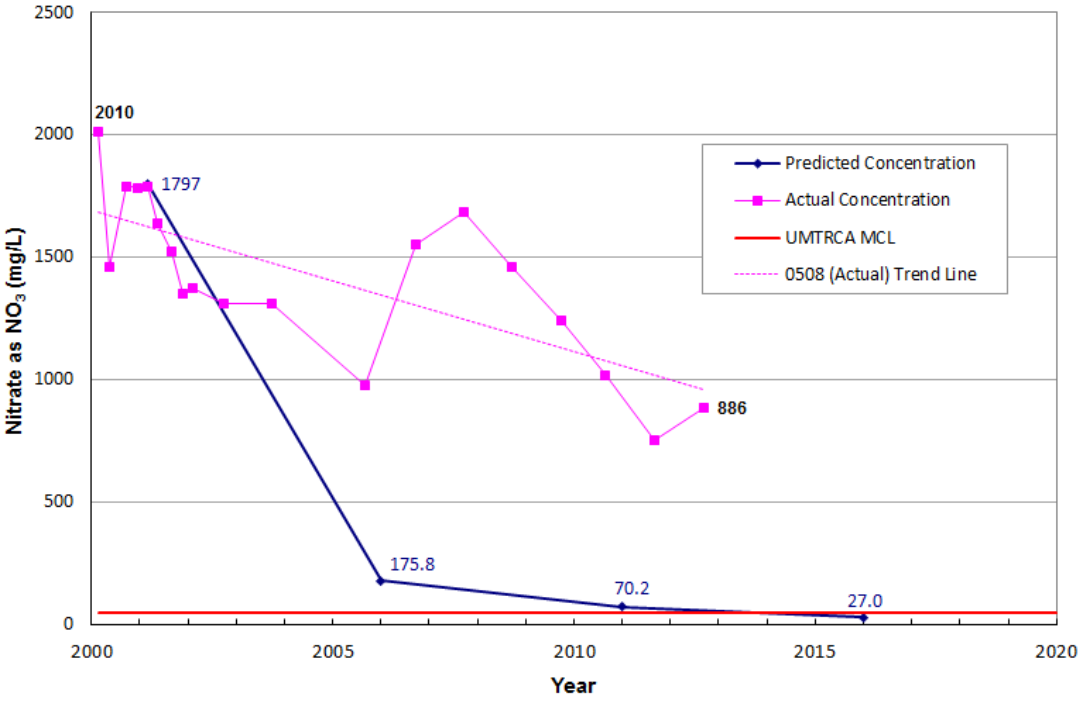


*Figure 23. Nitrate (as $NO_3$) Concentrations in SRW Well 0508 Versus Groundwater Model Predictions*

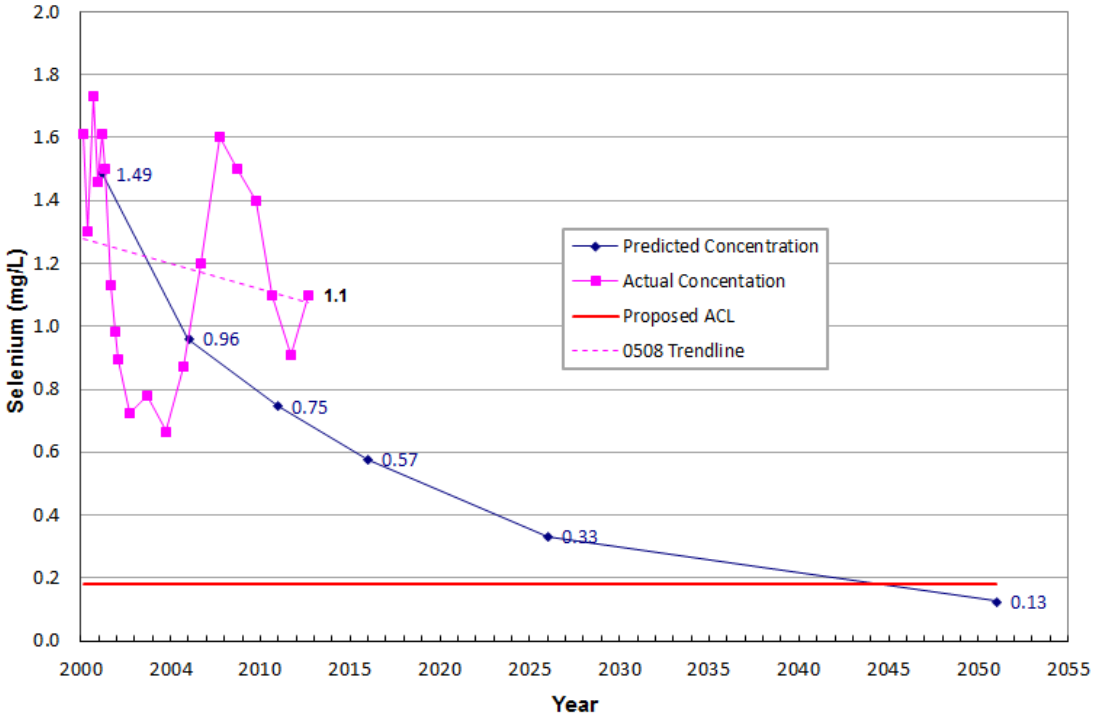


*Figure 24. Selenium Concentrations in SRW Well 0508 Versus Groundwater Model Predictions*

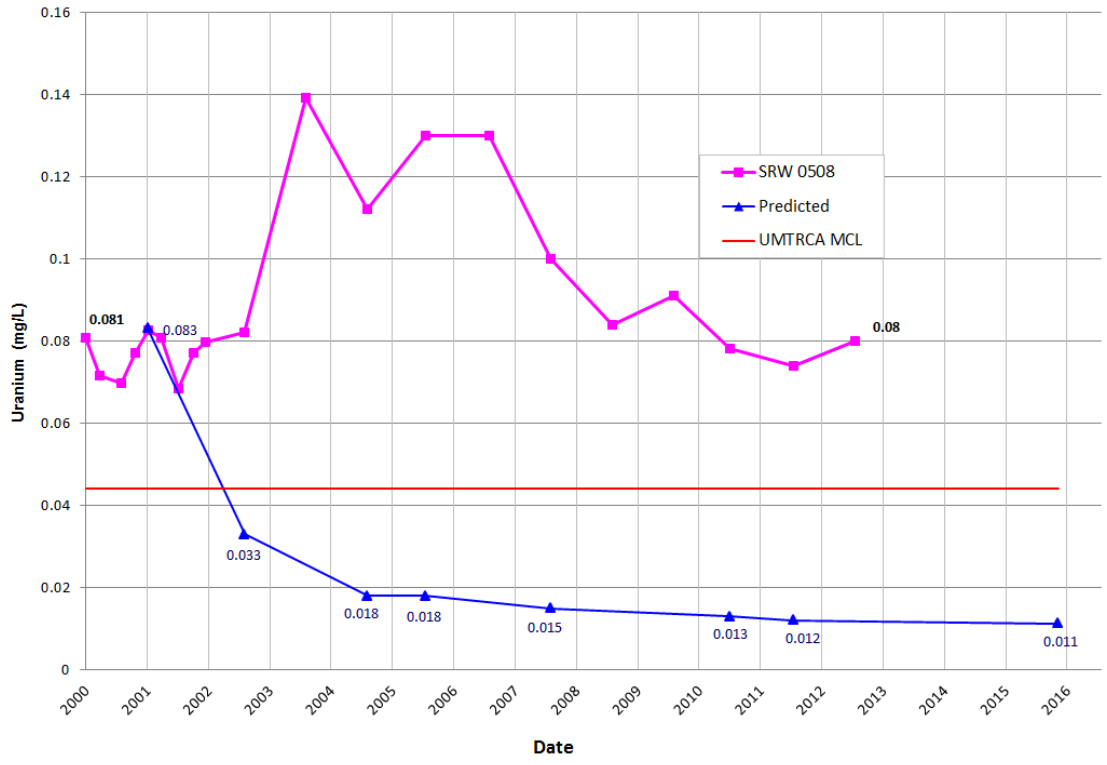


*Figure 25. Uranium Concentrations in SRW Well 0508 Versus Groundwater Model Predictions*

# 6.0 Conclusions

## 6.1 Status of Site Compliance

Although technically the 100-year time frame established in 40 CFR 192 does not commence until NRC approves the (DOE 2006) GCAP, data presented in Sections 4.0 and 5.0 suggest that certain constituents are not attenuating as initially predicted based on groundwater modeling conducted for the SOWP (DOE 2002). Trend analysis performed in the last several years (DOE 2010, 2011, 2012b) and time-concentration plots provided in this report indicate relatively stable contaminant trends for most site COPCs. Exceptions are selenium at SRE and manganese and nitrate at SRW. However, downward trending is not occurring for uranium or molybdenum at both SRE and SRW sites or for selenium at SRW.

## 6.2 Recommendations

As recommended in previous VMRs, annual verification monitoring of groundwater from designated monitoring wells and surface water locations should continue as specified in the draft final GCAP (DOE 2006) and at new wells 0339 and 0340. Annual monitoring is planned for 10 years after NRC concurrence with the GCAP, after which monitoring requirements will be reevaluated. Based on earlier modeling predictions, it had been anticipated that monitoring at the Slick Rock processing site could eventually be decreased to once every 5 years. However, given historical fluctuations in contaminant concentrations in some wells and persistent contamination north of the Dolores River, it may be advisable to adjust this projected decrease to monitoring once every 2 years until contaminant concentrations stabilize or decline.

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# 7.0 References

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DOE (U.S. Department of Energy), 2012b. *Verification Monitoring Report for the Slick Rock, Colorado, Processing Sites,* LMS/SRE-SRW/S08837, Office of Legacy Management, Grand Junction, Colorado, May.

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# Appendix A

# Groundwater Quality Data by Parameter

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GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 10:19 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (As CaCO3) | mg/L | 0303 | WL | 09/12/2012 | N001 | 4.30 - 14.30 | 408 | | F | # | - | - |
| | mg/L | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 480 | | F | # | - | - |
| | mg/L | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | 828 | | F | # | - | - |
| | mg/L | 0309 | WL | 09/12/2012 | N001 | 10.20 - 20.20 | 770 | | F | # | - | - |
| | mg/L | 0310 | WL | 09/12/2012 | N001 | 14.70 - 19.70 | 184 | | F | # | - | - |
| | mg/L | 0311 | WL | 09/12/2012 | N001 | 14.10 - 19.10 | 239 | | F | # | - | - |
| | mg/L | 0312 | WL | 09/12/2012 | N001 | 14.50 - 19.50 | 580 | | F | # | - | - |
| Oxidation Reduction Potential | mV | 0303 | WL | 09/12/2012 | N001 | 4.30 - 14.30 | -22.3 | | F | # | - | - |
| | mV | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 16.2 | | F | # | - | - |
| | mV | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | -66.5 | | F | # | - | - |
| | mV | 0309 | WL | 09/12/2012 | N001 | 10.20 - 20.20 | -100.4 | | F | # | - | - |
| | mV | 0310 | WL | 09/12/2012 | N001 | 14.70 - 19.70 | -55.6 | | F | # | - | - |
| | mV | 0311 | WL | 09/12/2012 | N001 | 14.10 - 19.10 | 24.1 | | F | # | - | - |
| | mV | 0312 | WL | 09/12/2012 | N001 | 14.50 - 19.50 | 59.2 | | F | # | - | - |
| pH | s.u. | 0303 | WL | 09/12/2012 | N001 | 4.30 - 14.30 | 7.25 | | F | # | - | - |
| | s.u. | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 7.36 | | F | # | - | - |
| | s.u. | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | 7.28 | | F | # | - | - |
| | s.u. | 0309 | WL | 09/12/2012 | N001 | 10.20 - 20.20 | 7.83 | | F | # | - | - |
| | s.u. | 0310 | WL | 09/12/2012 | N001 | 14.70 - 19.70 | 7.50 | | F | # | - | - |
| | s.u. | 0311 | WL | 09/12/2012 | N001 | 14.10 - 19.10 | 7.20 | | F | # | - | - |
| | s.u. | 0312 | WL | 09/12/2012 | N001 | 14.50 - 19.50 | 7.21 | | F | # | - | - |
| Selenium | mg/L | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 0.014 | | F | # | 0.0016 | - |
| | mg/L | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | 0.0029 | | F | # | 0.00016 | - |
| Specific Conductance | umhos/cm | 0303 | WL | 09/12/2012 | N001 | 4.30 - 14.30 | 2643 | | F | # | - | - |

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 10:19 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance | umhos/cm | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 2850 | | F | # | - | - |
| | umhos/cm | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | 6830 | | F | # | - | - |
| | umhos/cm | 0309 | WL | 09/12/2012 | N001 | 10.20 - 20.20 | 2023 | | F | # | - | - |
| | umhos/cm | 0310 | WL | 09/12/2012 | N001 | 14.70 - 19.70 | 736 | | F | # | - | - |
| | umhos/cm | 0311 | WL | 09/12/2012 | N001 | 14.10 - 19.10 | 1099 | | F | # | - | - |
| | umhos/cm | 0312 | WL | 09/12/2012 | N001 | 14.50 - 19.50 | 7009 | | F | # | - | - |
| Temperature | C | 0303 | WL | 09/12/2012 | N001 | 4.30 - 14.30 | 16.82 | | F | # | - | - |
| | C | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 16.00 | | F | # | - | - |
| | C | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | 15.22 | | F | # | - | - |
| | C | 0309 | WL | 09/12/2012 | N001 | 10.20 - 20.20 | 14.76 | | F | # | - | - |
| | C | 0310 | WL | 09/12/2012 | N001 | 14.70 - 19.70 | 14.97 | | F | # | - | - |
| | C | 0311 | WL | 09/12/2012 | N001 | 14.10 - 19.10 | 15.97 | | F | # | - | - |
| | C | 0312 | WL | 09/12/2012 | N001 | 14.50 - 19.50 | 16.70 | | F | # | - | - |
| Turbidity | NTU | 0303 | WL | 09/12/2012 | N001 | 4.30 - 14.30 | 2.84 | | F | # | - | - |
| | NTU | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 3.75 | | F | # | - | - |
| | NTU | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | 5.75 | | F | # | - | - |
| | NTU | 0309 | WL | 09/12/2012 | N001 | 10.20 - 20.20 | 8.46 | | F | # | - | - |
| | NTU | 0310 | WL | 09/12/2012 | N001 | 14.70 - 19.70 | 8.76 | | F | # | - | - |
| | NTU | 0311 | WL | 09/12/2012 | N001 | 14.10 - 19.10 | 7.12 | | F | # | - | - |
| | NTU | 0312 | WL | 09/12/2012 | N001 | 14.50 - 19.50 | 2.09 | | F | # | - | - |
| Uranium | mg/L | 0303 | WL | 09/12/2012 | N001 | 4.30 - 14.30 | 0.260 | | F | # | 0.00029 | - |
| | mg/L | 0305 | WL | 09/12/2012 | N001 | 8.70 - 18.70 | 0.690 | | F | # | 0.00015 | - |
| | mg/L | 0307 | WL | 09/12/2012 | N001 | 4.40 - 14.40 | 0.590 | | F | # | 0.00015 | - |
| | mg/L | 0309 | WL | 09/12/2012 | N001 | 10.20 - 20.20 | 0.043 | | F | # | 2.9E-05 | - |
| | mg/L | 0310 | WL | 09/12/2012 | N001 | 14.70 - 19.70 | 0.016 | | F | # | 2.9E-05 | - |

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 10:19 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Uranium | mg/L | 0311 | WL | 09/12/2012 | N001 | 14.10 - 19.10 | 0.060 | | F | # | 2.9E-05 | - |
| | mg/L | 0312 | WL | 09/12/2012 | N001 | 14.50 - 19.50 | 0.110 | | F | # | 2.9E-05 | - |

RECORDS: SELECTED FROM USEE200 WHERE site_code='SRK06' AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%' ) AND DATE_SAMPLED between #9/1/2012# and #10/1/2012#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

LAB QUALIFIERS:

| | |
|---|---|
| * | Replicate analysis not within control limits. |
| + | Correlation coefficient for MSA < 0.995. |
| > | Result above upper detection limit. |
| A | TIC is a suspected aldol-condensation product. |
| B | Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank. |
| C | Pesticide result confirmed by GC-MS. |
| D | Analyte determined in diluted sample. |
| E | Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS. |
| H | Holding time expired, value suspect. |
| I | Increased detection limit due to required dilution. |
| J | Estimated |
| M | GFAA duplicate injection precision not met. |
| N | Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC). |
| P | > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. |
| S | Result determined by method of standard addition (MSA). |
| U | Analytical result below detection limit. |
| W | Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. |
| X | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |
| Y | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |
| Z | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |

DATA QUALIFIERS:

| | | | | | |
|---|---|---|---|---|---|
| F | Low flow sampling method used. | G | Possible grout contamination, pH > 9. | J | Estimated value. |
| L | Less than 3 bore volumes purged prior to sampling. | N | Presumptive evidence that analyte is present. The analyte is "tentatively identified". | Q | Qualitative result due to sampling technique |
| R | Unusable result. | U | Parameter analyzed for but was not detected. | X | Location is undefined. |

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

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GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 10:20 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (As CaCO3) | mg/L | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 300 | | F | # | - | - |
| | mg/L | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 297 | | F | # | - | - |
| | mg/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 1007 | | F | # | - | - |
| | mg/L | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 340 | | F | # | - | - |
| | mg/L | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 295 | | F | # | - | - |
| | mg/L | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 295 | | F | # | - | - |
| | mg/L | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 210 | | F | # | - | - |
| | mg/L | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 286 | | F | # | - | - |
| | mg/L | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 189 | | F | # | - | - |
| Benzene | ug/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 2500 | | FJ | # | 30 | - |
| | ug/L | 0319 | WL | 09/11/2012 | N002 | 4.55 - 14.58 | 2300 | | FJ | # | 30 | - |
| Ethylbenzene | ug/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 180 | | FJ | # | 3 | - |
| | ug/L | 0319 | WL | 09/11/2012 | N002 | 4.55 - 14.58 | 200 | | FJ | # | 3 | - |
| m,p-Xylene | ug/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 3500 | | FJ | # | 30 | - |
| | ug/L | 0319 | WL | 09/11/2012 | N002 | 4.55 - 14.58 | 3200 | | FJ | # | 30 | - |
| Manganese | mg/L | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 0.850 | | F | # | 0.00011 | - |
| | mg/L | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 0.470 | | F | # | 0.00011 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 1.700 | | F | # | 0.00011 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N002 | 11.00 - 14.00 | 1.700 | | F | # | 0.00011 | - |
| | mg/L | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 5.400 | | F | # | 0.00011 | - |
| | mg/L | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 2.700 | | F | # | 0.00011 | - |
| | mg/L | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 3.700 | | F | # | 0.00011 | - |
| | mg/L | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 0.440 | | F | # | 0.00011 | - |
| Molybdenum | mg/L | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 0.150 | | F | # | 0.00032 | - |
| | mg/L | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 1.000 | | F | # | 0.00032 | - |

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 10:20 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | mg/L | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 0.0096 | | F | # | 3.2E-05 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 1.100 | | F | # | 0.0016 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N002 | 11.00 - 14.00 | 1.100 | | F | # | 0.0032 | - |
| | mg/L | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 1.500 | | F | # | 0.0032 | - |
| | mg/L | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 1.200 | | F | # | 0.0016 | - |
| | mg/L | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 0.810 | | F | # | 0.00032 | - |
| | mg/L | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 0.0058 | | F | # | 3.2E-05 | - |
| Nitrate + Nitrite as Nitrogen | mg/L | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 34 | | F | # | 0.2 | - |
| | mg/L | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 0.01 | U | F | # | 0.01 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 44 | | F | # | 0.5 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N002 | 11.00 - 14.00 | 37 | | F | # | 0.5 | - |
| | mg/L | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 320 | | F | # | 2 | - |
| | mg/L | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 200 | | F | # | 2 | - |
| | mg/L | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 210 | | F | # | 2 | - |
| | mg/L | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 0.01 | U | F | # | 0.01 | - |
| Oxidation Reduction Potential | mV | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 161.7 | | F | # | - | - |
| | mV | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 85.0 | | F | # | - | - |
| | mV | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | -132.7 | | F | # | - | - |
| | mV | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | -61.2 | | F | # | - | - |
| | mV | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 84.4 | | F | # | - | - |
| | mV | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 83.2 | | F | # | - | - |
| | mV | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 75.9 | | F | # | - | - |
| | mV | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 63.7 | | F | # | - | - |
| | mV | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | -11.4 | | F | # | - | - |
| o-Xylene | ug/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 700 | | FJ | # | 30 | - |

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 10:20 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| o-Xylene | ug/L | 0319 | WL | 09/11/2012 | N002 | 4.55 - 14.58 | 620 | | FJ | # | 30 | - |
| pH | s.u. | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 7.49 | | F | # | - | - |
| | s.u. | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 7.13 | | F | # | - | - |
| | s.u. | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 7.12 | | F | # | - | - |
| | s.u. | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 7.30 | | F | # | - | - |
| | s.u. | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 7.15 | | F | # | - | - |
| | s.u. | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 6.78 | | F | # | - | - |
| | s.u. | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 6.67 | | F | # | - | - |
| | s.u. | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 6.75 | | F | # | - | - |
| | s.u. | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 7.46 | | F | # | - | - |
| Radium-226 | pCi/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 1.7 | | F | # | 0.23 | ± 0.63 |
| | pCi/L | 0319 | WL | 09/11/2012 | N002 | 4.55 - 14.58 | 2.16 | | F | # | 0.29 | ± 0.75 |
| Radium-228 | pCi/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 1.95 | | F | # | 0.33 | ± 0.52 |
| | pCi/L | 0319 | WL | 09/11/2012 | N002 | 4.55 - 14.58 | 2.13 | | F | # | 0.33 | ± 0.56 |
| Selenium | mg/L | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 0.0058 | | F | # | 0.00032 | - |
| | mg/L | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 2.200 | | F | # | 0.00032 | - |
| | mg/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 0.0013 | | F | # | 0.00016 | - |
| | mg/L | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 0.00033 | | F | # | 3.2E-05 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 1.800 | | F | # | 0.0016 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N002 | 11.00 - 14.00 | 1.800 | | F | # | 0.0032 | - |
| | mg/L | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 2.400 | | F | # | 0.0032 | - |
| | mg/L | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 1.100 | | F | # | 0.0016 | - |
| | mg/L | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 1.100 | | F | # | 0.00032 | - |
| | mg/L | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 0.00012 | | F | # | 3.2E-05 | - |
| Specific Conductance | umhos/cm | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 2472 | | F | # | - | - |

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 10:20 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance | umhos/cm | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 1820 | | F | # | - | - |
| | umhos/cm | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 4639 | | F | # | - | - |
| | umhos/cm | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 824 | | F | # | - | - |
| | umhos/cm | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 1920 | | F | # | - | - |
| | umhos/cm | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 4373 | | F | # | - | - |
| | umhos/cm | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 3985 | | F | # | - | - |
| | umhos/cm | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 3651 | | F | # | - | - |
| | umhos/cm | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 693 | | F | # | - | - |
| Temperature | C | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 14.02 | | F | # | - | - |
| | C | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 17.97 | | F | # | - | - |
| | C | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 17.76 | | F | # | - | - |
| | C | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 16.06 | | F | # | - | - |
| | C | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 16.97 | | F | # | - | - |
| | C | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 19.26 | | F | # | - | - |
| | C | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 17.75 | | F | # | - | - |
| | C | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 17.64 | | F | # | - | - |
| | C | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 14.16 | | F | # | - | - |
| Toluene | ug/L | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 570 | | FJ | # | 3 | - |
| | ug/L | 0319 | WL | 09/11/2012 | N002 | 4.55 - 14.58 | 550 | | FJ | # | 3 | - |
| Turbidity | NTU | 0317 | WL | 09/11/2012 | N001 | 19.46 - 39.52 | 1.32 | | F | # | - | - |
| | NTU | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 4.88 | | F | # | - | - |
| | NTU | 0319 | WL | 09/11/2012 | N001 | 4.55 - 14.58 | 7.54 | | F | # | - | - |
| | NTU | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 3.17 | | F | # | - | - |
| | NTU | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 9.62 | | F | # | - | - |
| | NTU | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 7.61 | | F | # | - | - |

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 10:20 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turbidity | NTU | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 4.0 | | F | # | - | - |
| | NTU | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 2.41 | | F | # | - | - |
| | NTU | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 2.98 | | F | # | - | - |
| Uranium | mg/L | 0318A | WL | 09/11/2012 | N001 | 9.20 - 14.20 | 0.026 | | F | # | 2.9E-05 | - |
| | mg/L | 0320 | WL | 09/11/2012 | N001 | 4.92 - 9.96 | 0.010 | | F | # | 2.9E-06 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N001 | 11.00 - 14.00 | 0.030 | | F | # | 0.00015 | - |
| | mg/L | 0339 | WL | 09/11/2012 | N002 | 11.00 - 14.00 | 0.031 | | F | # | 2.9E-06 | - |
| | mg/L | 0340 | WL | 09/11/2012 | N001 | 6.51 - 11.51 | 0.045 | | F | # | 0.00029 | - |
| | mg/L | 0508 | WL | 09/11/2012 | N001 | 1.01 - 11.01 | 0.080 | | F | # | 0.00015 | - |
| | mg/L | 0510 | WL | 09/11/2012 | N001 | 4.92 - 13.92 | 0.083 | | F | # | 2.9E-05 | - |
| | mg/L | 0684 | WL | 09/12/2012 | N001 | 11.00 - 21.00 | 0.0092 | | F | # | 2.9E-06 | - |

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 10:20 am

| PARAMETER | UNITS | LOCATION CODE | LOCATION TYPE | SAMPLE: DATE | ID | DEPTH RANGE (FT BLS) | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

RECORDS: SELECTED FROM USEE200 WHERE site_code='SRK05' AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%' ) AND DATE_SAMPLED between #9/1/2012# and #10/1/2012#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

LAB QUALIFIERS:

| | |
|---|---|
| * | Replicate analysis not within control limits. |
| + | Correlation coefficient for MSA < 0.995. |
| > | Result above upper detection limit. |
| A | TIC is a suspected aldol-condensation product. |
| B | Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank. |
| C | Pesticide result confirmed by GC-MS. |
| D | Analyte determined in diluted sample. |
| E | Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS. |
| H | Holding time expired, value suspect. |
| I | Increased detection limit due to required dilution. |
| J | Estimated |
| M | GFAA duplicate injection precision not met. |
| N | Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC). |
| P | > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. |
| S | Result determined by method of standard addition (MSA). |
| U | Analytical result below detection limit. |
| W | Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. |
| X | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |
| Y | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |
| Z | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |

DATA QUALIFIERS:

| | | | | | |
|---|---|---|---|---|---|
| F | Low flow sampling method used. | G | Possible grout contamination, pH > 9. | J | Estimated value. |
| L | Less than 3 bore volumes purged prior to sampling. | N | Presumptive evidence that analyte is present. The analyte is "tentatively identified". | Q | Qualitative result due to sampling technique |
| R | Unusable result. | U | Parameter analyzed for but was not detected. | X | Location is undefined. |

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

# Appendix B

# Surface Water Quality Data by Parameter

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SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 11:02 am

| PARAMETER | UNITS | LOCATION CODE | SAMPLE: DATE | ID | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (As CaCO3) | mg/L | 0692 | 09/12/2012 | 0001 | 152 | | | | # | - | - |
| | mg/L | 0696 | 09/12/2012 | 0001 | 109 | | | | # | - | - |
| | mg/L | 0700 | 09/12/2012 | 0001 | 132 | | | | # | - | - |
| Oxidation Reduction Potential | mV | 0692 | 09/12/2012 | N001 | -5.1 | | | | # | - | - |
| | mV | 0696 | 09/12/2012 | N001 | 47.2 | | | | # | - | - |
| | mV | 0700 | 09/12/2012 | N001 | 14.4 | | | | # | - | - |
| pH | s.u. | 0692 | 09/12/2012 | N001 | 8.57 | | | | # | - | - |
| | s.u. | 0696 | 09/12/2012 | N001 | 8.38 | | | | # | - | - |
| | s.u. | 0700 | 09/12/2012 | N001 | 8.34 | | | | # | - | - |
| Specific Conductance | umhos/cm | 0692 | 09/12/2012 | N001 | 335 | | | | # | - | - |
| | umhos/cm | 0696 | 09/12/2012 | N001 | 373 | | | | # | - | - |
| | umhos/cm | 0700 | 09/12/2012 | N001 | 334 | | | | # | - | - |
| Temperature | C | 0692 | 09/12/2012 | N001 | 21.33 | | | | # | - | - |
| | C | 0696 | 09/12/2012 | N001 | 24.41 | | | | # | - | - |
| | C | 0700 | 09/12/2012 | N001 | 21.30 | | | | # | - | - |
| Turbidity | NTU | 0692 | 09/12/2012 | N001 | 181 | | | | # | - | - |
| | NTU | 0696 | 09/12/2012 | N001 | 99.7 | | | | # | - | - |
| | NTU | 0700 | 09/12/2012 | N001 | 168 | | | | # | - | - |
| Uranium | mg/L | 0692 | 09/12/2012 | 0001 | 0.0007 | | | | # | 2.9E-05 | - |
| | mg/L | 0696 | 09/12/2012 | 0001 | 0.0005 | | | | # | 2.9E-05 | - |
| | mg/L | 0700 | 09/12/2012 | 0001 | 0.0004 | | | | # | 2.9E-05 | - |

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 11:02 am

| PARAMETER | UNITS | LOCATION CODE | SAMPLE: DATE | ID | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|

RECORDS: SELECTED FROM USEE800 WHERE site_code='SRK06' AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%' ) AND DATE_SAMPLED between #9/1/2012# and #10/1/2012#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

| | |
|---|---|
| * | Replicate analysis not within control limits. |
| + | Correlation coefficient for MSA < 0.995. |
| > | Result above upper detection limit. |
| A | TIC is a suspected aldol-condensation product. |
| B | Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank. |
| C | Pesticide result confirmed by GC-MS. |
| D | Analyte determined in diluted sample. |
| E | Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS. |
| H | Holding time expired, value suspect. |
| I | Increased detection limit due to required dilution. |
| J | Estimated |
| M | GFAA duplicate injection precision not met. |
| N | Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC). |
| P | > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. |
| S | Result determined by method of standard addition (MSA). |
| U | Analytical result below detection limit. |
| W | Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. |
| X | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |
| Y | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |
| Z | Laboratory defined (USEPA CLP organic) qualifier, see case narrative. |

DATA QUALIFIERS:

| | | | |
|---|---|---|---|
| F | Low flow sampling method used. | G | Possible grout contamination, pH > 9. |
| J | Estimated value. | L | Less than 3 bore volumes purged prior to sampling. |
| N | Presumptive evidence that analyte is present. The analyte is "tentatively identified". | Q | Qualitative result due to sampling technique |
| R | Unusable result. | U | Parameter analyzed for but was not detected. |
| X | Location is undefined. | | |

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 11:03 am

| PARAMETER | UNITS | LOCATION CODE | SAMPLE: DATE | ID | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (As CaCO3) | mg/L | 0347 | 09/11/2012 | 0001 | 134 | | | | # | - | - |
| | mg/L | 0349 | 09/12/2012 | 0001 | 130 | | | | # | - | - |
| | mg/L | 0693 | 09/12/2012 | 0001 | 134 | | | | # | - | - |
| | mg/L | 0694 | 09/12/2012 | 0001 | 134 | | | | # | - | - |
| Manganese | mg/L | 0347 | 09/11/2012 | 0001 | 0.0056 | | J | | # | 0.00011 | - |
| | mg/L | 0349 | 09/12/2012 | 0001 | 0.024 | | | | # | 0.00011 | - |
| | mg/L | 0693 | 09/12/2012 | 0001 | 0.0037 | B | J | | # | 0.00011 | - |
| | mg/L | 0694 | 09/12/2012 | 0001 | 0.055 | | | | # | 0.00011 | - |
| Molybdenum | mg/L | 0347 | 09/11/2012 | 0001 | 0.0009 | | | | # | 3.2E-05 | - |
| | mg/L | 0349 | 09/12/2012 | 0001 | 0.0011 | | | | # | 3.2E-05 | - |
| | mg/L | 0693 | 09/12/2012 | 0001 | 0.0009 | | | | # | 3.2E-05 | - |
| | mg/L | 0694 | 09/12/2012 | 0001 | 0.0016 | | | | # | 3.2E-05 | - |
| Nitrate + Nitrite as Nitrogen | mg/L | 0347 | 09/11/2012 | 0001 | 0.01 | U | | | # | 0.01 | - |
| | mg/L | 0349 | 09/12/2012 | 0001 | 0.01 | U | | | # | 0.01 | - |
| | mg/L | 0693 | 09/12/2012 | 0001 | 0.01 | U | | | # | 0.01 | - |
| | mg/L | 0694 | 09/12/2012 | 0001 | 0.025 | | | | # | 0.01 | - |
| Oxidation Reduction Potential | mV | 0347 | 09/11/2012 | N001 | 31.0 | | | | # | - | - |
| | mV | 0349 | 09/12/2012 | N001 | 102.9 | | | | # | - | - |
| | mV | 0693 | 09/12/2012 | N001 | 2.6 | | | | # | - | - |
| | mV | 0694 | 09/12/2012 | N001 | 173.9 | | | | # | - | - |
| pH | s.u. | 0347 | 09/11/2012 | N001 | 8.31 | | | | # | - | - |
| | s.u. | 0349 | 09/12/2012 | N001 | 8.08 | | | | # | - | - |
| | s.u. | 0693 | 09/12/2012 | N001 | 8.41 | | | | # | - | - |
| | s.u. | 0694 | 09/12/2012 | N001 | 7.46 | | | | # | - | - |
| Selenium | mg/L | 0347 | 09/11/2012 | 0001 | 0.0003 | | | | # | 3.2E-05 | - |
| | mg/L | 0349 | 09/12/2012 | 0001 | 0.0003 | | | | # | 3.2E-05 | - |
| | mg/L | 0693 | 09/12/2012 | 0001 | 0.0002 | | | | # | 3.2E-05 | - |
| | mg/L | 0694 | 09/12/2012 | 0001 | 0.0003 | | | | # | 3.2E-05 | - |
| Specific Conductance | umhos/cm | 0347 | 09/11/2012 | N001 | 326 | | | | # | - | - |
| | umhos/cm | 0349 | 09/12/2012 | N001 | 325 | | | | # | - | - |
| | umhos/cm | 0693 | 09/12/2012 | N001 | 337 | | | | # | - | - |
| | umhos/cm | 0694 | 09/12/2012 | N001 | 374 | | | | # | - | - |
| Temperature | C | 0347 | 09/11/2012 | N001 | 20.85 | | | | # | - | - |
| | C | 0349 | 09/12/2012 | N001 | 19.42 | | | | # | - | - |
| | C | 0693 | 09/12/2012 | N001 | 19.44 | | | | # | - | - |

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 11:03 am

| PARAMETER | UNITS | LOCATION CODE | SAMPLE: DATE | ID | RESULT | QUALIFIERS: LAB | DATA | QA | DETECTION LIMIT | UN-CERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|
| Temperature | C | 0694 | 09/12/2012 | N001 | 17.99 | | | # | - | - |
| Turbidity | NTU | 0347 | 09/11/2012 | N001 | 47.0 | | | # | - | - |
| | NTU | 0349 | 09/12/2012 | N001 | 1000 | > | | # | - | - |
| | NTU | 0693 | 09/12/2012 | N001 | 136 | | | # | - | - |
| | NTU | 0694 | 09/12/2012 | N001 | 1000 | > | | # | - | - |
| Uranium | mg/L | 0347 | 09/11/2012 | 0001 | 0.0005 | | | # | 2.9E-06 | - |
| | mg/L | 0349 | 09/12/2012 | 0001 | 0.0006 | | | # | 2.9E-06 | - |
| | mg/L | 0693 | 09/12/2012 | 0001 | 0.0005 | | | # | 2.9E-06 | - |
| | mg/L | 0694 | 09/12/2012 | 0001 | 0.0008 | | | # | 2.9E-06 | - |

RECORDS: SELECTED FROM USEE800 WHERE site_code='SRK05' AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%' ) AND DATE_SAMPLED between #9/1/2012# and #10/1/2012#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- G Possible grout contamination, pH > 9.
- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- N Presumptive evidence that analyte is present. The analyte is "tentatively identified".
- Q Qualitative result due to sampling technique
- R Unusable result.
- U Parameter analyzed for but was not detected.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

# Appendix C

# Hydrographs and Static Water Level Data

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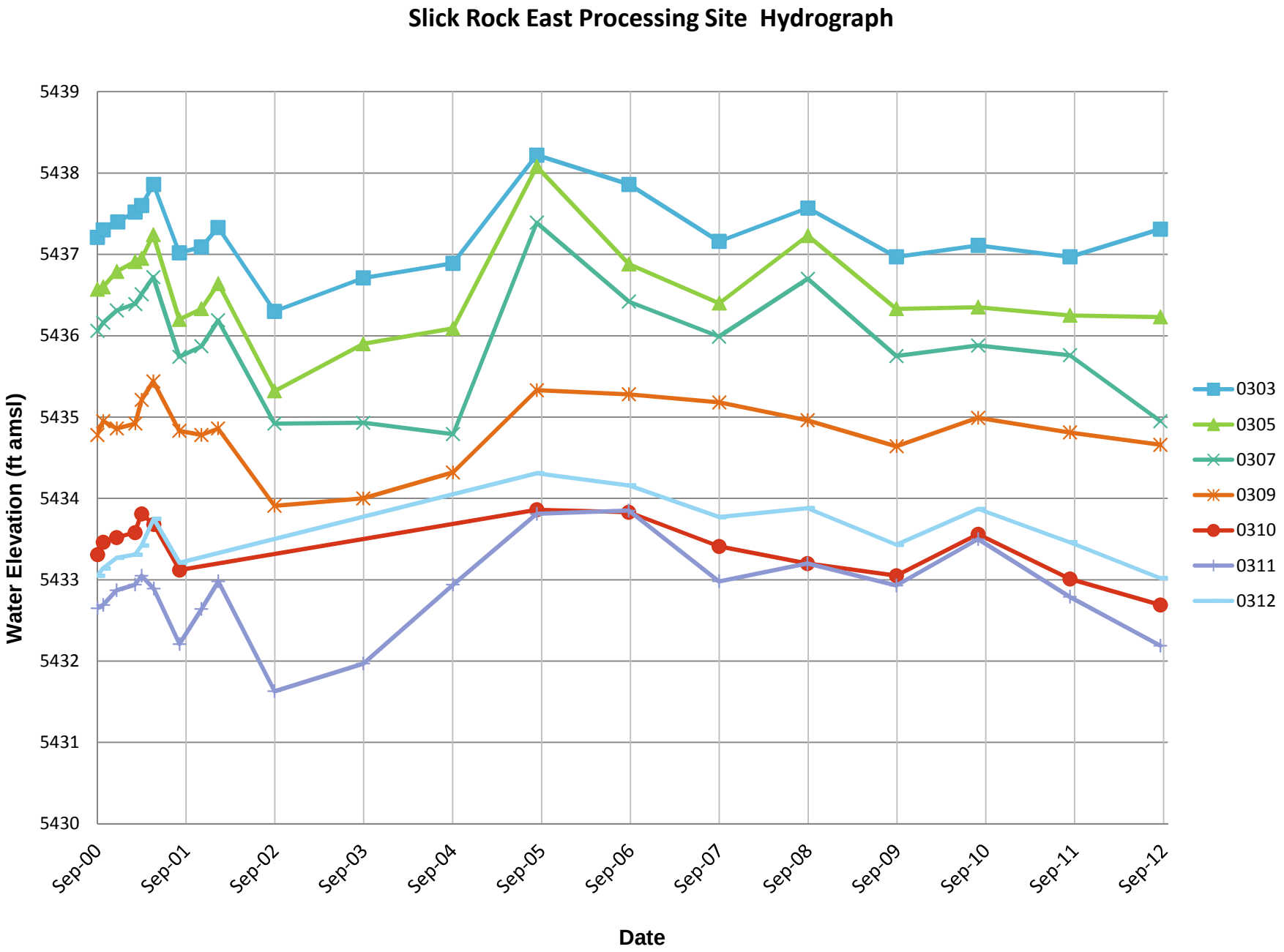

Slick Rock East Processing Site Hydrograph
Water Elevation (ft amsl)
5439
5438
5437
5436
5435
5434
5433
5432
5431
5430
Sep-00
Sep-01
Sep-02
Sep-03
Sep-04
Sep-05
Sep-06
Sep-07
Sep-08
Sep-09
Sep-10
Sep-11
Sep-12
Date
0303
0305
0307
0309
0310
0311
0312

STATIC WATER LEVELS (USEE700) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 11:17 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT | | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| | | | DATE | TIME | | | |
| 0300 | U | 5467.35 | 09/27/2000 | 11:12 | 14.73 | 5452.62 | |
| | | 5467.35 | 10/20/2000 | 12:13 | 14.32 | 5453.03 | |
| | | 5467.35 | 12/19/2000 | 10:45 | 13.99 | 5453.36 | |
| | | 5467.35 | 02/28/2001 | 13:16 | 13.78 | 5453.57 | |
| | | 5467.35 | 03/27/2001 | 11:20 | 13.54 | 5453.81 | |
| | | 5467.35 | 05/14/2001 | 11:40 | 13.26 | 5454.09 | |
| | | 5467.35 | 08/29/2001 | 09:00 | 15.30 | 5452.05 | |
| | | 5467.35 | 09/29/2010 | 13:55 | 14.15 | 5453.20 | |
| 0303 | O | 5446.91 | 09/26/2000 | 17:12 | 9.70 | 5437.21 | |
| | | 5446.91 | 10/20/2000 | 11:22 | 9.61 | 5437.30 | |
| | | 5446.91 | 12/19/2000 | 10:03 | 9.51 | 5437.40 | |
| | | 5446.91 | 02/28/2001 | 15:18 | 9.39 | 5437.52 | |
| | | 5446.91 | 03/27/2001 | 11:45 | 9.31 | 5437.60 | |
| | | 5446.91 | 05/15/2001 | 09:44 | 9.05 | 5437.86 | |
| | | 5446.91 | 08/29/2001 | 11:31 | 9.89 | 5437.02 | |
| | | 5446.91 | 11/28/2001 | 14:39 | 9.82 | 5437.09 | |
| | | 5446.91 | 02/04/2002 | 16:49 | 9.58 | 5437.33 | |
| | | 5446.91 | 09/24/2002 | 14:45 | 10.61 | 5436.30 | |
| | | 5446.91 | 09/24/2003 | 14:12 | 10.20 | 5436.71 | |
| | | 5446.91 | 09/27/2004 | 12:47 | 10.02 | 5436.89 | |
| | | 5446.91 | 09/06/2005 | 14:46 | 8.69 | 5438.22 | |
| | | 5446.91 | 09/20/2006 | 15:35 | 9.05 | 5437.86 | |
| | | 5446.91 | 09/25/2007 | | 9.75 | 5437.16 | |
| | | 5446.91 | 09/24/2008 | | 9.34 | 5437.57 | |
| | | 5446.91 | 09/23/2009 | | 9.94 | 5436.97 | |
| | | 5446.91 | 08/25/2010 | 14:20 | 9.80 | 5437.11 | |
| | | 5446.91 | 09/06/2011 | 13:05 | 9.94 | 5436.97 | |
| | | 5446.91 | 09/12/2012 | 15:10 | 9.60 | 5437.31 | |
| 0305 | O | 5448.75 | 09/26/2000 | 12:27 | 12.18 | 5436.57 | |
| | | 5448.75 | 10/20/2000 | 11:26 | 12.15 | 5436.60 | |
| | | 5448.75 | 12/15/2000 | 11:08 | 11.96 | 5436.79 | |
| | | 5448.75 | 02/28/2001 | 16:42 | 11.84 | 5436.91 | |
| | | 5448.75 | 03/27/2001 | 11:42 | 11.80 | 5436.95 | |
| | | 5448.75 | 05/14/2001 | 15:51 | 11.51 | 5437.24 | |
| | | 5448.75 | 08/29/2001 | 12:50 | 12.55 | 5436.20 | |
| | | 5448.75 | 11/28/2001 | 13:22 | 12.42 | 5436.33 | |
| | | 5448.75 | 02/05/2002 | 09:33 | 12.11 | 5436.64 | |

STATIC WATER LEVELS (USEE700) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 11:17 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT | | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| | | | DATE | TIME | | | |
| 0305 | O | 5448.75 | 09/24/2002 | 14:20 | 13.43 | 5435.32 | |
| | | 5448.75 | 09/24/2003 | 13:41 | 12.85 | 5435.90 | |
| | | 5448.75 | 09/27/2004 | 12:21 | 12.66 | 5436.09 | |
| | | 5448.75 | 09/06/2005 | 15:14 | 10.67 | 5438.08 | |
| | | 5448.75 | 09/20/2006 | 14:32 | 11.87 | 5436.88 | |
| | | 5448.75 | 09/26/2007 | | 12.35 | 5436.40 | |
| | | 5448.75 | 09/24/2008 | | 11.52 | 5437.23 | |
| | | 5448.75 | 09/23/2009 | | 12.42 | 5436.33 | |
| | | 5448.75 | 08/25/2010 | 13:58 | 12.40 | 5436.35 | |
| | | 5448.75 | 09/06/2011 | 12:30 | 12.50 | 5436.25 | |
| | | 5448.75 | 09/12/2012 | 14:05 | 12.52 | 5436.23 | |
| 0307 | O | 5447.10 | 09/26/2000 | 15:29 | 11.04 | 5436.06 | |
| | | 5447.10 | 10/20/2000 | 11:30 | 10.94 | 5436.16 | |
| | | 5447.10 | 12/15/2000 | 10:17 | 10.79 | 5436.31 | |
| | | 5447.10 | 03/01/2001 | 08:53 | 10.71 | 5436.39 | |
| | | 5447.10 | 03/27/2001 | 11:36 | 10.59 | 5436.51 | |
| | | 5447.10 | 05/14/2001 | 14:49 | 10.38 | 5436.72 | |
| | | 5447.10 | 08/29/2001 | 10:27 | 11.36 | 5435.74 | |
| | | 5447.10 | 11/28/2001 | 12:33 | 11.23 | 5435.87 | |
| | | 5447.10 | 02/04/2002 | 15:57 | 10.91 | 5436.19 | |
| | | 5447.10 | 09/24/2002 | 13:52 | 12.18 | 5434.92 | |
| | | 5447.10 | 09/24/2003 | 13:08 | 12.17 | 5434.93 | |
| | | 5447.10 | 09/27/2004 | 11:56 | 12.31 | 5434.79 | |
| | | 5447.10 | 09/06/2005 | 14:10 | 9.71 | 5437.39 | |
| | | 5447.10 | 09/20/2006 | 13:51 | 10.68 | 5436.42 | |
| | | 5447.10 | 09/25/2007 | | 11.11 | 5435.99 | |
| | | 5447.10 | 09/24/2008 | | 10.40 | 5436.70 | |
| | | 5447.10 | 09/23/2009 | | 11.35 | 5435.75 | |
| | | 5447.10 | 08/25/2010 | 15:38 | 11.22 | 5435.88 | |
| | | 5447.10 | 09/06/2011 | 12:15 | 11.34 | 5435.76 | |
| | | 5447.10 | 09/12/2012 | 14:45 | 12.15 | 5434.95 | |
| 0309 | O | 5450.18 | 09/26/2000 | 09:29 | 15.40 | 5434.78 | |
| | | 5450.18 | 10/20/2000 | 11:35 | 15.23 | 5434.95 | |
| | | 5450.18 | 12/15/2000 | 09:43 | 15.32 | 5434.86 | |
| | | 5450.18 | 03/01/2001 | 09:26 | 15.26 | 5434.92 | |
| | | 5450.18 | 03/27/2001 | 11:30 | 14.97 | 5435.21 | |
| | | 5450.18 | 05/14/2001 | 14:04 | 14.74 | 5435.44 | |

STATIC WATER LEVELS (USEE700) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 11:17 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT | | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| | | | DATE | TIME | | | |
| 0309 | O | 5450.18 | 08/29/2001 | 09:43 | 15.35 | 5434.83 | |
| | | 5450.18 | 11/28/2001 | 11:53 | 15.40 | 5434.78 | |
| | | 5450.18 | 02/04/2002 | 13:30 | 15.32 | 5434.86 | |
| | | 5450.18 | 09/24/2002 | 12:38 | 16.27 | 5433.91 | |
| | | 5450.18 | 09/24/2003 | 12:42 | 16.18 | 5434.00 | |
| | | 5450.18 | 09/27/2004 | 10:44 | 15.86 | 5434.32 | |
| | | 5450.18 | 09/06/2005 | 13:22 | 14.85 | 5435.33 | |
| | | 5450.18 | 09/20/2006 | 12:34 | 14.90 | 5435.28 | |
| | | 5450.18 | 09/26/2007 | | 15.00 | 5435.18 | |
| | | 5450.18 | 09/23/2008 | | 15.22 | 5434.96 | |
| | | 5450.18 | 09/24/2009 | | 15.54 | 5434.64 | |
| | | 5450.18 | 08/25/2010 | 14:53 | 15.19 | 5434.99 | |
| | | 5450.18 | 09/06/2011 | 11:30 | 15.37 | 5434.81 | |
| | | 5450.18 | 09/12/2012 | 13:25 | 15.52 | 5434.66 | |
| 0310 | D | 5450.56 | 09/27/2000 | 13:34 | 17.25 | 5433.31 | |
| | | 5450.56 | 10/20/2000 | 12:52 | 17.10 | 5433.46 | |
| | | 5450.56 | 12/14/2000 | 16:34 | 17.04 | 5433.52 | |
| | | 5450.56 | 02/28/2001 | 10:28 | 16.98 | 5433.58 | |
| | | 5450.56 | 03/27/2001 | 12:45 | 16.75 | 5433.81 | |
| | | 5450.56 | 05/16/2001 | 14:35 | 16.88 | 5433.68 | |
| | | 5450.56 | 08/30/2001 | 09:28 | 17.44 | 5433.12 | |
| | | 5450.56 | 09/06/2005 | 17:14 | 16.70 | 5433.86 | |
| | | 5450.56 | 09/19/2006 | 17:34 | 16.73 | 5433.83 | |
| | | 5450.56 | 09/25/2007 | | 17.15 | 5433.41 | |
| | | 5450.56 | 09/22/2008 | | 17.36 | 5433.20 | |
| | | 5450.56 | 09/23/2009 | | 17.51 | 5433.05 | |
| | | 5450.56 | 08/25/2010 | 11:57 | 17.00 | 5433.56 | |
| | | 5450.56 | 09/06/2011 | 15:20 | 17.55 | 5433.01 | |
| | | 5450.56 | 09/12/2012 | 11:35 | 17.87 | 5432.69 | |
| 0311 | D | 5450.70 | 09/27/2000 | 14:00 | 18.05 | 5432.65 | |
| | | 5450.70 | 10/20/2000 | 12:49 | 18.01 | 5432.69 | |
| | | 5450.70 | 12/14/2000 | 17:00 | 17.83 | 5432.87 | |
| | | 5450.70 | 02/28/2001 | 11:03 | 17.76 | 5432.94 | |
| | | 5450.70 | 03/27/2001 | 12:41 | 17.65 | 5433.05 | |
| | | 5450.70 | 05/16/2001 | 13:46 | 17.81 | 5432.89 | |
| | | 5450.70 | 08/30/2001 | 08:50 | 18.49 | 5432.21 | |
| | | 5450.70 | 11/28/2001 | 15:59 | 18.06 | 5432.64 | |

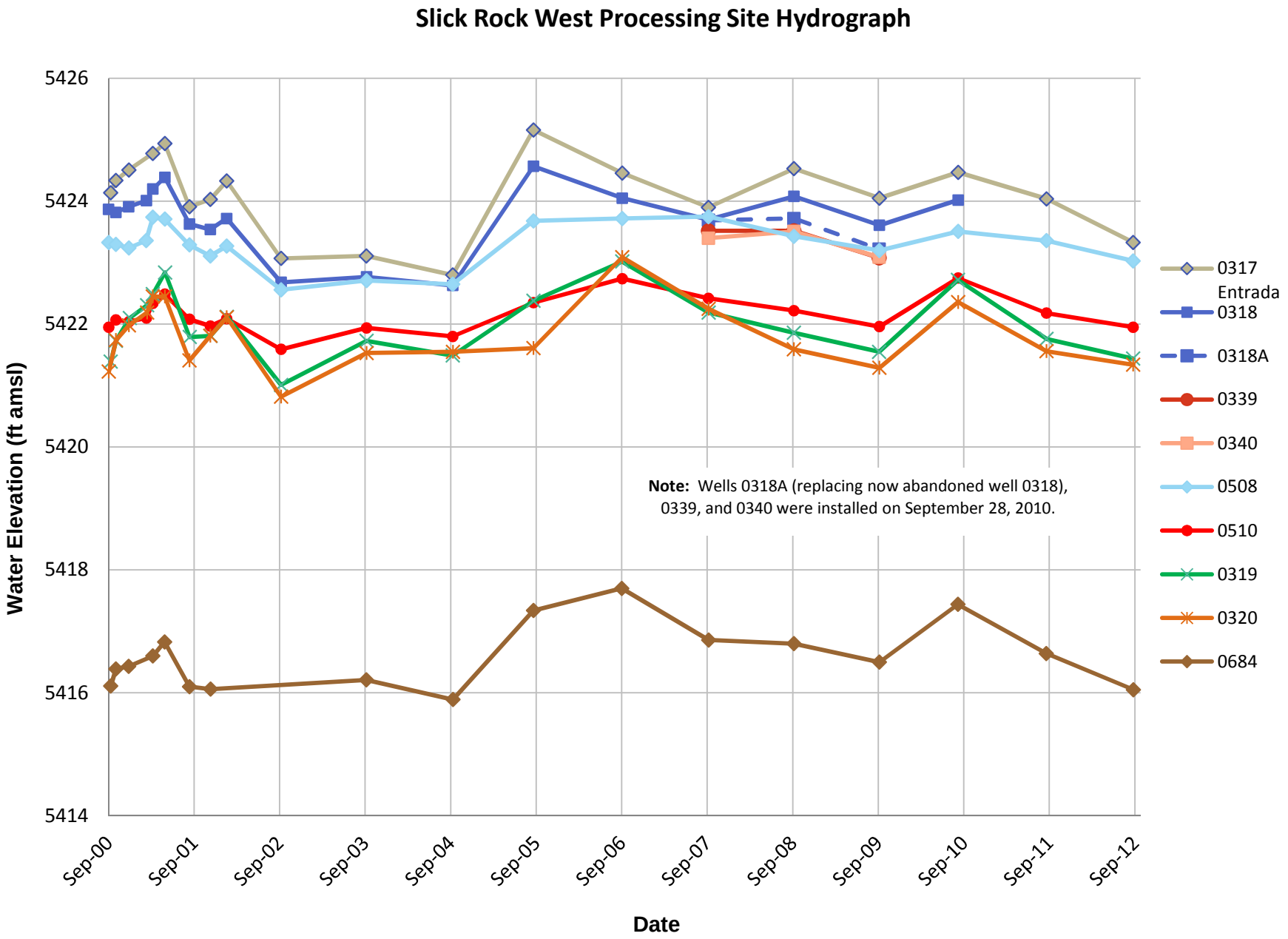
STATIC WATER LEVELS (USEE700) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 3/25/2013 11:17 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT DATE | MEASUREMENT TIME | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| 0311 | D | 5450.70 | 02/05/2002 | 10:48 | 17.72 | 5432.98 | |
| | | 5450.70 | 09/24/2002 | 16:10 | 19.07 | 5431.63 | |
| | | 5450.70 | 09/24/2003 | 15:14 | 18.73 | 5431.97 | |
| | | 5450.70 | 09/27/2004 | 14:07 | 17.76 | 5432.94 | |
| | | 5450.70 | 09/06/2005 | 16:46 | 16.89 | 5433.81 | |
| | | 5450.70 | 09/19/2006 | 17:11 | 16.85 | 5433.85 | |
| | | 5450.70 | 09/25/2007 | | 17.72 | 5432.98 | |
| | | 5450.70 | 09/22/2008 | | 17.50 | 5433.20 | |
| | | 5450.70 | 09/23/2009 | | 17.77 | 5432.93 | |
| | | 5450.70 | 08/25/2010 | 12:14 | 17.20 | 5433.50 | |
| | | 5450.70 | 09/06/2011 | 14:40 | 17.91 | 5432.79 | |
| | | 5450.70 | 09/12/2012 | 11:55 | 18.51 | 5432.19 | |
| 0312 | D | 5451.06 | 09/27/2000 | 14:56 | 18.01 | 5433.05 | |
| | | 5451.06 | 10/20/2000 | 12:47 | 17.92 | 5433.14 | |
| | | 5451.06 | 12/15/2000 | 09:04 | 17.79 | 5433.27 | |
| | | 5451.06 | 02/28/2001 | 11:38 | 17.75 | 5433.31 | |
| | | 5451.06 | 03/27/2001 | 12:44 | 17.64 | 5433.42 | |
| | | 5451.06 | 05/16/2001 | 13:06 | 17.31 | 5433.75 | |
| | | 5451.06 | 08/30/2001 | 08:07 | 17.85 | 5433.21 | |
| | | 5451.06 | 09/06/2005 | 16:22 | 16.75 | 5434.31 | |
| | | 5451.06 | 09/19/2006 | 16:42 | 16.90 | 5434.16 | |
| | | 5451.06 | 09/25/2007 | | 17.29 | 5433.77 | |
| | | 5451.06 | 09/22/2008 | | 17.18 | 5433.88 | |
| | | 5451.06 | 09/23/2009 | | 17.63 | 5433.43 | |
| | | 5451.06 | 08/25/2010 | 12:36 | 17.19 | 5433.87 | |
| | | 5451.06 | 09/06/2011 | 14:15 | 17.60 | 5433.46 | |
| | | 5451.06 | 09/12/2012 | 12:10 | 18.04 | 5433.02 | |

RECORDS: SELECTED FROM USEE700 WHERE site_code='SRK06' AND location_code in('0300','0303','0305','0307','0309','0310','0311','0312') AND LOG_DATE between #1/1/2000# and #10/1/2012#

FLOW CODES: D DOWN GRADIENT O ON-SITE U UPGRADIENT

WATER LEVEL FLAGS:


Slick Rock West Processing Site Hydrograph
Water Elevation (ft amsl)
5426
5424
5422
5420
5418
5416
5414
Sep-00
Sep-01
Sep-02
Sep-03
Sep-04
Sep-05
Sep-06
Sep-07
Sep-08
Sep-09
Sep-10
Sep-11
Sep-12
Date
Note: Wells 0318A (replacing now abandoned well 0318), 0339, and 0340 were installed on September 28, 2010.
0317 Entrada
0318
0318A
0339
0340
0508
0510
0319
0320
0684

STATIC WATER LEVELS (USEE700) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 11:28 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT | | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| | | | DATE | TIME | | | |
| 0317 | | 5435.18 | 09/28/2000 | 16:00 | 11.04 | 5424.14 | |
| | | 5435.18 | 10/20/2000 | 14:59 | 10.84 | 5424.34 | |
| | | 5435.18 | 12/14/2000 | 09:52 | 10.67 | 5424.51 | |
| | | 5435.18 | 03/27/2001 | 14:19 | 10.40 | 5424.78 | |
| | | 5435.18 | 05/17/2001 | 08:47 | 10.24 | 5424.94 | |
| | | 5435.18 | 08/30/2001 | 12:55 | 11.27 | 5423.91 | |
| | | 5435.18 | 11/27/2001 | 11:31 | 11.15 | 5424.03 | |
| | | 5435.18 | 02/05/2002 | 13:50 | 10.85 | 5424.33 | |
| | | 5435.18 | 09/25/2002 | 11:35 | 12.11 | 5423.07 | |
| | | 5435.18 | 09/24/2003 | 16:34 | 12.07 | 5423.11 | |
| | | 5435.18 | 09/27/2004 | 16:04 | 12.38 | 5422.80 | |
| | | 5435.18 | 09/07/2005 | 11:57 | 10.02 | 5425.16 | |
| | | 5435.18 | 09/21/2006 | 12:09 | 10.72 | 5424.46 | |
| | | 5435.18 | 09/24/2007 | | 11.28 | 5423.90 | |
| | | 5435.18 | 09/23/2008 | | 10.65 | 5424.53 | |
| | | 5435.18 | 09/23/2009 | 11:00 | 11.13 | 5424.05 | |
| | | 5435.18 | 08/25/2010 | 09:27 | 10.71 | 5424.47 | |
| | | 5435.18 | 09/07/2011 | 09:00 | 11.14 | 5424.04 | |
| | | 5435.18 | 09/11/2012 | 13:05 | 11.85 | 5423.33 | |
| 0318 | O | 5435.22 | 09/19/2000 | 13:27 | 11.35 | 5423.87 | |
| | | 5435.22 | 10/20/2000 | 14:47 | 11.40 | 5423.82 | |
| | | 5435.22 | 12/13/2000 | 16:40 | 11.31 | 5423.91 | |
| | | 5435.22 | 02/27/2001 | 10:49 | 11.21 | 5424.01 | |
| | | 5435.22 | 03/27/2001 | 14:05 | 11.02 | 5424.20 | |
| | | 5435.22 | 05/17/2001 | 09:47 | 10.83 | 5424.39 | |
| | | 5435.22 | 08/30/2001 | 14:34 | 11.59 | 5423.63 | |
| | | 5435.22 | 11/27/2001 | 12:36 | 11.68 | 5423.54 | |
| | | 5435.22 | 02/05/2002 | 14:33 | 11.50 | 5423.72 | |
| | | 5435.22 | 09/25/2002 | 10:52 | 12.54 | 5422.68 | |
| | | 5435.22 | 09/25/2003 | 09:00 | 12.45 | 5422.77 | |
| | | 5435.22 | 09/27/2004 | 15:28 | 12.59 | 5422.63 | |
| | | 5435.22 | 09/07/2005 | 12:24 | 10.65 | 5424.57 | |
| | | 5435.22 | 09/21/2006 | 12:42 | 11.17 | 5424.05 | |
| | | 5435.22 | 09/24/2007 | | 11.52 | 5423.70 | |
| | | 5435.22 | 09/23/2008 | | 11.14 | 5424.08 | |
| | | 5435.22 | 09/23/2009 | 11:30 | 11.61 | 5423.61 | |
| | | 5435.22 | 08/25/2010 | 09:52 | 11.20 | 5424.02 | |

STATIC WATER LEVELS (USEE700) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 11:28 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT | | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| | | | DATE | TIME | | | |
| 0318A | | - | 09/29/2010 | 16:25 | 12.08 | -12.08 | |
| | | - | 09/07/2011 | 09:35 | 12.05 | -12.05 | |
| | | - | 09/11/2012 | 13:35 | 12.55 | -12.55 | |
| 0319 | O | 5430.66 | 09/28/2000 | 15:28 | 9.27 | 5421.39 | |
| | | 5430.66 | 10/20/2000 | 14:25 | 8.93 | 5421.73 | |
| | | 5430.66 | 12/19/2000 | 13:40 | 8.56 | 5422.10 | |
| | | 5430.66 | 03/02/2001 | 09:00 | 8.35 | 5422.31 | |
| | | 5430.66 | 03/27/2001 | 13:49 | 8.17 | 5422.49 | |
| | | 5430.66 | 05/18/2001 | 08:32 | 7.82 | 5422.84 | |
| | | 5430.66 | 08/31/2001 | 08:53 | 8.87 | 5421.79 | |
| | | 5430.66 | 11/28/2001 | 08:45 | 8.85 | 5421.81 | |
| | | 5430.66 | 02/06/2002 | 09:34 | 8.54 | 5422.12 | |
| | | 5430.66 | 09/25/2002 | 14:58 | 9.65 | 5421.01 | |
| | | 5430.66 | 09/25/2003 | 10:56 | 8.93 | 5421.73 | |
| | | 5430.66 | 09/27/2004 | 17:00 | 9.17 | 5421.49 | |
| | | 5430.66 | 09/07/2005 | 13:13 | 8.28 | 5422.38 | |
| | | 5430.66 | 09/21/2006 | 09:49 | 7.64 | 5423.02 | |
| | | 5430.66 | 09/25/2007 | | 8.47 | 5422.19 | |
| | | 5430.66 | 09/23/2008 | | 8.80 | 5421.86 | |
| | | 5430.66 | 09/22/2009 | 15:55 | 9.11 | 5421.55 | |
| | | 5430.66 | 08/24/2010 | 16:54 | 7.94 | 5422.72 | |
| | | 5430.66 | 09/07/2011 | 12:25 | 8.90 | 5421.76 | |
| | | 5430.66 | 09/11/2012 | 15:25 | 9.22 | 5421.44 | |
| 0320 | O | 5427.40 | 09/20/2000 | 16:28 | 6.17 | 5421.23 | |
| | | 5427.40 | 10/20/2000 | 14:11 | 5.66 | 5421.74 | |
| | | 5427.40 | 12/14/2000 | 12:51 | 5.42 | 5421.98 | |
| | | 5427.40 | 03/02/2001 | 11:30 | 5.21 | 5422.19 | |
| | | 5427.40 | 03/27/2001 | 13:39 | 4.95 | 5422.45 | |
| | | 5427.40 | 05/17/2001 | 12:49 | 4.95 | 5422.45 | |
| | | 5427.40 | 08/30/2001 | 16:17 | 5.99 | 5421.41 | |
| | | 5427.40 | 11/27/2001 | 15:38 | 5.59 | 5421.81 | |
| | | 5427.40 | 02/05/2002 | 16:36 | 5.29 | 5422.11 | |
| | | 5427.40 | 09/25/2002 | 13:57 | 6.58 | 5420.82 | |
| | | 5427.40 | 09/25/2003 | 12:37 | 5.87 | 5421.53 | |
| | | 5427.40 | 09/28/2004 | 08:45 | 5.85 | 5421.55 | |
| | | 5427.40 | 09/07/2005 | 14:10 | 5.79 | 5421.61 | |
| | | 5427.40 | 09/21/2006 | 16:15 | 4.31 | 5423.09 | |

STATIC WATER LEVELS (USEE700) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 11:28 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT | | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| | | | DATE | TIME | | | |
| 0320 | O | 5427.40 | 09/25/2007 | | 5.15 | 5422.25 | |
| | | 5427.40 | 09/23/2008 | | 5.81 | 5421.59 | |
| | | 5427.40 | 09/23/2009 | 12:50 | 6.11 | 5421.29 | |
| | | 5427.40 | 08/25/2010 | 11:01 | 5.04 | 5422.36 | |
| | | 5427.40 | 09/07/2011 | 11:30 | 5.84 | 5421.56 | |
| | | 5427.40 | 09/11/2012 | 17:20 | 6.06 | 5421.34 | |
| 0339 | | - | 09/29/2010 | 15:40 | 10.95 | -10.95 | |
| | | - | 09/07/2011 | 09:50 | 10.95 | -10.95 | |
| | | - | 09/11/2012 | 14:05 | 11.39 | -11.39 | |
| 0340 | | - | 09/29/2010 | 14:55 | 9.69 | -9.69 | |
| | | - | 09/07/2011 | 10:20 | 9.58 | -9.58 | |
| | | - | 09/11/2012 | 14:50 | 10.00 | -10.00 | |
| 0508 | O | 5430.20 | 02/23/2000 | 15:01 | 6.65 | 5423.55 | |
| | | 5430.20 | 05/17/2000 | 14:38 | 5.00 | 5425.20 | |
| | | 5430.20 | 09/20/2000 | 09:30 | 6.87 | 5423.33 | |
| | | 5430.20 | 10/20/2000 | 14:44 | 6.90 | 5423.30 | |
| | | 5430.20 | 12/14/2000 | 10:30 | 6.96 | 5423.24 | |
| | | 5430.20 | 02/26/2001 | 11:26 | 6.84 | 5423.36 | |
| | | 5430.20 | 03/27/2001 | 13:57 | 6.46 | 5423.74 | |
| | | 5430.20 | 05/17/2001 | 10:45 | 6.49 | 5423.71 | |
| | | 5430.20 | 08/30/2001 | 15:14 | 6.91 | 5423.29 | |
| | | 5430.20 | 11/27/2001 | 13:08 | 7.09 | 5423.11 | |
| | | 5430.20 | 02/05/2002 | 15:00 | 6.93 | 5423.27 | |
| | | 5430.20 | 09/25/2002 | 13:00 | 7.64 | 5422.56 | |
| | | 5430.20 | 09/25/2003 | 09:41 | 7.49 | 5422.71 | |
| | | 5430.20 | 09/27/2004 | 14:45 | 7.55 | 5422.65 | |
| | | 5430.20 | 09/07/2005 | 11:01 | 6.52 | 5423.68 | |
| | | 5430.20 | 09/21/2006 | 14:14 | 6.48 | 5423.72 | |
| | | 5430.20 | 09/24/2007 | | 6.45 | 5423.75 | |
| | | 5430.20 | 09/23/2008 | | 6.77 | 5423.43 | |
| | | 5430.20 | 09/23/2009 | 09:45 | 7.00 | 5423.20 | |
| | | 5430.20 | 08/25/2010 | 08:34 | 6.69 | 5423.51 | |
| | | 5430.20 | 09/07/2011 | 10:35 | 6.84 | 5423.36 | |
| | | 5430.20 | 09/11/2012 | 16:35 | 7.17 | 5423.03 | |
| 0510 | O | 5427.87 | 02/24/2000 | 08:38 | 5.56 | 5422.31 | |
| | | 5427.87 | 05/17/2000 | 15:56 | 3.92 | 5423.95 | |
| | | 5427.87 | 09/20/2000 | 11:04 | 5.92 | 5421.95 | |

STATIC WATER LEVELS (USEE700) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 11:28 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT | | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|
| | | | DATE | TIME | | | |
| 0510 | O | 5427.87 | 10/20/2000 | 14:38 | 5.80 | 5422.07 | |
| | | 5427.87 | 12/14/2000 | 12:02 | 5.83 | 5422.04 | |
| | | 5427.87 | 02/27/2001 | 12:05 | 5.77 | 5422.10 | |
| | | 5427.87 | 03/27/2001 | 13:51 | 5.53 | 5422.34 | |
| | | 5427.87 | 05/17/2001 | 11:23 | 5.38 | 5422.49 | |
| | | 5427.87 | 08/30/2001 | 15:46 | 5.79 | 5422.08 | |
| | | 5427.87 | 11/27/2001 | 14:58 | 5.90 | 5421.97 | |
| | | 5427.87 | 02/05/2002 | 15:41 | 5.78 | 5422.09 | |
| | | 5427.87 | 09/25/2002 | 13:24 | 6.28 | 5421.59 | |
| | | 5427.87 | 09/25/2003 | 10:17 | 5.93 | 5421.94 | |
| | | 5427.87 | 09/27/2004 | 16:34 | 6.07 | 5421.80 | |
| | | 5427.87 | 09/07/2005 | 10:13 | 5.52 | 5422.35 | |
| | | 5427.87 | 09/21/2006 | 15:17 | 5.13 | 5422.74 | |
| | | 5427.87 | 09/24/2007 | | 5.45 | 5422.42 | |
| | | 5427.87 | 09/23/2008 | | 5.65 | 5422.22 | |
| | | 5427.87 | 09/23/2009 | 09:15 | 5.91 | 5421.96 | |
| | | 5427.87 | 08/25/2010 | 10:15 | 5.12 | 5422.75 | |
| | | 5427.87 | 09/07/2011 | 11:05 | 5.69 | 5422.18 | |
| | | 5427.87 | 09/11/2012 | 17:00 | 5.92 | 5421.95 | |
| 0684 | D | 5432.68 | 02/23/2000 | 12:31 | 15.78 | 5416.90 | |
| | | 5432.68 | 05/17/2000 | 12:36 | 14.03 | 5418.65 | |
| | | 5432.68 | 09/28/2000 | 13:49 | 16.57 | 5416.11 | |
| | | 5432.68 | 10/20/2000 | 14:00 | 16.29 | 5416.39 | |
| | | 5432.68 | 12/13/2000 | 14:06 | 16.25 | 5416.43 | |
| | | 5432.68 | 03/27/2001 | 13:27 | 16.08 | 5416.60 | |
| | | 5432.68 | 05/16/2001 | 16:37 | 15.85 | 5416.83 | |
| | | 5432.68 | 08/30/2001 | 10:56 | 16.58 | 5416.10 | |
| | | 5432.68 | 11/28/2001 | 10:15 | 16.62 | 5416.06 | |
| | | 5432.68 | 09/24/2003 | 15:45 | 16.47 | 5416.21 | |
| | | 5432.68 | 09/28/2004 | 10:10 | 16.79 | 5415.89 | |
| | | 5432.68 | 09/07/2005 | 09:09 | 15.34 | 5417.34 | |
| | | 5432.68 | 09/19/2006 | 15:08 | 14.98 | 5417.70 | |
| | | 5432.68 | 09/25/2007 | | 15.82 | 5416.86 | |
| | | 5432.68 | 09/23/2008 | | 15.88 | 5416.80 | |
| | | 5432.68 | 09/23/2009 | 13:55 | 16.18 | 5416.50 | |
| | | 5432.68 | 08/24/2010 | 15:27 | 15.24 | 5417.44 | |
| | | 5432.68 | 09/06/2011 | 16:30 | 16.04 | 5416.64 | |
| | | 5432.68 | 09/12/2012 | 10:35 | 16.63 | 5416.05 | |

STATIC WATER LEVELS (USEE700) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 3/25/2013 11:28 am

| LOCATION CODE | FLOW CODE | TOP OF CASING ELEVATION (FT) | MEASUREMENT DATE | MEASUREMENT TIME | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|---|---|

RECORDS: SELECTED FROM USEE700 WHERE site_code='SRK05' AND location_code in('0317','0318','0318A','0319','0320','0339','0340','0508','0510','0684') AND LOG_DATE between #1/1/2000# and #10/1/2012#

FLOW CODES: D DOWN GRADIENT O ON-SITE

WATER LEVEL FLAGS:

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