Appendix 5.15A
Groundwater Resources Investigation

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Groundwater Resources Investigation

Rice Solar Energy Project

Riverside County, California

52006721

09 October 2009

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October 9, 2009

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LIST OF ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
AFC	Application for Certification
AFY	acre-feet per year
bgs	Below ground surface
BLM	Bureau of Land Management
CED	California Energy Commission
DWR	California Department of Water Resources
gpd/ft	gallons per day per feet
mg/L	milligrams per liter
MW	megawatt
MWD	Metropolitan Water District of Southern California (MWD)
NOAA	National Oceanic and Atmospheric Administration (NOAA)
NWIS	USGS National Water Information System
RWQCB	Regional Water Quality Control Board (RWQCB)
RSEP	Rice Solar Energy Project (RSEP)
SR	State Route (SR)
TDS	Total Dissolved Solids
USGS	United States Geological Survey
WRCC	Western Regional Climate Center

1. INTRODUCTION

Rice Solar Energy, LLC proposes to construct a concentrated solar electric generating facility at the former Rice Airfield property located in eastern Riverside County in California. The site location is shown on **Figure 1**. The project proposes to use groundwater as a water supply during construction and operation. This Groundwater Resources Investigation has been prepared by WorleyParsons on behalf of Rice Solar Energy, LLC to meet the data adequacy requirements of the California Energy Commission (CEC) for an Application for Certification (AFC) for the proposed project. Specifically, this Groundwater Resources Investigation includes the following:

- A description of the project hydrogeologic setting and groundwater resources in the site vicinity;
- A description of the project water demand during construction and operation;
- An evaluation of impact of the project water demand on water resources, including groundwater level drawdown in the site vicinity, interference drawdown to nearby wells, groundwater budget including recharge and discharge, groundwater quality, surface water, and subsidence.

The remaining sections of this report are organized as follows:

- Section 2 presents a description of the project;
- Section 3 describes the project hydrogeologic setting based on a review of available literature, publically available well data, and site specific investigation;
- Section 4 presents an evaluation of the project impacts of the project's proposed use of groundwater.

2. PROJECT DESCRIPTION

The Rice Solar Energy Project (RSEP) is proposed to be located on approximately a site in an unincorporated area of eastern Riverside County, California, situated immediately south of State Route (SR) 62 at milepost 109 (**Figure 1**). The RSEP site covers approximately 1,410 acres of a total land holding of 3,324 acres. The RSEP site constitutes two parcels: (1) portions of Section 24 and 25, Township 1 South, Range 20 East; and (2) all of Sections 19, 20, 29 and 30, Township 1 South, Range 21 East.

The RSEP will consist of a 150-megawatt (MW) solar thermal power generating project with integral thermal storage, a central receiver tower, and a tracking heliostat field. Construction of the project is estimated to take approximately 27 months. Commercial operation is planned to commence October 2013, subject to timing of regulatory approvals and achievement of project equipment procurement and construction milestones.

In the proposed solar power generating process, reflected solar energy heats molten salt (a mixture of sodium nitrate and potassium nitrate) in the central receiver tower. The molten salt acts as a heat transfer medium, preserving solar energy and conveying it to a heat exchanger. The heat exchanger generates steam from water and the steam drives a conventional steam turbine which turns an electrical generator. The salt can be stored in molten form with little loss of the sun's energy, so that the RSEP facility can generate electricity during nighttime or on cloudy days. Rice Solar Energy LLC proposes to use a dry cooling technology (air-cooled condenser) for power plant cooling.

Water will be necessary for both the operation of the project as well as construction of the project. During construction of the facilities, water will be required for soil moisture conditioning during the earthmoving operations and for dust control. During the grading and heavier site disturbance portion of the project (expected to be 12 months), water use is expected to be approximately 35 acre-feet (AF) per month (on average). During the remainder of construction (expected to be 18 months), water use is expected to be approximately 20 AF per month (on average). The average water use for construction would be approximately 29 AF per month, or about 350 AF per year (AFY).

During the 30-year operating life of the plant, raw process water will be supplied from onsite groundwater wells, and will be treated and used for steam-cycle makeup, heliostat washing, molten salt system testing, boiler blowdown and domestic needs. The combined operating water demand for these uses is estimated to be approximately 150 AFY. A sanitary septic system and on-site leach field will be used to dispose of sanitary wastewater.

The water demand for the project will be met by pumping water from on-site wells completed in the lower alluvial aquifer (**Section 3**). At present, two wells exist at the site. Rice #1 (Well 1) is completed in the upper alluvium and is not suitable as a source of water for the project due to low yield and high total dissolved solids (TDS) of the groundwater. Rice #2 (Well 2) is completed in the

lower alluvium and underlying Bouse Formation, and with modifications can be developed as an adequate water supply for the project. Completion details for these wells are presented in **Table 1**, and additional information regarding these wells is discussed in **Section 3**. A single well is not sufficient to meet construction water demand and full redundancy is required for the operating water supply; therefore, one new well will be drilled early in the construction phase to supplement Rice #2. Groundwater will be put through a pre-treatment system and further purified for use as boiler make-up water for washing of the heliostat field and for other uses.

3. WATER RESOURCES

3.1 Site Location and Land Use

The RSEP site is located in a very sparsely settled portion of the Colorado Desert subregion of the Sonoran Desert. A crossroads settlement known as Rice was once located 3 miles west of the RSEP site, at the junction of SR 62 with Blythe-Midland Road but has been abandoned and little remains. The nearest residence and permanent settlement to the RSEP is Vidal Junction which is 14.8 miles east-northeast (15.4 miles by road) at the junction of SR 62 and US Route 95 (**Figure 1**). The nearest residence and permanent settlement to the west of the RSEP is Iron Mountain Pumping Plant operated by the Metropolitan Water District of Southern California (MWD), where there are several residences. The Iron Mountain Pumping Plant is located 17.8 miles west-northwest of the RSEP site (20.9 miles by road). The nearest town offering significant services to the RSEP is Parker, Arizona, located approximately 32.5 road miles to the east. Blythe, California is 40 miles to the south of the RSEP site via Blythe-Midland Road and Twenty-nine Palms, California is 75 miles to the west of the RSEP site. These developments, with the exception of the cross-roads settlement, are located outside of the Rice Valley.

The RSEP site is surrounded by private land to the west and north, and public lands managed by the Bureau of Land Management (BLM) to the east and south. SR 62 and the Colorado River Aqueduct, operated by MWD, are located just north of the site in San Bernardino County. Generally, all of the land surrounding the RSEP, for miles in every direction, is uninhabited public land managed by BLM. The former Rice Valley Dunes Off-Highway Vehicle Recreation area is located immediately south of the RSEP site, however the BLM closed this area due to lack of use and potential risk of encountering unexploded ordinance left from the use of Rice Army Airfield as part of the Desert Training Center.

3.2 Physiographic Setting

The site is located in the southeastern portion of California's Mojave Desert geomorphic province, an area characterized by basin and range geomorphology which consists of alluvial valleys interspersed between low mountain ranges. This area includes some of the most arid regions in the United States. Surface water is scarce, and many valleys are internally drained or have drainages that lead to terminal sinks in other valleys (USGS, 1995).

The site is located in Rice Valley, a broad alluvial valley contiguous with Ward Valley to the northwest and Vidal Valley to the northeast (**Figure 2**). Rice Valley is bounded by the Turtle Mountains on the north, the Little Maria and Big Maria Mountains on the South, the Arica Mountains on the west, and by the West Riverside and Riverside Mountains on the east. An alluvial arm of Rice Valley, referred to as Big Wash, extends eastward from the main area of the valley to the Colorado River. The elevation of the valley floor ranges from approximately 675 feet

above mean sea level (amsl) near the center of the valley to approximately 1,000 feet along the outer margins (DWR, 2004); although, ground surface elevations in the Big Wash area near the Colorado River are as low as 300 feet amsl. Low-lying alluvial drainage divides bound a portion of the basin on the northwest forming the boundary between the Ward Valley and Rice Valley and northeast forming the boundary between the Vidal Valley and the Ward Valley (DWR, 2004). There are no perennial drainages, lakes, playas or other surface water resources in Rice Valley.

The site lies in the north-central portion of Rice Valley near the toe of alluvial fans emanating from the Turtle Mountains, which are located approximately 10 miles to the north. The land surface of the site slopes gently to the south from an elevation of approximately 930 to 740 feet amsl. The general landscape in the vicinity of the RSEP site consists of a gently sloping bajada with a sparse covering of creosote and bursage bush scrub. An area of sand dunes known as the Rice Valley Dunes is located south of the site, in the central portion of the valley.

3.3 Climate and Precipitation

Average annual precipitation ranges from about 3 inches at the lower elevations, to 8 inches in the higher elevations of the mountains west of the Rice Valley (RWQCB, 2006; DWR, 2004). Surface runoff from the mountains drains towards the center of the valley, except in the eastern part of the valley, where Big Wash drains to the Colorado River. There are no perennial streams in the planning area and most of the moisture from rain is lost through evapotranspiration. The table below provides average historical rainfall from the meteorological station at the Blythe CA weather station.

Rainfall near the Proposed Project Site (1961-1990)

Precipitation (inches)	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	3.6	0.5	0.4	0.4	0.2	0.0	0.0	0.2	0.6	0.4	0.3	0.2	0.4
Maximum	7.0	1.7	1.8	1.9	3.0	0.1	0.1	2.4	2.1	2.1	1.9	1.8	3.3
Minimum	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Western Regional Climate Center (WRCC), 2006.

The mean annual precipitation (1961 to 1990) is 3.6 inches per year. The minimum and maximum annual precipitation for the period of record is 1.1 inches and 7.0 inches, respectively. Per the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for the Southeastern California, between 3 and 3.5 inches of rain fall in the 100-year, 24-hour storm event, and extreme events in the nearby area have recorded over 10 inches of rain in 24 hours.

3.4 Surface Water Resources

The Rice Valley is an area of internal drainage with no perennial streams (DWR, 1963). Average annual precipitation ranges from about 3 inches at the lower elevations, to 8 inches in the higher elevations of the mountains west of the Rice Valley (RWQCB, 2006; DWR, 2004). Surface water runoff from the mountains drains towards the center of the valley, except in the eastern part of the valley, where the Big Wash drains to the Colorado River (USGS, 1971a, 1971b, 1983a, 1983b, and 1983c). Although many internally drained valleys in this region contain playas[1], the central portion of Rice Valley is occupied by aeolian sand sheets and dunes.

The Colorado River Aqueduct flows in an east-west direction within 1,000 feet north of the RSEP site. Because the aqueduct is a manmade feature, the aqueduct is concrete lined and is a controlled feature, it does not affect the natural hydrology of Rice Valley (RWQCB, 2006).

3.5 Hydrogeologic Setting

The Site is located in the Rice Valley Groundwater Basin (DWR Basin No. 7-4), which has a surface area of 295 square miles underlying the Rice Valley (**Figure 2**) (DWR, 2004). The basin is located in northeast Riverside and southeast San Bernardino Counties in the Colorado River Hydrologic Region. The basin is bounded by nonwater-bearing rocks of the Turtle Mountains on the north, the Little Maria and Big Maria Mountains on the South, the Arica Mountains on the west, and by the West Riverside and Riverside Mountains on the east. Low-lying alluvial (surface) drainage divides separate the basin from the Ward Valley Groundwater Basin to the northwest and the Vidal Valley Groundwater Basin to the northeast (DWR, 2004). These drainage divides are not reported as groundwater flow boundaries. The Colorado River also bounds a portion of the basin on the east within the Big Wash area (DWR, 2004).

3.5.1 Hydrostratigraphy

The following general information is excerpted from the *Groundwater Atlas of the United States, California and Nevada* (USGS, 1995) and is applicable to understanding the hydrogeologic setting of the site within the Rice Valley Groundwater Basin.

> *Before the most recent period of tectonic activity, which began in middle Miocene time (about 17 million years before present), the Basin and Range region was characterized by moderate relief, and streams in the region did not have enough power to transport large volumes of*

[1] Dry playas are ephemeral lake deposits created by the intermittent accumulation of standing water during particularly wet periods, which may occur once every few years. Wet playas accumulate water during wet periods, but are also underlain by shallow groundwater and are major sources of groundwater discharge due to evapotranspiration and concurrent deposition of salts. Rice Valley lacks both types of deposits.

sediments. As the mountains were uplifted, however, stream gradients increased and the transporting power of the streams greatly increased. Steep, narrow canyons and gulches were incised into the sharp escarpments that bounded the mountain ranges and enormous volumes of material were eroded from the mountains. The sediments eroded, transported, and deposited by the streams are the principal material of basin-fill aquifers. Some of the older basin-fill deposits (Miocene and Pliocene age) are consolidated; however, the basin fill consists mostly of unconsolidated deposits of Pliocene through Holocene age.

The most permeable basin-fill deposits are present in the depressions created by late Tertiary to Quaternary block faulting and can be classified by origin as alluvial-fan, lake-bed, or fluvial deposits. At the time of major deposition, the climate was more humid than the modern climate. Lakes were in most of the closed basins and some basins were connected by streams. In general, the coarsest materials (gravel and boulders) were deposited near the mountains, and the finer materials (sand and clay) were deposited in the central parts of the basins or in the lakes. Occasionally, torrential storms produced heavy runoff that carried coarse material farther from the mountains and resulted in the interfingering of fine and coarse material. The distribution of sediment size is directly associated with distance from the mountains. Three geomorphic landforms can be distinguished on the basis of the gradient of the land surface. Alluvial fans border the mountains and have the steepest surface slopes and the coarsest sediments. Basinward, individual alluvial fans flatten, coalesce, and form alluvial slopes of moderate gradient. A playa, or dry lake bed with a flat surface, is present in the lowest part of the basin, usually at or near the center of the basin, and most of the sediment deposited on the playa is fine grained.

The most important hydrologic features of the basins are the alluvial fans. The basin fill receives most of its recharge through the coarse sediments deposited in the fans. These highly permeable deposits allow rapid infiltration of water as streams exit the valleys that are cut into the almost impermeable rock of the surrounding mountains and flow out onto the surface of the fans. The coarse and fine sediments within the alluvial fans are complexly interbedded and interfingering because the position of the distributary streams that transported the sediments continually shifted across the top of the fan.

Material deposited in perennial lakes or in playas consists principally of clay and silt with minor amounts of sand and is present in all of the basins. In most places, these sediments include some salts deposited by evaporation. The clay and salt deposits merge laterally into coarse-grained deposits of the alluvial slopes. Minor well-sorted beach sand and gravel locally are in the subsurface near the shores of once perennial lakes.

Fluvial deposits of Holocene age in the basins consist primarily of alluvial sand and gravel and are present along the courses of modern or ancestral streams that generally parallel the long axes of the basins. Quaternary fluvial deposits in stream channels usually exhibit a greater degree of sorting than the alluvial-fan deposits.

Little specific information has been reported in the literature about the hydrostratigraphy of Rice Valley Groundwater Basin. In general, the geologic units in the Rice Valley are reportedly grouped into two broad categories: unconsolidated deposits and consolidated rocks (DWR, 1963).

Quaternary Alluvium. Unconsolidated Recent to Holocene alluvial materials reportedly overlie unconsolidated to semi-consolidated Pleistocene alluvial materials (DWR, 1954 and DWR, 1963). These materials were deposited in a continental environment and were waterlain as alluvial fan, stream channel, lake or playa deposits, although, some of the sand was deposited by wind. The Recent and Holocene alluvium are generally comprised of poorly sorted gravel, sand, silt and clay that typically lie above the water table (DWR, 1963). The Pleistocene alluvium is comprised of well sorted sand, interbedded with gravel, silt, and clay that when saturated, yields water freely to wells (DWR, 1963).

Site specific investigations suggest that the alluvium is divided into two units, the upper alluvium and the lower alluvia aquifer. The saturated upper alluvium occurs form approximately 80 feet bgs to 630 feet bgs and the lower alluvium occurs from approximately 630 feet bgs to 810 feet bgs (**Figure 3**). The upper alluvium is comprised dominantly of clays and fine grained sediments with lesser amounts of sand. The lower alluvial aquifer is comprised mostly of sands, gravels and clays with coarser-grained materials dominating.

Pliocene Bouse Formation. The regionally extensive Pliocene Bouse Formation has been identified as underlying the Quaternary Alluvium in the area, including the Ward Valley Groundwater Basin to the northwest (Young and Spammer, 2000), the Chuckwalla Valley Groundwater Basin to the south, and the Palo Verde Mesa Groundwater Basin to the southeast (Wilson and Owen-Joyce, 1994). Metzger (1968) reported that erosional remnants of the Bouse Formation are present in a belt approximately 20 to 30 miles wide extending along the Lower Colorado River for approximately 190 miles from Lake Mohave to near Yuma, Arizona. Although the Bouse Formation is not specifically reported to underlie the Rice Valley, its presence has been inferred based on the above data and site-specific investigation.

Wilson and Owen-Joyce (1994) reported the Bouse Formation occurs between approximately 250 and 125 feet amsl in the eastern Chuckwalla Valley and western Palo Verde Mesa, respectively. A review of borehole logs in the central and eastern Chuckwalla Valley indicates that the Bouse Formation occurs between approximately 125 and 165 feet amsl and a review of borehole logs in the northern Palo Verde Mesa (near McCoy Wash) indicate that the Bouse Formation occurs at approximately -125 feet amsl. Metzger and others (1973) reported that the Bouse Formation occurs at approximately 190 feet amsl in the Parker Valley. Based on a review of the well log from on-Site well 2 it appears that the top of the Bouse Formation occurs at approximately 62 feet amsl (810 feet below ground surface [bgs]) (**Figure 3**). This elevation generally correlates with the reported elevations reported in near-by groundwater basins.

The Bouse Formation includes a marine to brackish-water estuarine sequence deposited in an arm of the proto-Gulf of California (Metzger 1968; Wilson and Owen-Joyce, 1994). This formation has alternatively been interpreted as, or may include, lacustrine sediments deposited in a closed,

brackish basin (Stone, 2006). It is reported to be composed of a basal limestone (marl) overlain by interbedded clay, silt, sand and tufa. The top of the Bouse Formation is relatively flat lying with a reported dip of approximately 2 degrees south of Cibola (Metzger and others, 1973).

Miocene Fanglomerate. A Miocene Fanglomerate unconformably underlies the Bouse Formation in the Colorado River Valley and tributary basins, but it is unknown if this unit exists beneath Rice Valley. The Fanglomerate is composed chiefly of angular to subrounded and poorly sorted partially to fully cemented pebbles with a sandy matrix (Metzger and others, 1973). The Fanglomerate represents composite alluvial fans built from the mountains towards the valley and the debris of the fanglomerate likely represent a stage in the wearing down of the mountains following the pronounced structural activity that produced the basin and range topography in the area (Metzger and others, 1973).

Bedrock. Bedrock reportedly consists of metamorphic and igneous intrusive rocks of pre-Tertiary age that form the basement complex and some undifferentiated volcanic rocks that may be of Tertiary age and Quaternary age (DWR, 1963). Bedinger and others (1989) reported that the bedrock in the basin consists of metamorphic rocks of Precambrain age consisting of gneiss, schist, metasedimentary and metaplutonic rocks and intrustive plutonic rocks of Mesozoic age consisting of biotite-quartz monzonite and hornblende gabbro, quartz diorite, granodiorite, quartz monzodiorite, and syenogranite. The bedrock in the basin is considered nonwater-bearing (DWR, 1963). Based on an evaluation of a geologic cross section reported by Bedinger and others (1989), the depth to bedrock beneath the site appears to be approximately 1,640 feet bgs (-770 feet amsl).

3.5.2 Groundwater Levels and Flow

Only limited information on groundwater levels and flow directions in the Rice Valley Groundwater Basin is available. Groundwater flows southeast-ward from Ward Valley into the basin, generally toward the center of Rice Valley within the basin, and northeast from Rice Valley into the Vidal Valley Groundwater Basin (Thompson 1929; DWR 1954; DWR, 2004). Bedinger and others (1989) and Wilshire and others (1994) theorized that groundwater flows southeast from Ward Valley, through Rice Valley Groundwater Basin, and into the Colorado River Aquifer. However, DWR appears to have adopted the interpretation that a topographic divide and bedrock high that occur within Big Wash separate the main portion of the Rice Valley Groundwater Basin from the Colorado River Aquifer (**Figure 2**). The USGS also appears to have adopted this interpretation when it mapped the Colorado River Aquifer and the associated Accounting Surface as extending to the drainage divide and bedrock high in Big Wash, but not into Rice Valley (Wilson and Owen-Joyce, 1994). The Colorado River Aquifer is defined as being *"hydraulically connected to the Colorado River so that water can move between the river and the aquifer in response to differences in water-level elevations between the river and the aquifer (Wilson and Owen-Joyce, 1994)."* The mapped boundary of the river aquifer extends from the river approximately 3 miles into Big Wash to a topographic divide in the alluvial valley fill. This topographic high coincides with an underlying bedrock high that is illustrated in a cross-section prepared by Bedinger and others (1989). This bedrock high extends to an elevation of approximately 494 feet amsl, which is 190 feet above the

Colorado River accounting surface elevation (304 feet amsl) reported by Wilson and Owen-Joyce (1994)[2].

Groundwater beneath the Site likely flows northeast in the direction of the Vidal Valley Groundwater Basin as indicated by a groundwater contour map prepared by Steinemann (1989) (**Figure 2**).

Historical groundwater elevations in the basin range from approximately 475.4 feet amsl (507 feet bgs) in well 8 which is in located in the west central portion of the basin to approximately 785 feet amsl (125 feet bgs) in well 14 which is located in the southern portion of the basin near the foot of Little Maria Mountains (**Table 2**). Groundwater elevations near the Colorado River range from 302.3 feet amsl (17.7 feet bgs) in well 18 to 308.66 feet amsl (11.34 feet bgs); however, these wells are located in the Big Wash area which is in a separate flow system from the Rice Valley (**Table 2**). Beneath the Site, the groundwater elevations ranged from 493.37 feet amsl (380.63 feet bgs) in Rice #2 (Well 2) to 583.45 feet amsl (288.55 feet bgs) in Rice #1 (Well 1) as measured on July 6, 2009 (**Table 2**). The water level difference between these two wells is approximately 92 feet. Rice #1 is screened in the upper alluvium and Rice #2 is screened in the lower alluvium and upper Bouse Formation (**Figure 3**). The magnitude of the vertical gradient indicates that these wells are screened in separate aquifers. Based on this difference Rice #1 is screened in a water table aquifer (upper alluvium) and Rice #2 is screened in an underlying confined aquifer system. The well construction details of all known wells in the basin are summarized in **Table 1**.

3.5.3 Groundwater Level Trends

The DWR (2004) reported that groundwater levels near the center of the basin were relatively stable between 1962 and 1983 and groundwater levels in the southwestern part of the basin were declining slightly between 1962 and 1984 (DWR, 2004). In order to further assess groundwater level trends in the basin, hydrographs were constructed for selected wells for which time-series water level data were available from the USGS National Water Information System (NWIS) and compared to precipitation trends. Precipitation records from the nearest meteorological station for which long term data were available (located near Blythe, California) were examined to help determine if fluctuations in groundwater levels were related to climatic trends or other factors. The period of record for this meteorological station extends to 1910. The data were used to calculate the cumulative departure from average precipitation, which was plotted with the well hydrographs. An upward trend in the cumulative departure curve indicates a wetter than normal period; whereas, a downward trend indicates a drier than normal period. **Table 2** summarizes the water levels that were graphed. The locations of these wells are illustrated on **Figure 2**.

[2] The accounting surface *"… represents the elevation and slope of the unconfined static water table in the river aquifer outside of the flood plain and the reservoirs of the Colorado River that would exist if the river were the only source of water to the river aquifer."* (Wilson and Owen-Joyce, 1994).

The long-term hydrograph for well 4, which is located just outside the southern site boundary, indicates that water levels were relatively stable near the Site between 1962 and 1983 with a maximum decline of approximately 2 feet in 1963 (**Graph 1**).

The long-term hydrograph for well 15, which is located approximately 9.8 miles south of the Site, indicates that water levels were relatively stable in the southern portion of the basin between 1962 and 1984 with a maximum decline of less than 1 foot over the period of record (**Graph 2**).

3.5.4 Groundwater Budget

The basin is assigned a "Type C" water budget by DWR (DWR, 2004), which means that little information is known about the water budget components in the basin.

GROUNDWATER INFLOW/RECHARGE

Recharge within the basin is derived chiefly from infiltration of runoff through alluvial deposits and is dominated by mountain front recharge with a negligible amount of areal recharge form incident precipitation. This is consistent with the USGS (1995) description that "(m)ost recharge to the basin-fill deposits originates in the mountains …, and, where the mountain streams emerge from bedrock channels, the water infiltrates into the alluvial fans and replenishes the basin-fill aquifer." Mountain front recharge occurs in proximal fan areas, where deposits are coarse grained and heterogeneous, and the aquitards that define the more distal portions of the basin are absent, so recharge can percolate into deeper water-bearing zones.

Natural recharge has been estimated at approximately 500 AFY and is assumed to represent mountain front recharge (DWR, 1975). Additional recharge may be derived from subsurface inflow from the Ward Valley Groundwater Basin (DWR, 1963); however, this recharge has not been quantified. The mountain front recharge estimate is assumed to be derived from all of the surrounding mountains, including those surrounding Big Wash. It is assumed that east of the interpreted groundwater flow divide within Big Wash, mountain front recharge and discharge to the Colorado River cancel one another. Assuming that recharge is apportioned equally among the mountain fronts that encircle Rice Valley, this effectively decreases mountain front recharge to the remainder of the basin from 500 AFY to 394 AFY (**Table 5**).

GROUNDWATER OUTFLOW/DISCHARGE

Discharge reportedly occurs via underflow to the Vidal Valley Groundwater Basin to the northeast (**Figure 2**) (Thompson, 1929; DWR, 1954; DWR, 2004).

The basin does not include a central wet playa, groundwater is relatively deep, and phreatophyte trees (e.g., Mesquite, Palo Verde or Tamarisk) generally have not been widely reported. Therefore, evapotranspiration does not appear to be a significant discharge component in the basin once groundwater has infiltrated to the water table.

There appears to be very little groundwater development in the basin and in 1952, groundwater extractions were estimated at about 1 AFY (DWR, 1975). Steinemann (1989) reported that there was virtually no groundwater development in the basin. Information summarized by DWR for the California Water Plan indicates that the Rice Valley had no agricultural development as of 2001 (DWR, 2005). Review of aerial photography revealed no current indication of irrigated agricultural land, except in a small area of Big Wash adjacent to the Colorado River. It is unknown if Colorado River water or groundwater is used to irrigate these fields; however, this portion of the basin is not believed to be hydraulically connected to the portion of the basin underlying the site.

17 off-site wells and three on-site wells have been identified in the basin based on review of available reports and on-line data from the National Water Information System (NWIS). Information regarding the construction of these wells is summarized in **Table 1** and their locations are shown on **Figure 2**. Five of the off-site wells are located in the portion of Big Wash that drains to the Colorado River. Of the remaining off-site wells, seven are completed in the upper alluvium and five are of unknown depth. WorleyParsons conducted a reconnaissance to assess the status and condition of wells 4, 5, 6 and 7, which are located within 2 miles of the site. All four of these wells are either destroyed, collapsed or disused.

The volume of underflow to the Vidal Valley Groundwater Basin was not reported in the documents reviewed by WorelyParsons. Because other avenues of significant discharge have not been identified, underflow to Vidal Valley Groundwater Basin is assumed to be equal to basin recharge, excluding the portion of the Big Wash that discharges to the Colorado River Aquifer. The assumed underflow to Vidal Valley Groundwater Basin is therefore assumed to be equal to 394 AFY, plus the amount of underflow from Ward Valley Groundwater Basin, which is unknown.

EXISTING GROUNDWATER DEMAND

As stated previously, there appears to be very little, if any, groundwater demand in Rice Valley. Although some agricultural groundwater development may exist in the portion of Big Wash that is located near the Colorado River, this area is not hydraulically connected to Rice Valley. Seventeen off-site wells and three on-site wells have been identified in the basin based on review of available reports and on-line data from the National Water Information System (NWIS). Information regarding the construction of these wells is summarized in **Table 1** and their locations are shown on **Figure 2**. Five of the off-site wells are located in the portion of Big Wash that drains to the Colorado River. Of the remaining off-site wells, seven are completed in the upper alluvium and five are of unknown depth. WorleyParsons conducted a reconnaissance to assess the status and condition of wells 4, 5, 6 and 7, which are located within 2 miles of the site. All four of these wells are either destroyed, collapsed or disused.

GROUNDWATER STORAGE CHANGES

A change in groundwater levels corresponds with a change in groundwater storage. Based on the groundwater level data it appears that groundwater storage has remained relatively stable for the

period of record (1962 to present). This is consistent with the lack of significant groundwater development in the basin.

3.5.5 Groundwater Quality

Based on limited data, the groundwater quality in the basin appears to vary both laterally and vertically. The concentration of total dissolved solids (TDS) in the basin is reported to range from 662 to more than 2,600 milligrams per liter (mg/L), with an average of 1,900 mg/L (MWD, 2001 and DWR, 2004). The groundwater character in the basin is sodium chloride-sulfate or sodium chloride-bicarbonate (DWR, 2004). TDS concentrations reported for seven wells in the basin range from 662 mg/L (Well 10) to 3,540 mg/L (well 1) (**Table 3**).

To further investigate the water quality at the site, depth discrete and composite (whole well) groundwater samples were collected from Rice #1 (Well 1) and Rice #2 (Well 2). Additional whole well samples were also collected by others at the time of well installation. The TDS results of these analyses are summarized in **Table 3**, full analytical results are summarized in **Table 4**, and detailed analytical reports are included in **Appendix 1**. As a general indicator of water quality, on-site TDS concentrations ranged from 880 mg/L (Rice #2) to 3,540 mg/L (Rice #1). TDS concentrations detected in depth-discrete groundwater samples collected between 310 feet bgs and 950 feet bgs from Rice #2 ranged from 2,370 mg/L (at 310 feet bgs) to 1,330 mg/L, indicating that groundwater quality generally improves with depth (**Table 3**).

Variability in TDS concentrations with depth was also evaluated by calculating theoretical TDS concentrations using the geophysical log (electrical resistivity) from Rice #2. The methods used to calculate the TDS concentrations are described in detail in **Appendix 2**. Calculated TDS concentrations from borehole geophysical logging indicate that TDS concentrations range from greater than 15,000 mg/L within finer grained units in the upper alluvium to less than 1,000 mg/L in deeper coarse-grained units. Calculated TDS concentrations in clayey materials may not be an accurate representation of the formation fluid salinity because the clays themselves contribute to the formation conductivity, but nevertheless, a clear trend is discernible even if the finer grained units are neglected.

Based on the above information the lowest TDS concentrations within the alluvium occur in coarser grained units (sands and gravels) of the lower alluvial aquifer between 740 to 810 feet bgs (**Figure 3**). In this interval calculated TDS concentrations are between 1,193 to 1,922 mg/L, which is consistent with the TDS concentration of 1,330 mg/L reported for the discrete groundwater sample collected from 750 feet bgs. As discussed in more detail in the following section, dynamic flow profile data indicates that more than 50 percent of the groundwater flow in Well 2 during the pumping test conducted for this study originated from within this interval. Whole-well groundwater samples collected from Rice #2 during pumping tests conducted for this study showed TDS concentrations decreased over time from 1,220 mg/L to 885 mg/L after three days of pumping.

This is consistent with the whole well TDS concentration of 880 mg/L reported during a previous pumping test conducted in 2008 (**Table 3**).[3]

Water quality samples collected from Rice #1 and calculated TDS concentrations illustrated in **Figure 3** indicate that the highest TDS concentrations occur in the upper alluvium between approximately 300 and 450 feet bgs. Rice #1 is screened within this interval and during a 24-hour pumping test the groundwater quality remained generally similar for the duration of the test (TDS concentration of 2,900 mg/L at the beginning of the test and a TDS concentration of 3,000 mg/L at the end of the test (**Table 3**)).

3.5.6 Aquifer Testing Program

RICE #1 (WELL 1)

In August 2009, a constant rate pumping test was conducted by WorleyParsons at Rice #1 (Well 1). The test consisted of pumping the well at an average discharge rate of approximately 15 gallons per minute (gpm) for 24 hours followed by 24 hours of recovery. Groundwater was pumped using an electric submersible pump. All water generated during the test was discharged to an on-site above ground storage tank and was pumped from the tank to a spray field for disposal under an approved discharge permit from the Regional Water Quality Control Board, Colorado River Basin Region (RWQCB).

During the test, water levels in Rice #1 and Rice #2 were monitored using vented, digital, pressure transducers with internal data loggers. Following well recovery, the data were downloaded and reduced for analysis. Additional details regarding the aquifer testing program and data analysis are presented in **Appendix 3**. The results of the pumping test are summarized below.

Rice #1 Pumping Test Results

Phase	Delta s (feet)	T (ft2/day)	b (feet)	K (ft/day)
Drawdown	4.9	104	135	0.8
Recovery	5.8	88	135	0.7

Notes:

1. Delta s = change in head

2. T = transmissivity

[3] This suggests that high TDS groundwater was purged from the transmissive zones of the lower alluvial aquifer during the pumping test, and that the lower TDS values are more representative of water quality in these zones. We suspect that under ambient conditions, downward gradients drive convective flow of higher TDS water downward within the screened interval of Rice #2 and outward into these more permeable zones.

3. b = tested aquifer thickness

4. K = hydraulic conductivity

During the Rice #1 pumping test, no drawdown was observed in Rice #2. A storativity value could not be computed since there was no observation well. Based on the observed stratigraphy and the literature, a storativity value of approximately 0.1 to 0.01 would be applicable to this water-bearing zone for unconfined to semi-confined conditions. The well efficiency for Rice #1 appears to be fairly high at the pumping rate used since the estimated recovery transmissivity was not greater than the drawdown transmissivity.

RICE #2 (WELL 2)

Two pumping tests and dynamic flow profiling have been conducted at Rice #2 since its installation. The first test was conducted by Azca Drilling and Pump Inc. and the second test was conducted by WorleyParsons as part of the current study.

The first pumping test was conducted in August 2008 following well construction. The test consisted of pumping the well for 24 hours at a constant discharge rate of 380 gpm. The results of the this test indicated that the well has a specific capacity of 17.72 gallons per minute per foot of drawdown (gpm/ft).

In June 2009 dynamic flow profiling was conducted within Rice #2 to assess the vertical flow contribution across the well screen at a pumping rate of 100 gpm. Tracer dye was injected at various discrete depths within the well screen and the rate of dye return was used to calculate the dynamic flow contribution from selected intervals. The results indicate that at a pumping rate of approximately 100 gpm, 89% of the groundwater production in Rice #2 was derived between 625 and 785 feet bgs and 11% came from below a depth of 785 feet. Based on the signature of the dye return at 845 and 865 feet, a vertical flow boundary was apparent below a depth of 845 feet. Below 885 feet bgs there were no dye returns after waiting for 102 minutes. The vertical flow boundary approximately coincides with the top of the Bouse Formation, indicating that nearly all of the groundwater produced during the test came from the overlying lower alluvial aquifer. Within the lower alluvial aquifer, 50% of the total flow was derived between 745 and 785 feet bgs. This interval had the highest flow contribution and is dominated by gravels (**Figure 3**). Approximately 6% of the total flow came from the upper Bouse Formation.

The second pumping test was conducted in August 2009. This test consisted of pumping Rice #2 at a constant discharge rate of approximately 100 gpm for 3 days followed by 3 days of recovery. All water generated during the test was discharged to an on-site above ground storage tank and was pumped from the tank to a spray field for disposal in accordance with an approved RWQCB waste discharge permit. During the test, water levels in Rice #1 and Rice #2 were monitored using vented, digital, pressure transducers with internal data loggers. Following well recovery, the data were downloaded and reduced for analysis. Additional details regarding the aquifer testing program and data analysis are presented in **Appendix 3**. The results of the pumping test are summarized below.

Rice #2 Pumping Test Results

Phase	Delta s (feet)	T (ft2/day)	b (feet)	K (ft/day)
Drawdown	0.60	5,900	180	33
Recovery	0.82	4,300	180	24

Notes:

1. Delta s = change in head

2. T = transmissivity

3. B = assumed aquifer thickness (Note that since the majority of flow was derived from the lower alluvial aquifer, pumping test results were interpreted to be representative of the lower alluvial aquifer and the length of the well's screened interval in the Bouse Formation was neglected.)

4. K = hydraulic conductivity (of the lower alluvial aquifer)

A storativity value could not be computed since there was no observation well. Based on the observed stratigraphy and the literature, a storativity value of 0.0001 was assumed for the lower alluvial aquifer based on confined conditions. The well efficiency for Rice #2 appears to be fairly high at the pumping rate used, since the estimated recovery transmissivity was not greater than the drawdown transmissivity.

4. IMPACT EVALUATION

4.1 Objectives and Approach

Project water supply impacts would be considered significant if the project resulted in:

- Substantial depletion of groundwater resources and interference with local wells;
- Substantial interference with groundwater recharge;
- Use of water in a wasteful manner;
- Depletion of surface water resources that results in significant biological or air quality impacts (*i.e.,* through impacts to springs or wet playas); or
- Pumping-induced ground subsidence

The direct potential effects of the Project on local water resources are those associated with using groundwater for construction (specifically for demands during site grading) and with the plant's operational process water demand. Potential impacts on groundwater resources during construction and operation include drawdown-related impacts, depletion of water resources and water quality impacts.

To support the evaluation of potential environmental impacts, an analytical groundwater modeling study was undertaken using the USGS modelling code THWELLS (Van der Heijde, P.K.M, 1996). Predictive simulations were run to assess the potential impacts of pumping on water levels in the basin. Potential impacts to the basin water budget, solute transport and subsidence were evaluated based on our understanding of the basin and the modelling results. Potential impacts to surface water resources and recharge were evaluated based on our understanding of the basin and the proposed project.

The analytical modelling approach was designed and applied based on our understanding of the groundwater flow regime. To facilitate this, a conceptual model of the basin was developed as described below in **Section 4.2**. The conceptual model is applied to construction of the analytical modelling approach as described in **Section 4.3**.

4.2 Conceptual Model

The site is located in the central portion of the Rice Valley Groundwater Basin, where coarser grained alluvial fan deposits are interbedded with finer grained distal fan, lacustrine and playa deposits that form competent aquitards between the upper and lower alluvium. The primary recharge mechanism is mountain front recharge, which occurs via deep percolation in the coarse and heterogeneous proximal alluvial fan deposits that ring Rice Valley at its boundary with the

surrounding mountains. Because aquitards are expected to be absent in this area, vertical gradients are expected to drive recharge to both shallow and deeper water bearing deposits.

Natural recharge includes mountain front recharge and underflow from Ward Valley Groundwater Basin, which has not been quantified. Areal recharge from precipitation falling on the valley floor is expected to be negligible. For the purposes of this study, underflow from Ward Valley Groundwater Basin is neglected. This is a conservative assumption. The total mountain front recharge to the Rice Valley Groundwater Basin has been estimated to be 500 AFY; however, as discussed in **Section 3.5.4**, this includes a portion of Big Wash that drains to the Colorado River. When this area is neglected, the remaining mountain front recharge in the basin is estimated to be approximately 394 AFY (**Table 5**). Discharge is assumed to be via underflow to Vidal Valley Groundwater Basin, and is equal to recharge. Any increases in pumping in Rice Valley are assumed to result in an proportional decrease in discharge to Vidal Valley.

Long-term and short-term groundwater level trends in the basin are stable, indicating that the basin is not in overdraft and groundwater storage has remained stable for the period of record (1962 to present). There is virtually no existing groundwater supply development in the basin.

The regional lateral gradient is assumed to be oriented from the Rice Valley Groundwater Basin toward the Vidal Valley Groundwater Basin. The regional gradient magnitude, though unknown, is anticipated to be small based on the relatively low natural recharge rate (394 AFY) in relation to the area of the Rice Valley.

The primary water-bearing units of interest to this study are the upper alluvium and lower alluvial aquifer. The upper alluvium extends to a depth of approximately 630 feet bgs and consists mostly of fine grained sediment (silt can clay) with some sand strata in the lower portions. Groundwater in the upper alluvium is assumed to occur under unconfined to semi-confined conditions. The average hydraulic conductivity for sediment in the upper alluvium penetrated by Rice #1 is estimated to be approximately 1 foot/day based on a site-specific pumping test. The hydraulic conductivity in the portions of the upper alluvium that are deeper than the screened interval of this well may be higher due to the presence of sand strata. Nevertheless, the upper alluvium is inadequate to provide the water construction and operating water demand of the project.

The lower alluvial aquifer underlies the upper alluvium from a depth of approximately 630 to 810 feet bgs and is separated from the upper alluvium by a thick sequence of clay beds. The lower alluvial aquifer consists mainly of sand and gravel with lesser amounts of fine grained sediments (silt and/or clay). The average hydraulic conductivity of the lower alluvial aquifer is estimated to be approximately 30 feet/day based on a pump test performed at Rice #2. The lower alluvial aquifer is adequate to provide the construction and operating water supplies for the project. The competence of the clay aquitard separating the upper alluvium from the lower alluvial aquifer is supported by the pronounced downward gradient between the upper alluvium and the lower alluvial aquifer, and the fact that despite this downward gradient, TDS concentrations in the lower alluvial aquifer have remained significantly lower than in the overlying upper alluvium. These clay beds are expected to be relatively continuous throughout the central portions of the basin based on our understanding of

the distal fan, lacustrine and playa deposits that were laid down in this area over time. It is expected that the drawdown cone in the lower alluvial aquifer would expand laterally to intercept the mountain front recharge areas of the basin where deep percolation would be intercepted.

The lower alluvial aquifer is underlain at a depth of approximately 810 feet bgs by clay interpreted to belong to the Pliocene Bouse Formation. The upper clay stratum of the Bouse formation also is expected to be relatively continuous. Although the Bouse formation appears to contain sand strata that may exhibit significant transmissivity, significant flow was not derived from the Bouse Formation during the hydrodynamic profiling of Rice #2. Conflicting water quality data were obtained for the Bouse Formation. The evaluation of these water quality data is beyond the scope of this study, but it is possible that a downward vertical gradient between the Bouse Formation and overlying higher TDS strata in the overlying alluvium has caused the convective transport of higher TDS water through the well and into the Bouse Formation.

Based on limited data, the groundwater quality in the basin appears to vary both laterally and vertically. Site specific investigation indicates that groundwater TDS concentrations are lower in the lower alluvial aquifer than in the upper alluvium. Fresher groundwater in the lower alluvial aquifer is separated from the upper alluvium by a thick sequence of clay aquitards, and likely originates from fresher water that is recharged to the basin at the mountain fronts and flows laterally through the lower alluvial aquifer.

4.3 Analytical Drawdown Model

4.3.1 Description

The analytical drawdown model and its parameter values represent conditions in the lower alluvial aquifer of the Rice Valley Groundwater Basin, which is proposed to be used as a water supply for the project. The model uses the Theis equation to simulate drawdown and recovery from effects including mountain front recharge, project pumping (at Rice #2), underflow out to the Vidal Valley Groundwater Basin and residual drawdown from construction pumping during the operational pumping period for the project.

The model code utilized is THWells version 4.01 (P.K.M. van der Heijde, 1996). THWells is designed to simulate groundwater flow in a confined, leaky confined, of unconfined aquifer with regional uniform flow. It can simulate multiple wells that can be any combination of injection (recharge) wells and pumping wells.

Drawdown was predicted for nodes of a regular orthogonal grid that covers the area of the Rice Valley Groundwater Basin. The grid consists of 82 columns and 92rows having a constant spacing of 1,000 feet. The coordinate system is California State Plane Zone VI, NAD 83. The grid is oriented with its columns and rows aligned with the coordinate system. The lower-left corner of the grid has coordinates of 6964000 (easting) and 2268000 (northing).

The predicted drawdown from the input array of five simulated recharge wells one simulated discharge well (for a total of six wells to represent basin boundary conditions) and one project pumping well was combined (by addition/ superposition) to estimate the net drawdown across the Rice Valley Groundwater Basin from project pumping. The analytical drawdown model was designed to give reasonable predictions of the net drawdown effects from pumping Rice #2 by adding drawdown from the six boundary wells (injection/recharge is represented as negative drawdown) and Rice #2. The only known existing wells in the Rice Valley are (low-flow) domestic or stock wells, most of which are believed to be abandoned. Thus the initial conditions for the drawdown simulations are assumed equivalent to natural conditions. The existing off-site wells were not considered as pumping wells.

The mountain front recharge total of 394 AFY (**Table 5**) was distributed among the mountain front boundary wells shown on **Figure 4**. The mountain front boundary wells are numbered 1 through 5 on **Figure 4** and are located near the middle of the mountain front reaches or basin boundary reach representing each boundary well. Recharge flows were assigned to the five mountain front recharge wells by proportionately allocating the total recharge flow based on the length of each mountain front reach that borders Rice Valley as shown in **Table 5** and described in **Section 4.2**.

Underflow from Rice Valley Groundwater Basin to the Vidal Valley Groundwater Basin is represented by discharge boundary well number 6, shown on **Figure 4**. Natural discharge to the Vidal Valley Groundwater Basin was assumed to be equal to the total mountain front recharge within the Rice Valley Groundwater Basin (**Section 4.2** and **4.3.2**).

Project pumping rates and durations for simulating drawdown from construction and operational phases of the project are based on the project description presented in **Section 2**. Model results (drawdown predictions) were presented after 27 months of construction pumping, and after 5 and 30 years of operational pumping.

4.3.2 Model Assumptions

This section presents hydrogeologic assumptions that are particular to the analytical drawdown model. Additional assumptions that pertain to the conceptual model for groundwater occurrence and flow in the site area are presented in **Section 4.2**.

- The model consists of a single layer representing the lower alluvial aquifer, and mountain-front recharge is applied at the edges of the layer. This is equivalent to assuming that pumping but the project will intercept sufficient mountain front recharge to meet the project water demand, and that recharge is applied to the lower alluvial aquifer. This is considered a reasonable assumption because the existence of coarse grained alluvium near the mountain fronts is anticipated to make most of the mountain front recharge accessible to pumping in the lower alluvial aquifer, and, in reality, the project will also intercept underflow from Ward Valley in addition to mountain front recharge, so that the amount of available recharge to the lower alluvial aquifer is unlikely to be exceeded by project pumping.

- No-flow boundaries at the mountains that surround Rice Valley are recognized as part of the conceptual model (**Section 4.2**); however, the existence of no flow boundaries is neglected in the analytical drawdown model. The presence of a no flow boundary would have the same effect on water level impacts related to the simulated recharge wells at the mountain fronts and on the pumping well. Since these effects cancel each other out, the existence of no-flow boundaries can be neglected for modelling purposes. In addition, the drawdown impact from project pumping is projected to be negligible at the mountain front boundaries (**Figures 5 - 7**).
- Mountain-front recharge rates are not changed or affected by project pumping.
- The regional gradient is expected to be small and is not considered for purposes of the model predictions and modelling is performed on an impact-only (drawdown prediction) basis.
- The existing (low-flow domestic) wells (**Table 2**) were not considered as pumping wells in the model simulations or baseline conditions.
- During periods when project pumping occurs, a proportional portion of the discharge to Vidal Valley Groundwater Basin is intercepted by the project pumping wells. Thus, project pumping is treated as intercepted discharge and the modelled project pumping rate is subtracted from the simulated discharge rate to Vidal Valley Groundwater Basin.
- The maximum projected pumping rate for the project (up to 347 afy) is less than the natural discharge to Vidal Valley Groundwater Basin (394 afy). Thus the model assumes continuous discharge from the Rice Valley to the Vidal Valley.
- Seasonal and annual variations in natural recharge and discharge, and project pumping rates, are assumed to be well-represented by constant (*i.e.*, average) long-term values for purposes of estimating the impacts of project pumping. It may be assumed that water levels near the site will respond over long periods as if the average pumping rates were in effect and that stable, though lower, groundwater levels will be reached after some period of time.

4.3.3 Model Inputs

The Analytical Drawdown Model's input parameters are summarized in the table below. The model and its parameter values represent conditions in the lower alluvial aquifer, where Rice #2 is screened and for which pumping test, lithologic and geophysical log data are available.

Model Input Parameter	Input Data Value	Data Source or Report Section
Transmissivity	5,100 ft^2/day (38,100 gpd/ft)	Average calculated T in Section 3.5.6
Storativity	0.0001	Literature
Locations of Boundary Conditions	Mountain front recharge (five boundary wells) and discharge to Vidal Valley Groundwater Basin (one boundary well)	Simulated Boundary Wells (Figure 3)
Pumping Rates for Simulated Boundary Wells	Mountain Front Recharge (394 afy) and Vidal Narrows Discharge (-394 afy, reduced by project pumping rates)	Sections 4.2 and 4.3.2; Table 5
Project Pumping Rates and Durations	780 af in 27 months (347 AFY), 150 AFY for 30 years, respectively	Section 2

4.3.4 Limitations

Model limitations result from the use of the Theis equation to simulate long-term drawdown and recovery from effects including mountain front recharge, project pumping, underflow from the basin to the Vidal Valley Groundwater Basin, and residual drawdown from construction pumping during the operational pumping period.

The Theis non-equilibrium well equation incorporates the following standard assumptions:

1. The aquifer being pumped is homogeneous and isotropic.
2. The aquifer is uniform in thickness and infinite in areal extent.
3. The aquifer receives no recharge, thus all flow produced from the pumping well comes from aquifer storage.
4. The pumping well is screened in, and receives water from, the full thickness of the aquifer.
5. Water is released from aquifer storage instantaneously when the water level is lowered.
6. The pumping well is 100 percent efficient.
7. Laminar flow exists throughout the well and aquifer.
8. The water table or potentiometric surface has no slope.

The Theis equation was developed using the eight assumptions listed above. The Theis equation is accurate to the extent that each of these assumptions is met. In the case of the analytical drawdown model for the project, assumptions 1, 4, 5, 6 and 7 are fully met, to the extent that can be determined from available data. Assumption 2 is partially met *(i.e.*, the lower alluvial aquifer is considered to be uniform in thickness). Assumption 8 is not met since a hydraulic gradient exists across the basin (**Section 4.2**); however, the slope of this gradient is very small, so assuming a potentiometric surface without a slope for impact modelling is a reasonable simplification.

Assumption 3 (absence of recharge and producing water only from storage) and the unmet component of assumption 2 (an infinite aquifer) are related, and are not met for the Rice Valley Groundwater Basin. As used, the analytical drawdown model compensates for the presence of recharge and the finite areal extent of the Rice Valley by simulating recharge and discharge boundary wells through the use of boundary wells (**Figure 3**). The drawdown impact from project pumping is projected to be negligible at the mountain front boundaries, due to the distance from the pumping center (averaging approximately 8 miles and ranging from 2.4 to 13 miles). In addition, the mountain front recharge rate is relatively large in comparison to the projected long term operational pumping rate.

5. CONCLUSIONS

5.1 Drawdown

Contour maps of estimated drawdown were produced for the end of the 27-month construction period (Figure 4) as well as after 5 years and 30 years of operational pumping (**Figures 5** and **6**). These contour maps show the estimated drawdown at each of the known on-site and off-site wells in the Rice Valley (refer to **Table 2** and **Section 3.5.2**). Projected off-site drawdown at the end of project construction is estimated to range from approximately 2 to 3 feet near the site boundary, and to decrease to less than 1 foot at a distance of 1 to 3 miles from the site. Projected drawdown after 5 and 30 years of pumping is approximately the same, and is estimated to be approximately 1 foot near the site boundary and decreasing further away from the site. The similarity of drawdown after 5 and 30 years indicates that drawdown will stabilize relatively quickly after pumping begins.

5.2 Well Interference

Of the 12 reported off-site wells in the area of Rice Valley, seven are known to be screened only in the upper alluvium. This includes wells 4, 5, 6, 7, 8, 13 and 14. The drawdown impact on these shallow wells from project pumping is expected to be negligible based on the aquifer test results, water quality and vertical head difference data which showed no drawdown in Rice #1 during pumping of Rice #2, suggesting hydraulic isolation of the upper alluvium from the lower alluvial aquifer. Based on a surface reconnaissance, wells 4, 5, 6 and 7 are either abandoned, collapsed or disused.

The remaining five reported off-site wells are of unknown depth and could potentially be screened in the lower alluvial aquifer (**Table 2**). This includes well numbers 9 through 12 and well number 15. These wells are located from 5 to 12 miles from the pumping center at the site. Based on Figures 4 through 6, the potential drawdown impact on these wells, assuming they were screened in the lower alluvium, would be approximately 1 foot or less during construction and less than 0.5 foot during operation.

The amount of drawdown projected in the off-site area during construction and operational pumping would not result in wells becoming unusable or significantly diminishing in capacity, and would not cause significant increases in well electrical usage or maintenance requirements.

5.3 Water Budget

Changes to the water budget of the Rice Valley Groundwater Basin would consist of reallocation of natural discharge from the Vidal Valley Groundwater Basin to the project pumping well(s). The underflow out of the Rice Valley Groundwater Basin is projected to decrease by an amount equal to the pumping for the project. Under natural conditions, this underflow is estimated to be about 394

AFY, and would decrease to about 47 AFY during construction and 244 AFY during operation. No significant changes to mountain front recharge are anticipated as a result of the project. The project could result in increased underflow from the Ward Valley Groundwater Basin into the Rice Valley Groundwater Basin; however, this component of the water budget was neglected during our evaluation. Increased underflow from Ward Valley, to the extent is occurs, would amount to a fraction of the project groundwater pumping.

5.4 Water Quality

Water quality impacts due to pumping from the lower alluvial aquifer are anticipated to be less than significant for the following reasons.

- The aquitard between the upper alluvium and lower alluvial aquifer is an effective barrier to downward vertical migration of high TDS water. Under natural conditions (before Rice #2 became active) TDS concentrations were high in the upper alluvium and low in the lower alluvial aquifer. The vertical gradient from the upper alluvium to the lower alluvial aquifer was downward with a vertical head difference of 90 feet, and yet, a low TDS condition was maintained in the aquifer. Thus, the TDS contrast and water level difference under natural conditions indicates that the aquitard is an effective barrier.
- Drawdown predictions for project pumping indicate that about 4 feet of drawdown will be induced near the pumping center after 30 year of pumping, and drawdown in the off-site area will be less than 1 foot. Thus, the induced drawdown adds only slightly to the existing vertical head difference under natural conditions, decreasing the potential for high TDS water to move downward into the lower alluvium in response to pumping.
- The cone of depression that results from pumping for the project will develop in the lower alluvial aquifer. The lower alluvial aquifer is expected to receive recharge at the mountain fronts that encircle Rice Valley, and water quality is therefore expected to be relatively good laterally throughout the aquifer. The cone of depression also will be relatively shallow, resulting in only negligible changes to the existing lateral groundwater gradients and flow field. As such, lateral migration of high TDS groundwater is not anticipated.

5.5 Recharge

Pumping for the project will intercept natural discharge from the Rice Valley Groundwater Basin, but is not expected to result in changes in recharge at the surrounding mountain fronts. Areal recharge from precipitation on the valley floor is expected to be negligible and runoff form the developed area of the project will be routed to detention basins where it can evaporate or infiltrate. As such, the project is not expected to result in significant changes to recharge.

5.6 Subsidence

Ground subsidence can occur as a result of water level decline in aquifer systems. When the fluid pressure in an aquifer is reduced as a result of changes in the groundwater level, a shift in the balance of support for the overlying materials causes the “skeleton” of the aquifer system to deform slightly. Reversible deformation occurs in all aquifer systems as a result of the cyclical rise and fall of groundwater levels associated with short and longer term climatic cycles. Permanent ground subsidence can occur when pore water pressures in the aquifer fall below their lowest historical point, and the particles in the aquifer skeleton are permanently rearranged and compressed. Soils particularly susceptible to such consolidation and subsidence include compressible clays in overdrafted confined aquifer systems that have experienced significant drawdown on the order of tens or hundreds of feet. Based on the small amount of drawdown predicted to result form groundwater pumping for the project, significant subsidence is not anticipated.

6. REFERENCES

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TABLES

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Table 1
Inventory of Wells in the Rice Valley Groundwater Basin

Well ID	State Well Number	Alternative Well Name	Source	Owner/User	Completion Date	Approximate Ground Surface Elevation	Total Depth (feet bgs)	Total Depth (feet amsl)	Screened Interval (feet bgs)	Filter Pack Interval (feet bgs)	Use	Specific Yield (gpm/ft)	Aquifer	Distance from Well 2 (miles)	Comments
On-Site															
1	--	Rice #1	DWR Well Completion Report	--	5/27/2009	872	455	417	225 to 425	20 to 455 [15]	Ab	--	Upper Alluvium	0.02	
2	--	Rice #2	NAI Capital (2008)	--	8/19/2008	872	985	-113	625 to 705 745 to 965	415 to 985 [15]	Un	17.72	Lower Alluvium/Bouse Formation	0	
3	1S/21E-19G1	--	NWIS/DWR, 1963	--	--	873	--	--	--	--	Ds	--	--	0.65	USGS notes well is obstructed above the water surface. Well was found by URS located west of the access road, and with vandalism damage to the top of concrete collar. The obstruction was observed at approx. 271 feet bgs. This was reported in the Phase
Off-Site															
4	1S/21E-32B1	--	NWIS/DWR, 1963	J.H. Roberts	--	740	175	565	--	--	Un	--	Upper Alluvium [19]	2	Well may be destroyed based on reconnaissance.
5	1S/21E-32B2	--	DWR, 1963	J.H. Roberts	--	740	153.6	586.4	--	--	Un	--	Upper Alluvium [19]	2	
6	1S/20E-14L1	--	NWIS/DWR, 1963	AT&SF	1910	929.9	575	354.9	--	--	Un	--	Upper Alluvium [19]	3.09	
7	1S/20E-14Z1	MWD-12	NWIS/DWR, 1963	MWD	1933	945	638	307	--	--	Ds	--	Upper Alluvium [19]	2.79	
8	2S/20E-8B1	WSP-497/Priests Well	NWIS/DWR, 1963	Priest/Assests Realizing & Mining Co.	--	982.4	587	395.4	--	--	Dm	--	Upper Alluvium [19]	7.02	
9	2S/20E-11Z1	WSP-578/Grays Well	NWIS/DWR, 1963	Grays Well	--	724	--	--	--	--	-	--	--	5.15	
10	2S-20E-16P1	WSP-578/Browns Well	NWIS/DWR, 1963	Browns Well	--	879	304	575	--	--	Ds	--	Upper Alluvium [19]	7.87	
11	2S/20E-28H1	--	NWIS	Fred McCoy	1956	903.6	--	--	--	--	-	--	--	9.08	
12	2S/20E-36F2	--	NWIS	--	--	817	--	--	--	--	-	--	--	9.41	
13	2S/21E-28N1	--	DWR, 1963	--	--	750	500	250	--	--	Un	--	Upper Alluvium/Lower Alluvium [19]	8.61	
14	3S/20E-13J1	WSP-197/Gypsum Well	DWR, 1963	Gypsum Well	1914	910	585	325	--	--	Ds	--	Upper Alluvium [19]	13.09	
15	3S/21E-18D1	--	DWR, 1963	--	--	885	--	--	--	--	Un	--	--	12.46	
16	2S/20E-36F1	--	NWIS	--	--	830	--	--	--	--	--	--	--	8.08	
17	2S/23E-36H2	--	NWIS	--	--	315	72	243	--	--	--	--	Upper Alluvium [19]	18.4	
18	2S/24E-30L1	--	NWIS	--	--	320	--	--	--	--	--	--	--	19.03	
19	2S/24E-31C1	--	NWIS	--	--	320	72	248	--	--	--	--	Upper Alluvium [19]	18.98	
20	2S/24E-31C2	--	NWIS	--	--	320	72	248	--	--	--	--	Upper Alluvium [19]	18.97	
21	2S/24E-31D1	--	NWIS	--	--	320	72	248	--	--	--	--	Upper Alluvium [19]	18.73	

Notes:
1. Un = unused
2. Ds = destroyed or dry
3. gpm/ft = gallons per minute per foot of drawdown
4. bgs = below ground surface
5. Most recent available water quality data
6. -- = not available/not applicable
7. GS = ground surface
8. Dm = domestic
9. Most recent available depth to water measurement
10. Ab- Abandoned
11. MWD = Metropolitan Water District of Southern California
12. WSP = U.S. Geological Survey Water-Supply Paper 497 (1923)
13. AT&SF = Atchison, Topeka, & Santa Fe Railway
14. NAI Capital, 2008. Pumping test for Kennedy Well At Rice #2.
15. Filter pack type - sand 4x16
16. DWR, 1963. Data on Water wells and Springs in the Rice and Vidal Valley Area, Riverside County, California. Bulletin No. 91-8. 35p
17. NWIS = USGS National Water Information Website. http://nwis.waterdata.usgs.gov/usa/nwis/gwlevels
18. DWR = California Department of Water Resources
19. Aquifer inferred based on the total depth of the well and the elevation of the hydrostratigraphic units observed at the Site.

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Table 2
Groundwater Levels for the Rice Valley Groundwater Basin

Well ID	State Well Number	Source	Date	Ground Surface Elevation (feet amsl)	Depth to Water (feet bgs)	Groundwater Elevation (feet amsl)
On-Site						
1	1S/21E-15	DWR Well Completion Report	5/27/2008	872	285.00	587.00
			2/13/2009	872	288.62	583.38
			6/27/2009	872	288.60	583.40
			7/6/2009	872	288.55	583.45
2	1S/21E-15	DWR Well Completion Report	12/11/2008	874	380.80	493.2
			2/12/2009	874	380.79	493.21
			2/13/2009	874	380.77	493.23
			6/27/2009	874	380.46	493.54
			7/6/2009	874	380.63	493.37
			8/20/2009	874	364.00	510
Off-Site						
3	1S/21E-19G1	NWIS/DWR, 1963	3/27/1962	873	Dry	Dry
4	1S/21E-32B1	NWIS/DWR, 1963	3/27/1962	740	150.65	589.35
			8/24/1962	740	150.71	589.29
			9/27/1962	740	150.67	589.33
			10/31/1962	740	150.60	589.4
			11/8/1962	740	150.60	589.4
			3/13/1963	740	150.69	589.31
			10/30/1963	740	152.65	587.35
			3/18/1964	740	152.74	587.26
			11/24/1964	740	151.91	588.09
			3/17/1965	740	152.05	587.95
			11/17/1965	740	152.11	587.89
			3/2/1966	740	150.88	589.12
			10/27/1966	740	150.76	589.24
			3/16/1967	740	150.76	589.24
			10/25/1967	740	150.66	589.34
			10/23/1969	740	150.70	589.3
			7/19/1979	740	150.54	589.46
			7/24/1980	740	150.66	589.34
			1/22/1981	740	150.58	589.42
			8/27/1981	740	150.43	589.57
			3/4/1982	740	150.53	589.47
			11/19/1982	740	150.54	589.46
			10/20/1983	740	150.58	589.42
5	1S/21E-32B2	DWR,1963	8/24/1962	740	152.06	587.94
6	1S/20E-14L1	NWIS/DWR, 1963	3/18/1992	929.9	345.90	584
7	1S/20E-14Z1	NWIS/DWR, 1963	5/25/1933	945	370.00	575

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Table 2
Groundwater Levels for the Rice Valley Groundwater Basin

Well ID	State Well Number	Source	Date	Ground Surface Elevation (feet amsl)	Depth to Water (feet bgs)	Groundwater Elevation (feet amsl)
8	2S/20E-8B1	NWIS/DWR, 1963	10/30/1917	982.4	507.00	475.4
9	2S/20E-11Z1	NWIS/DWR, 1963	1915	724	137.00	587
10	2S-20E-16P1	NWIS/DWR, 1963	1917-10	879	297.00	582
11	2S/20E-28H1	NWIS	3/20/1992	903.6	308.92	594.68
			3/9/2001	903.6	316.36	587.24
12	2S/20E-36F2	NWIS	3/16/1992	817	203.01	613.99
13	2S/21E-28N1	DWR, 1963	7/21/1962	750	181.50	568.5
14	3S/20E-13J1	DWR, 1963	3/29/1962	910	125.00	785
15	3S/21E-18D1	NWIS/DWR, 1963	3/29/1962	885	284.99	600.01
			4/24/1979	885	285.63	599.37
			7/27/1979	885	285.53	599.47
			7/24/1980	885	285.63	599.37
			1/22/1981	885	285.75	599.25
			8/28/1981	885	285.53	599.47
			3/4/1982	885	285.52	599.48
			12/9/1982	885	285.46	599.54
			10/20/1983	885	285.65	599.35
			4/18/1984	885	285.55	599.45
17	2S/23E-36H2	NWIS	5/4/1995	315	10.76	304.24
18	2S/24E-30L1	NWIS	1/13/1995	320	17.7	302.3
19	2S/24E-31C1	NWIS	5/4/1995	320	12.23	307.77
20	2S/24E-31C2	NWIS	5/4/1995	320	12.23	307.77
21	2S/24E-31D1	NWIS	5/4/1995	320	11.34	308.66

Notes:
1. bgs = below ground surface
2. NWIS = USGS National Water Information Website. http://nwis.waterdata.usgs.gov/usa/nwis/gwlevels
3. amsl = above mean sea level
4. DWR, 1963. Data on Water wells and Springs in the Rice and Vidal Valley Area, Riverside County, California. Bulletin No. 91-8. 35p
5. DWR = California Department of Water Resources

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Table 3
TDS Concentrations for the Rice Valley Groundwater Basin

Well ID	Source	Date	Sample Depth feet bgs	TDS mg/L
1	- -	7/2/2008	Whole Well	3,540
	WorleyParsons	2/13/2009	310	2,370
		8/20/09 [4]	Whole Well	2,900
		8/21/09 [4]	Whole Well	3,000
2	NAI Capital, 2008	8/21/2008	Whole Well	880
	WorleyParsons	12/11/2009	650	1,960
		2/13/2009	750	1,330
		2/13/2009	850	1,800
		2/12/2009	950	1,700
		6/27/2009 [1]	Whole Well	1,220
		6/28/2009 [1]	Whole Well	900
		6/29/2009 [2]	Bouse Formation	2,060
		6/30/2009 [1]	Whole Well	885
		8/21/09 [3]	Whole Well	890
6	DWR, 1963	7/2/1910	575	2,170
7	DWR, 1963	4/26/1933	675	2,340
8	DWR, 1963	10/30/1917	587	2,610
10	DWR, 1963	10/30/1917	233	662
13	DWR, 1963	2/3/1956	500	1,820

Notes:
1. Sample collected during a 3-day constant rate pumping test performed in June 2009. The sample was collected from the pump discharge.
2. Sample collected during a 3-day constant rate pumping test performed in June 2009. The sample was collected using a discrete sampler.
3. Sample collected at the end of a 3-day constant rate pumping test performed in August 2009. The sample was collected from the pump discharge.
4. Sample collected during a 24-hr constant rate pumping test performed in August 2009. The sample was collected from the pump discharge.
5. bgs = below ground surface
6. mg/L = milligrams per liter
7. - - = not available
8. NAI Capital, 2008. Pumping test for Kennedy Well At Rice #2.
9. Whole Well = composite sample collected from entire well screened interval.

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Table 4
Analytical Results for On-Site Groundwater Samples

Analyte	Analytical Method	Units	Well 1				Well 2									
		Sample Date	7/2/2008	2/13/2009	8/20/2009 [4]	8/21/2009 [4]	8/21/2008	12/11/2009	2/13/2009	2/13/2009	2/12/2009	6/27/2009 [1]	6/28/2009 [1]	6/29/2009 [2]	6/30/2009 [1]	8/21/2009 [3]
		Sample Depth (feet bgs)	Whole Well	310	Whole Well	Whole Well	Whole Well	650	750	850	950	Whole Well	Whole Well	Bouse Formation	Whole Well	Whole Well
General Minerals																
Alkalinity, Total (As CaCO3)	EPA 310.1	mg/L	--	**101**	**78**	**68**	--	**70**	**72.4**	**75.6**	**52**	**71.6**	**61.2**	**69.2**	**69.2**	**64**
Bicarbonate Alkalinity	EPA 310.1	mg/L	--	**101**	**78**	**68**	--	**54**	**72.4**	**75.6**	**52**	**71.6**	**61.2**	**69.2**	**58**	**60**
Carbonate Alkalinity	EPA 310.1	mg/L	--	<0.4	<10	<10	--	**16**	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	**11.2**	<10
Hydroxide Alkalinity	EPA 310.1	mg/L	--	<0.4	<10	<10	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<10
Chloride	SM 4500-Cl-B	mg/L	--	**938**	--	--	--	**684**	**508**	**618**	**610**	**472**	**340**	**778**	**342**	--
	EPA 300	mg/L	--	--	**1,100**	**1,100**	--	--	--	--	--	--	--	--	--	**350**
Fluoride	EPA 340.1	mg/L	--	**2.7**	**2.7**	**2.7**	--	--	**3.05**	**7**	**1.15**	**--**	**--**	**2.47**	**4.55**	**4.1**
Nitrate (as N)	EPA 300	mg/L	--	--	**5.6**	**5.6**	--	**2.4**	--	--	--	--	--	--	--	**2.3**
	EPA 353.3	mg/L	--	**3.3**	--	--	--	--	**2.7**	**2.3**	**1.7**	--	--	**1.5**	**2.7**	--
	Calculation	mg/L	**4.67**	--	--	--	**1.9**	--	--	--	--	--	--	--	--	--
Nitrate + Nitrite	EPA 353.3	mg/L	--	**3.31**	--	--		**2.5**	**2.74**	**2.5**	**1.71**	--	--	--	--	--
	SM 4500 N03 F	mg/L	**4.67**	--	--	--	**1.9**	--	--	--	--	--	--	--	--	--
Nitrite (as N)	SM 4500 N02 B	mg/L	<0.10	<0.02	--	--	<0.10	**0.068**	**0.028**	**0.155**	<0.02	--	--	<0.02	<0.02	--
	EPA 300	mg/L	--	--	<0.25	<0.25	--	--	--	--	--	--	--	--	--	<0.25
pH	EPA 150.1	pH Units	--	**7.44**	**7.8**	**7.9**	**8.3**	**8.32**	**7.99**	**7.61**	**7.62**	**7.62**	**8.19**	**8**	**8.25**	**8.5**
Specific Conductance (EC)	EPA 120.1	umhos/cm	--	**3,506**	--	--	--	**2,950**	**2,010**	**2,690**	**2,500**	**1,850**	**1,350**	**3,060**	**1,290**	
	EPA 120.1	uS/cm	--	--	**4,700**	**4,800**	--	--	--	--	--	--	--	--	--	**1,600**
Sulfate (as SO4)	EPA 375.4	mg/L	--	**370**	--	--	--	**470**	**240**	**420**	**340**	**210**	**160**	**440**	**140**	--
	EPA 300	mg/L	--	--	**920**	**920**	--	--	--	--	--	--	--	--	--	**200**
Total Dissolved Solids	EPA 160.1	mg/L	--	**2,370**	--	--	--	**1,960**	**1,330**	**1,800**	**1,700**	**1,220**	**900**	**2,060**	**885**	--
	SM 2540C	mg/L	**3,540**	--	**2,900**	**3,000**	**880**	--	--	--	--	--	--	--	--	**890**
Total Suspended Solids	EPA 160.2	mg/L	**--**	**3**	--	--	**--**	**7**	**2**	**3**	**2**	**--**	**--**	**--**	**--**	
Total Hardness	SM 2340 B	mg/L	--	**320**	**480**	**470**	--	**249**	**142**	**209**	**202**	**126**	**47**	**280**	**44**	**52**
Metals (dissolved)																
Antimony	EPA 200.7	mg/L	--	<0.031	--	--	--	<0.023	<0.031	<0.031	<0.031	<0.023	<0.023	<0.023	<0.023	--
	SW 6020	mg/L	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--	--	<0.005
Aluminum	EPA 200.7	mg/L	--	--	--	--	--	<0.063	--	--	--	--	--	--	--	--
Arsenic	EPA 200.7	mg/L	--	<0.015	--	--	--	<0.025	<0.015	<0.015	<0.015	<0.025	<0.025	<0.025	<0.025	--
	EPA 200.8	ug/L	--	--	--	--	--	<4.0	--	--	--	--	--	--	--	--
	SW 6020	mg/L	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--	--	**0.009**
Boron	EPA 200.7	mg/L	--	--	--	--	--	**1.9**	--	--	--	--	--	--	--	--
Barium	EPA 200.7	mg/L	--	**0.029**	--	--	--	**0.032**	**0.035**	**0.062**	**0.043**	**0.034**	**0.031**	**0.077**	**0.03**	--
	SW 6020	mg/L	--	--	**0.021**	**0.019**	--	--	--	--	--	--	--	--	--	**0.031**
Beryllium	EPA 200.7	mg/L	--	<0.001	--	--	--	<0.009	<0.001	<0.001	<0.001	<0.009	<0.009	<0.009	<0.009	--
	SW 6020	mg/L	--	--	<0.004	<0.004	--	--	--	--	--	--	--	--	--	<0.004
Cadmium	EPA 200.7	mg/L	--	<0.004	--	--	--	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	--
	SW 6020	mg/L	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--	--	<0.005
Calcium	EPA 200.7	mg/L	--	**84**	--	--	--	**70**	**42**	**59**	**56**	--	**17**	**79**	**16**	--
	SM 2340 B	mg/L	--	--	**130**	**120**	--	--	--	--	--	--	--	--	--	**19**
Chromium	EPA 200.7	mg/L	--	<0.006	--	--	--	<0.006	<0.006	<0.006	<0.006	<0.006	**0.011**	<0.006	**0.011**	--
	SW 6020	mg/L	--	--	**0.017**	**0.024**	--	--	--	--	--	--	--	--	--	**0.011**
Cobalt	EPA 200.7	mg/L	--	<0.007	--	--	--	<0.006	<0.007	<0.007	<0.007	<0.006	<0.006	<0.006	<0.006	--
	SW 6020	mg/L	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--	--	<0.005

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Table 4
Analytical Results for On-Site Groundwater Samples

Analyte	Analytical Method	Units	Well 1				Well 2									
		Sample Date	7/2/2008	2/13/2009	8/20/2009 [4]	8/21/2009 [4]	8/21/2008	12/11/2009	2/13/2009	2/13/2009	2/12/2009	6/27/2009 [1]	6/28/2009 [1]	6/29/2009 [2]	6/30/2009 [1]	8/21/2009 [3]
		Sample Depth (feet bgs)	Whole Well	310	Whole Well	Whole Well	Whole Well	650	750	850	950	Whole Well	Whole Well	Bouse Formation	Whole Well	Whole Well
Copper	EPA 200.7	mg/L	--	<0.011	--	--	--	<0.012	<0.011	<0.011	<0.011	**0.029**	**0.019**	**0.015**	<0.011	--
	SW 6020	mg/L	--	--	<0.010	<0.010	--	--	--	--	--	--	--	--	--	<0.01
Iron	EPA 200.7	mg/L	--	**23**	--	--	--	<0.064	**6.1**	**9.9**	**28**	**1.5**	**0.13**	**1.4**	**0.13**	--
	SW 6020	mg/L	--	--	**0.41**	**0.32**	--	--	--	--	--	--	--	--	--	<0.30
Lead	EPA 200.7	mg/L	--	<0.015	--	--	--	<0.019	<0.015	<0.015	<0.015	<0.019	<0.019	<0.019	<0.019	--
	SW 6020	mg/L	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--	--	<0.005
Magnesium	EPA 200.7	mg/L	--	**27**	--	--	--	**18**	**9.1**	**15**	**15**	**8.1**	**1.2**	**20**	**0.97**	--
	SM 2340 B	mg/L	--	--	**36**	**39**	--	--	--	--	--	--	--	--	--	**0.92**
Manganese	EPA 200.7	mg/L	--	**0.11**	--	--	--	**0.025**	**0.064**	**0.14**	**0.16**	**0.025**	<0.006	**0.18**	<0.006	--
Mercury	EPA 245.1	mg/L	--	**0.0003**	--	--	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--
	SW 6020	mg/L	--	--	<0.001	<0.001	--	--	--	--	--	--	--	--	--	<0.0010
Molybdenum	EPA 200.7	mg/L	--	**0.034**	--	--	--	**0.028**	**0.025**	**0.024**	**0.02**	**0.029**	**0.031**	<0.028	**0.029**	--
	SW 6020	mg/L	--	--	**0.04**	**0.038**	--	--	--	--	--	--	--	--	--	**0.025**
Nickel	EPA 200.7	mg/L	--	<0.009	--	--	--	<0.01	<0.009	<0.009	<0.009	<0.01	<0.01	<0.01	<0.01	--
	SW 6020	mg/L	--	--	<0.010	<0.010	--	--	--	--	--	--	--	--	--	<0.01
Potassium	EPA 200.7	mg/L	--	**11**	--	--	--	**7.4**	**5.9**	**7.4**	**8.5**	**4.1**	**2.7**	**7.4**	**2.6**	--
	SW 6020	mg/L	--	--	**9.2**	**10**	--	--	--	--	--	--	--	--	--	**2.9**
Selenium	EPA 200.7	mg/L	--	<0.018	--	--	--	<0.026	<0.018	<0.018	<0.018	<0.026	<0.026	<0.026	<0.026	--
	SW 6020	ug/L	--	--	**0.022**	**0.025**	--	**14**	--	--	--	--	--	--	--	<0.005
Silica (Si02)	EPA 200.7	mg/L	--	--	--	--	--	**20**	--	--	--	--	--	**8.1**	**16**	--
	SW 6020	mg/L	--	--	**22**	**23**	--	--	--	--	--	--	--	--	--	**20**
Silver	EPA 200.7	mg/L	--	<0.004	--	--	--	<0.003	<0.004	<0.004	<0.004	<0.003	<0.003	<0.003	<0.003	--
	SW 6020	mg/L	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--	--	<0.005
Sodium	EPA 200.7	mg/L	--	**670**	--	--	--	**550**	**390**	**520**	**470**	**360**	**270**	**580**	**260**	--
	SW 6020	mg/L	--	--	**870**	**930**	--	--	--	--	--	--	--	--	--	**310**
Strontium	EPA 200.7	mg/L	--	--	--	--	--	**2.1**	--	--	--	--	--	--	--	--
Thallium	EPA 200.7	mg/L	--	<0.007	--	--	--	<0.011	<0.007	<0.007	<0.007	<0.011	<0.011	<0.011	<0.011	--
	SW 6020	mg/L	--	--	<0.002	<0.002	--	--	--	--	--	--	--	--	--	<0.002
Vanadium	EPA 200.7	mg/L	--	<0.007	--	--	--	<0.012	<0.007	<0.007	<0.007	**0.013**	**0.02**	<0.012	**0.019**	--
Zinc	EPA 200.7	mg/L	--	**0.29**	--	--	--	<0.024	**1.1**	**2**	**0.52**	**0.11**	**0.04**	<0.013	**0.035**	
	SW 6020	mg/L	--	--	**0.11**	**0.13**	--	--	--	--	--	--	--	--	--	<0.1
Metals (total)																
Arsenic	EPA 200.9	mg/L	<0.002	--	--	--	**0.009**	--	--	--	--	--	--	--	--	--
Copper	EPA 200.7	mg/L	<0.002	--	--	--	<0.010	--	--	--	--	--	--	--	--	--
Lead	EPA 200.9	mg/L	<0.002	--	--	--	<0.002	--	--	--	--	--	--	--	--	--
Sodium	EPA 200.7	mg/L	**1,100**	--	--	--	**333**	--	--	--	--	--	--	--	--	--
Other																
Ammonia as Nitrogen	SM 4500-NH3	mg/L	--	**0.75**	--	--	--	**0.47**	**0.5**	**0.51**	**0.53**	--	--	--	--	--
Cyanide, Total	EPA 335.2	mg/L	--	<0.02	--	--	--	<0.02	--	--	--	--	--	--	--	--
Gross Alpha	EPA 00-02	pCi/L	--	--	--	--	--	1.26	--	--	--	--	--	--	--	--
Methylene Blue Active Substances	EPA 425.1	mg/L	--	<0.1	--		--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
Orthophosphate	EPA 365.2	mg/L	--	**0.21**	<0.25	<0.25	--	<0.05	**0.18**	**0.09**	**0.09**	--	--	**0.64**	**0.1**	<0.5
Phosphorus	EPA 365.2	mg/L	--	**0.24**	<0.10	<0.10	--	<0.05	**0.2**	**0.1**	**0.11**	--	--	**0.67**	**0.12**	<0.1
Silica, Reactive	SM 4500-Si E	mg/L	--	**2.83**	--		--	**7.55**	**1.65**	**4.88**	**1.8**	--	--	**7**	**13.7**	--
Sulfide	EPA 376.1	mg/L	--	<0.05	<0.10	<0.10	--	<0.05	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	<0.1
Total Organic Carbon	SM 5310 B	mg/L	--	**6.7**	--	--	--	**13**	**3.8**	**4.1**	**2.8**	--	--	**0.69**	--	--

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Table 4
Analytical Results for On-Site Groundwater Samples

Analyte	Analytical Method	Units	Well 1				Well 2									
		Sample Date	7/2/2008	2/13/2009	8/20/2009 [4]	8/21/2009 [4]	8/21/2008	12/11/2009	2/13/2009	2/13/2009	2/12/2009	6/27/2009 [1]	6/28/2009 [1]	6/29/2009 [2]	6/30/2009 [1]	8/21/2009 [3]
		Sample Depth (feet bgs)	Whole Well	310	Whole Well	Whole Well	Whole Well	650	750	850	950	Whole Well	Whole Well	Bouse Formation	Whole Well	Whole Well
Volatile Organic Compounds																
Toluene	EPA 8260	ug/L	--	**20**	--	--	--	<1.0	--	--	--	--	--	--	--	

Notes:
1. Sample collected during a 3-day constant rate pumping test performed in June 2009. The sample was collected from the pump discharge.
2. Sample collected during a 3-day constant rate pumping test performed in June 2009. The sample was collected using a discrete sampler.
3. Sample collected at the end of a 3-day constant rate pumping test performed in August 2009. The sample was collected from the pump discharge.
4. Sample collected during a 24-hr constant rate pumping test performed in August 2009. The sample was collected from the pump discharge.
5. <0.024 = analyte was not detected above the noted laboratory reporting limit.
6. mg/L = milligrams per liter
7. umhos/cm = micromhos per centimeter
8. bgs = below ground surface
9. - - =not analyzed
10. Whole Well = composite sample collected from entire well screened interval.

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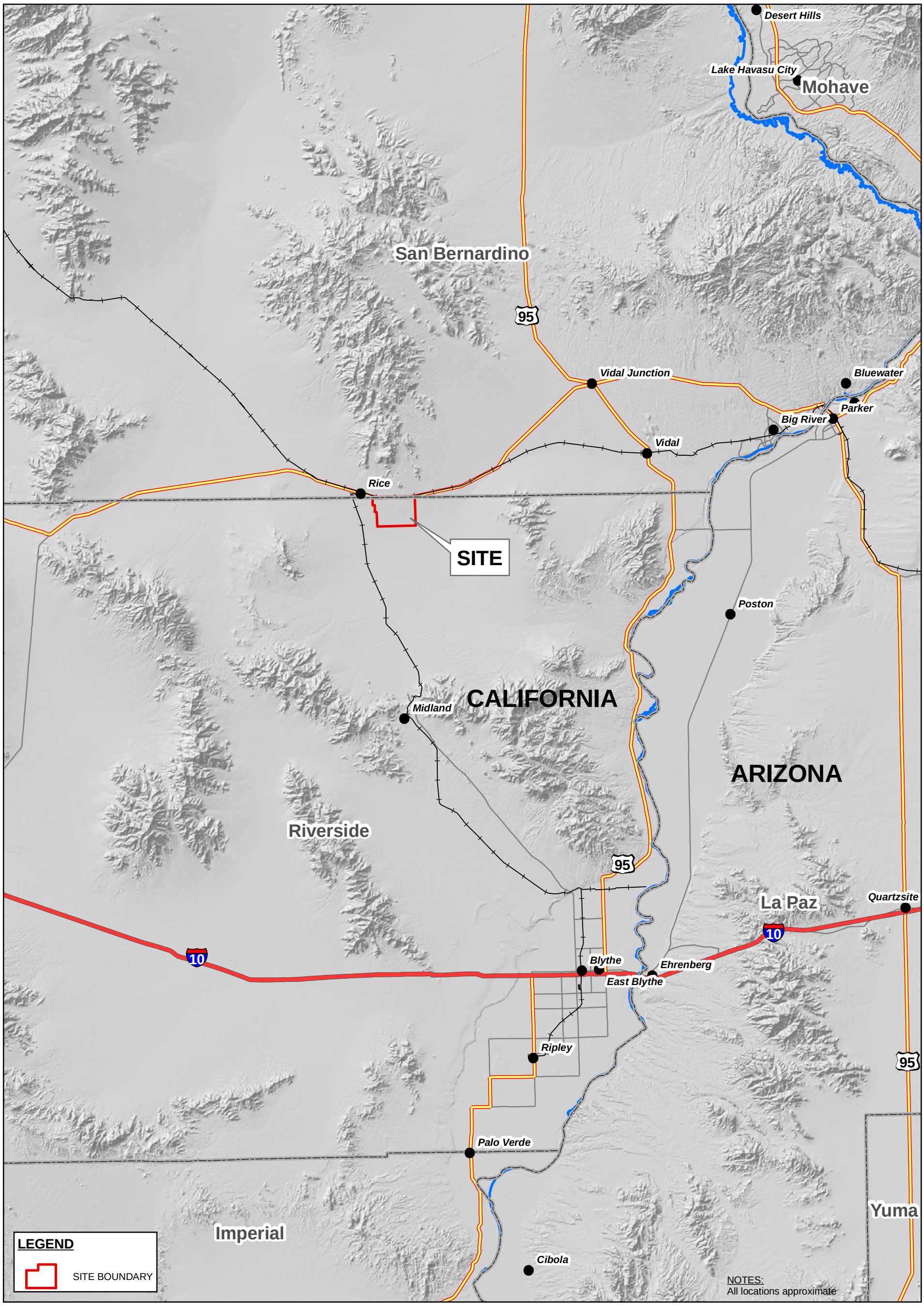
Table 5
Mountain Front Recharge Estimates

Mountain Range	Length of Mountain Front Reach (miles)	Distance of Mountain Front Reach from Pumping Center (miles)	Percent of Total Mountain Front Reach Length	Apportioned Natural Recharge (acre-ft) [1]	Percent of Total Mountain Front Reach Length, Rice Valley Only [3]	Apportioned Natural Recharge, Rice Valley Only (acre-ft) [1, 3]
Turtle Mountains	22.5	2.4 to 8	24.4%	122.0	31.0%	122.0
Unnamed	3.7	7.7 to 8.2	4.0%	20.1	5.1%	20.1
Little Maria Mountains	21	11.3 to 13.7	22.8%	113.9	28.9%	113.9
Big Maria Mountains (west of Big Wash drainage divide)	16.9	12.4 to 14.5	18.3%	91.6	23.3%	91.6
Big Maria Mountains (east of Big Wash drainage divide)	7.1	14.5 to 18.5	7.7%	38.5	0% [2]	0 [2]
West Riverside Mountains	8.5	7 to 11.6	9.2%	46.1	11.7%	46.1
Riverside Mountains	12.5	11.6 to 19.5	13.6%	67.8	0% [2]	0 [2]
Total	92.2	--	100.0%	500.0	100.0%	394

Notes:
1. Calculated based on the published estimate of 500 acre-ft/yr of total mountain front recharge to the Rice Valley apportioned per the percentage of mountain front reachs within the basin.
2. Not summed in the total because mountain front recharge from this reach is assumed negligible for the impact analysis.
3.Excludes the Big Maria Mountains east of the big wash drainage divide and the Riverside Mountains.

FIGURES



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RICE SOLAR ENERGY, LLC

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SWL	NB	2/2009
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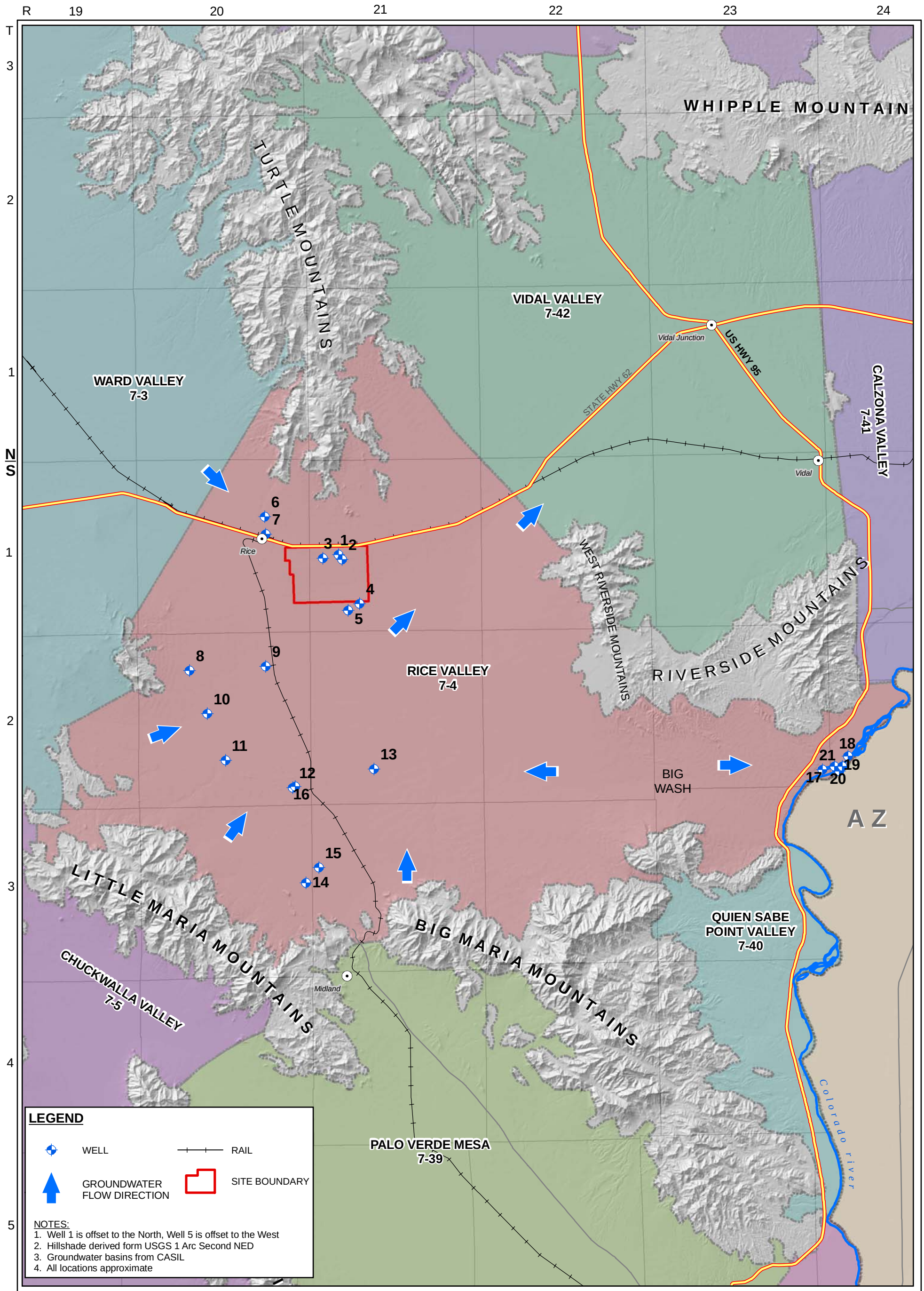
PROJECT LOCATION



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RICE SOLAR ENERGY, LLC

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HYDROGEOLOGIC SETTING

SWL	NB	9/2009
52006721		2

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Lithologic and TDS Log

Figure 3

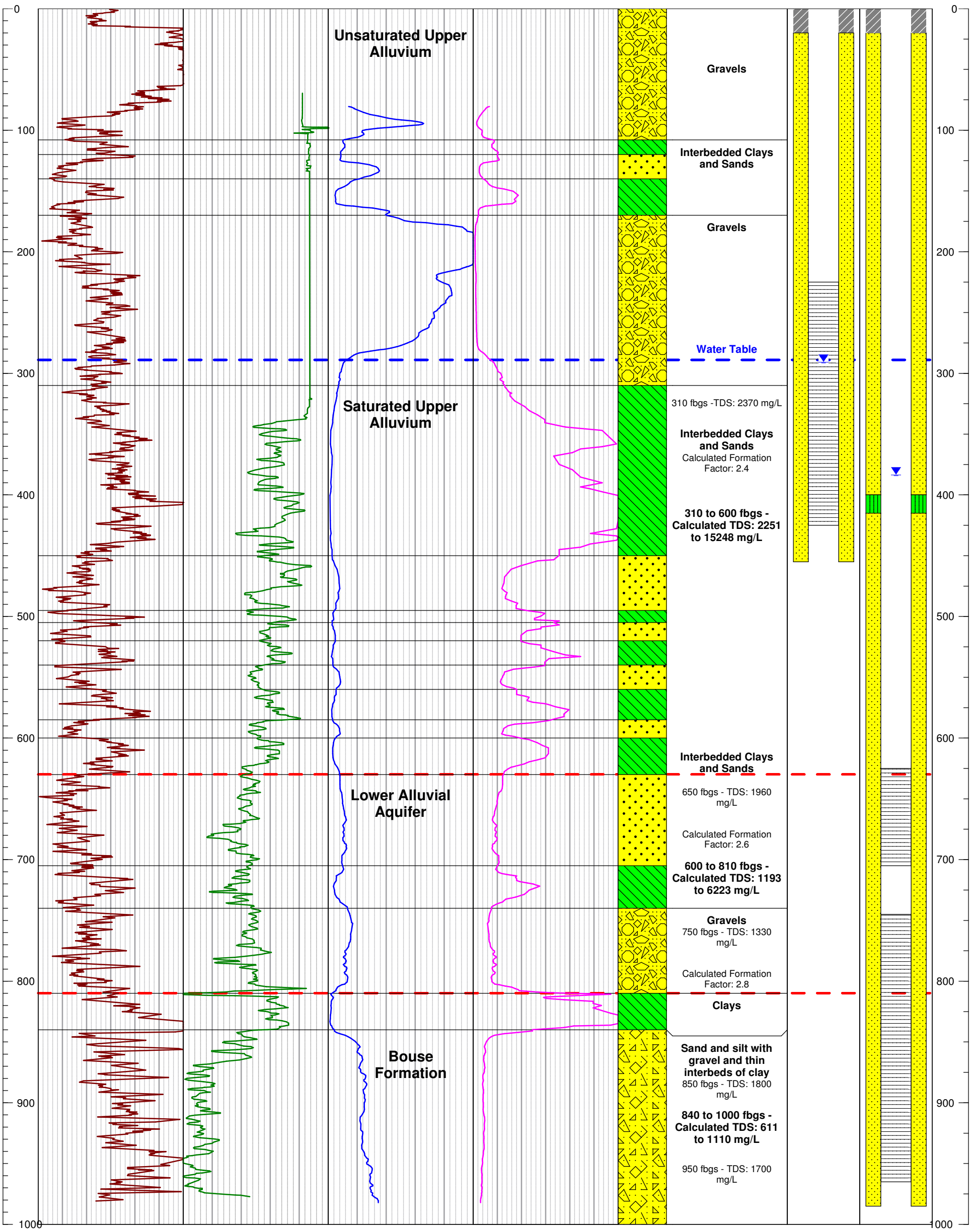
Rice Solar Energy, LLC
Project Number: 52006721

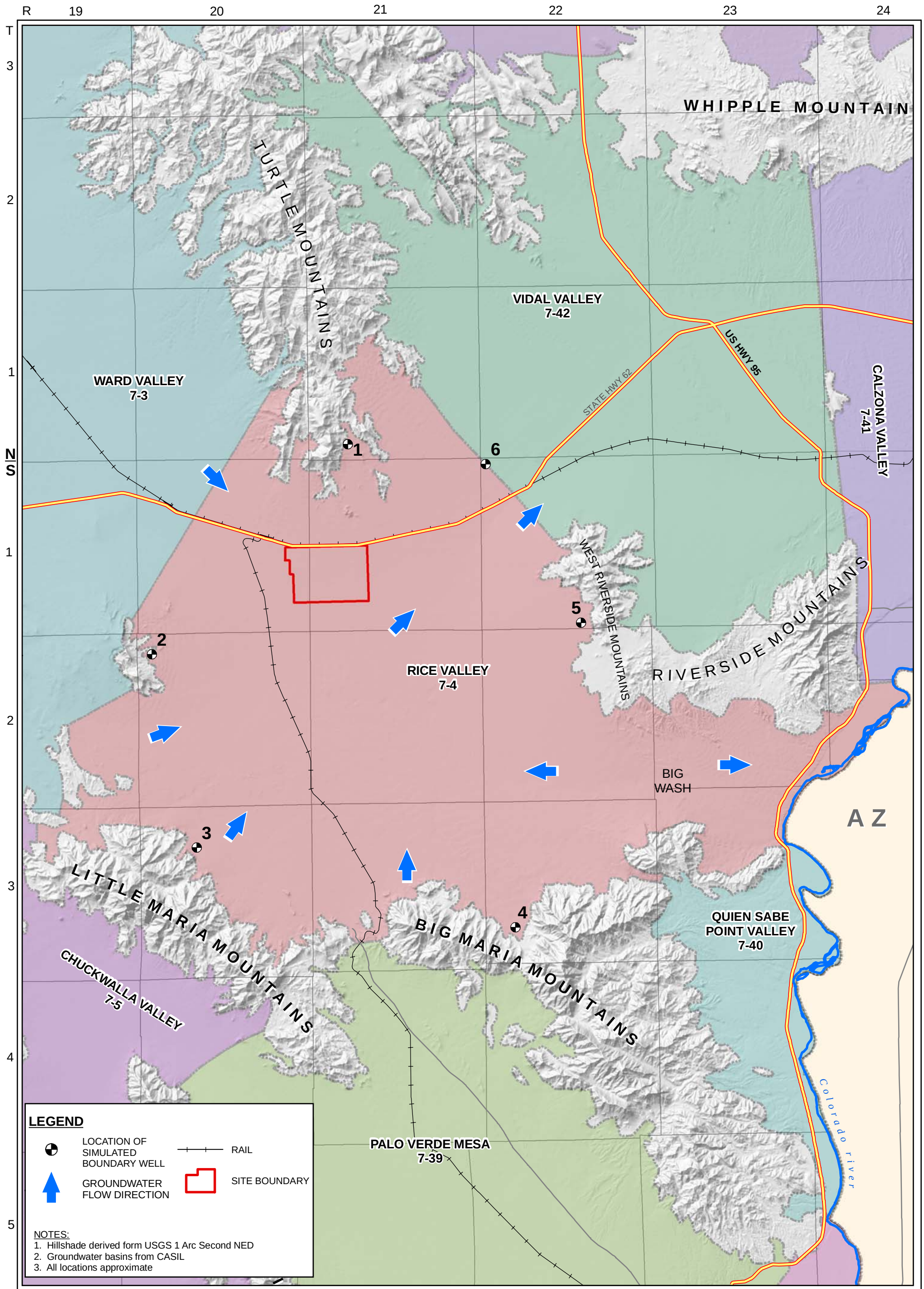
Date Drilled: 08/16/2008-08/17/2008	Borehole Location: SEC 20, TWP 18, RGE 21E
Drilling Method: Mud Rotary	Ground Surface Elevation: 870 feet amsl
Drilling Contractor: Azca Drilling + Pump Inc.	First Groundwater: 285 feet bgs
Geologist: N/A / Reviewer: N/A	Total Depth: 990 ft / Well Depth:

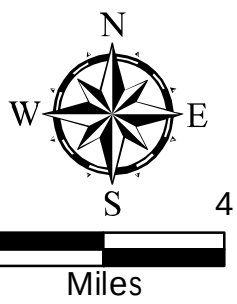
Notes:
TDS calculated from the formation water salinity determined from the average Formation Factor, 2.7

Well Completion Legend: Cement, Bentonite, Filter Pack, Water Level, Screen

Lithology Legend: Gravel, Silt/Sand with Gravel, Sand, Clay







RICE SOLAR ENERGY, LLC

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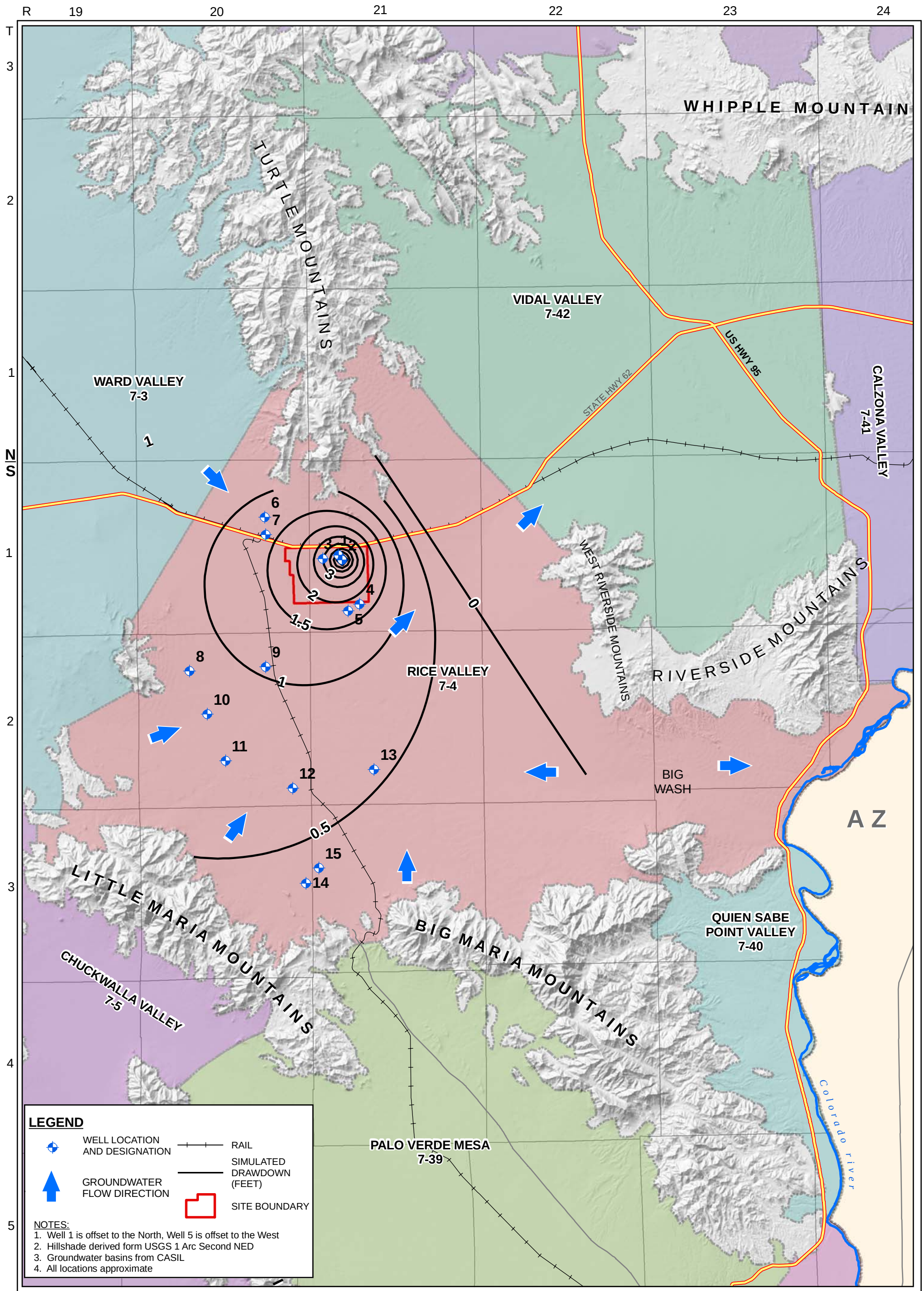
LOCATIONS OF SIMULATED RECHARGE AND DISCHARGE BOUNDARY WELLS

SWL	NB	9/2009
52006721		4



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RICE SOLAR ENERGY, LLC

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SIMULATED DRAWDOWN AFTER 27 MONTHS OF CONSTRUCTION PUMPING

SWL	NB	9/2009
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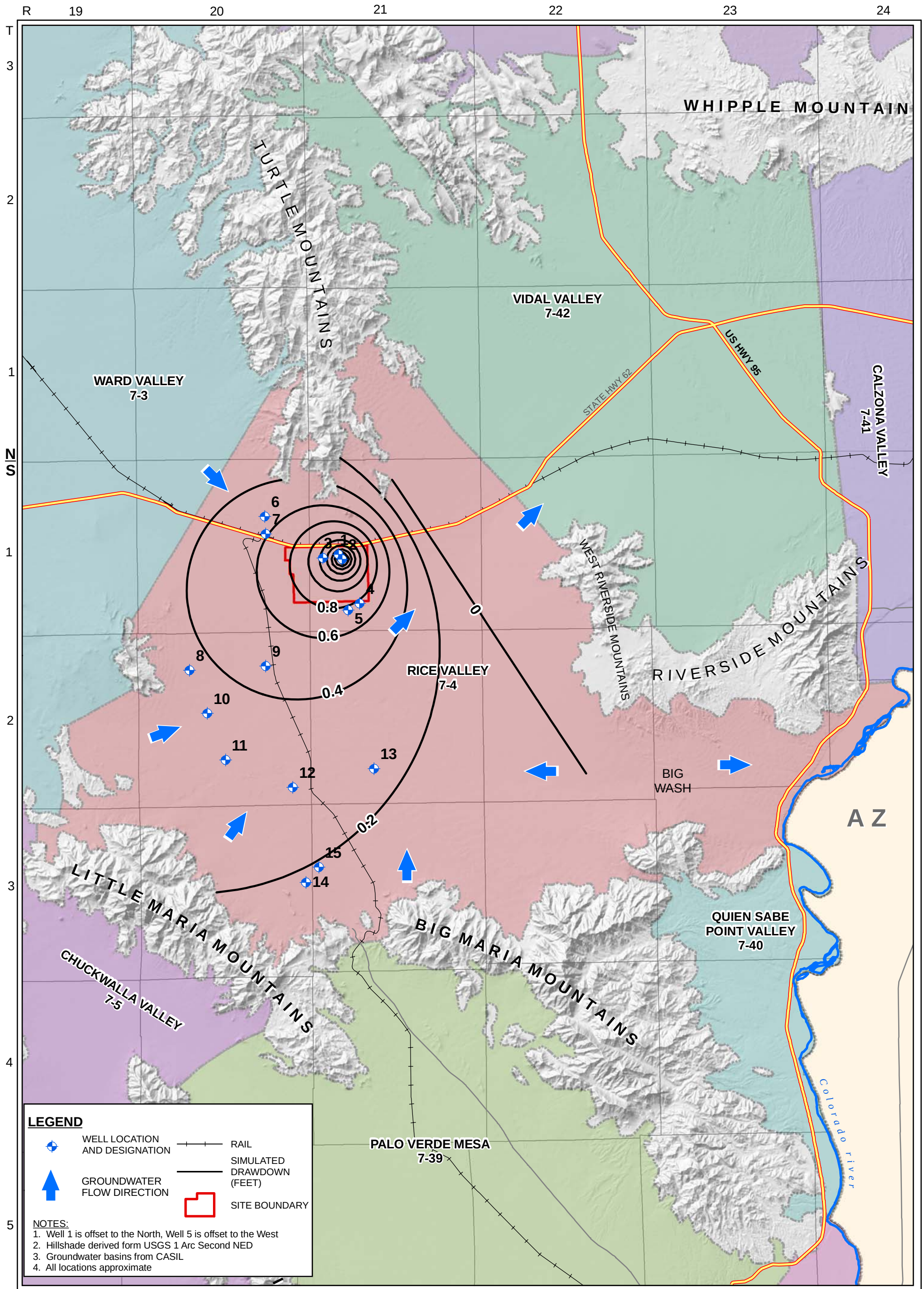

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RICE SOLAR ENERGY, LLC

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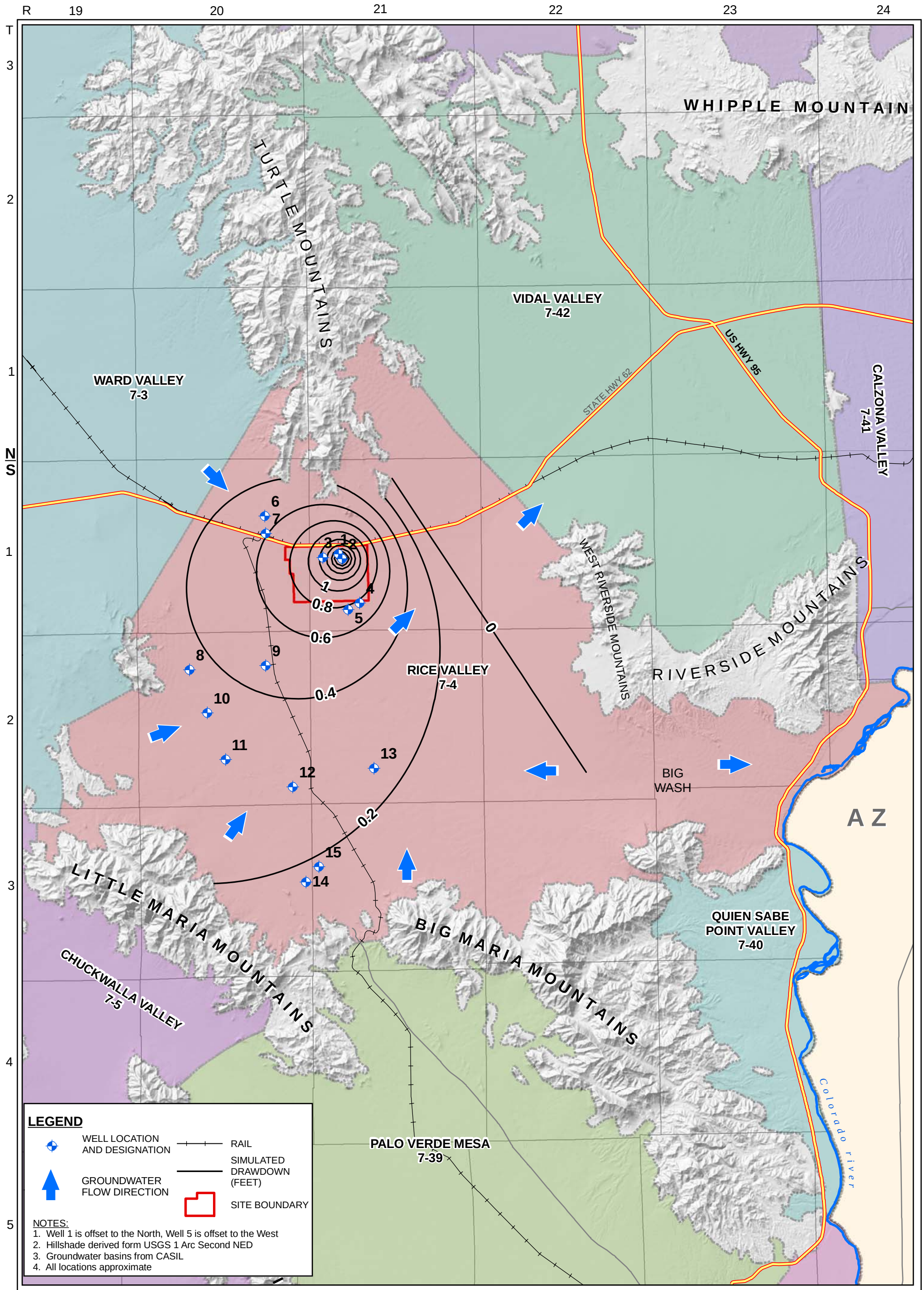
SIMULATED DRAWDOWN AFTER 5 YEARS OF OPERATIONAL PUMPING

SWL	NB	9/2009
52006721		6



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RICE SOLAR ENERGY, LLC

WorleyParsons
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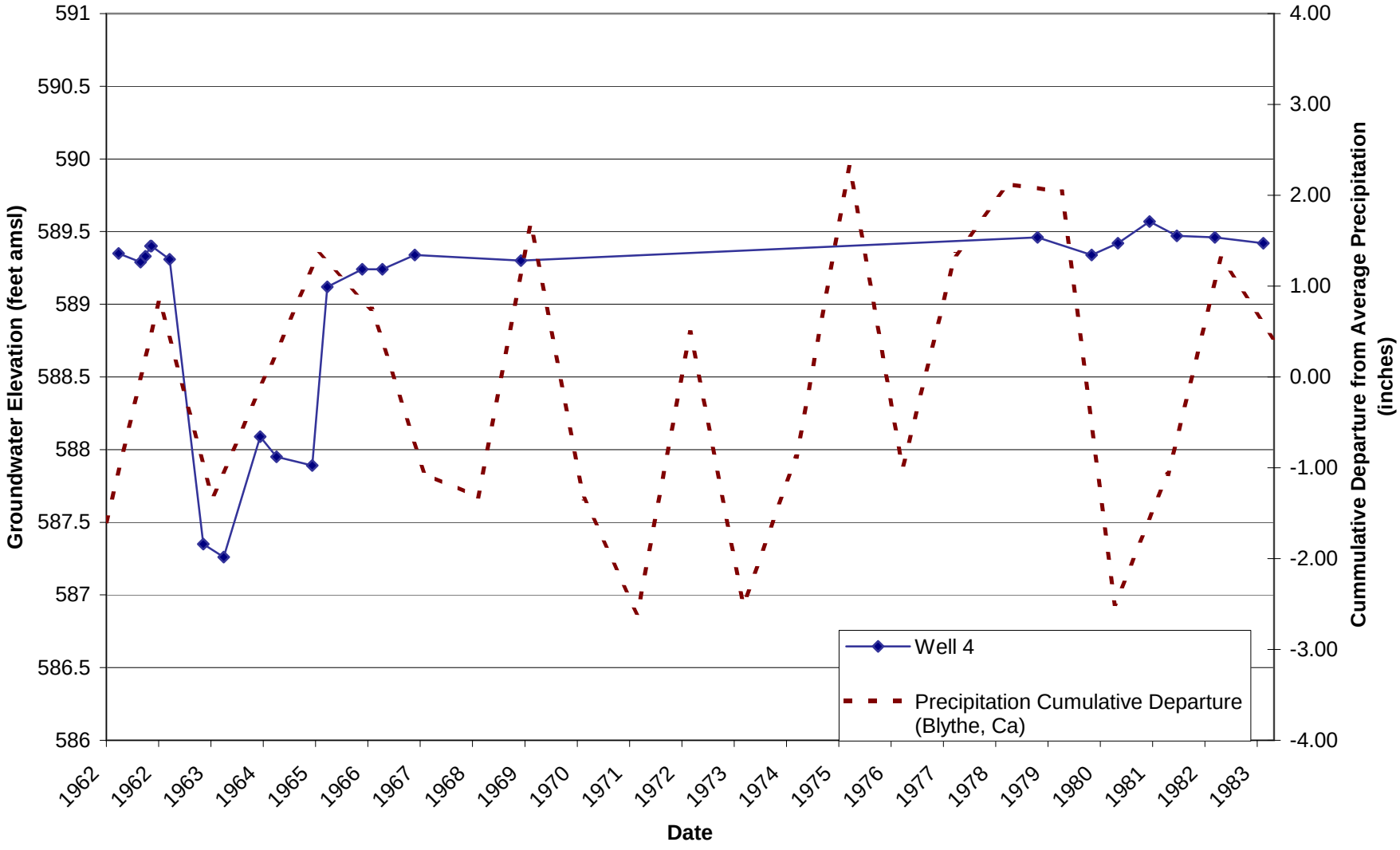
SIMULATED DRAWDOWN AFTER 30 YEARS OF OPERATIONAL PUMPING

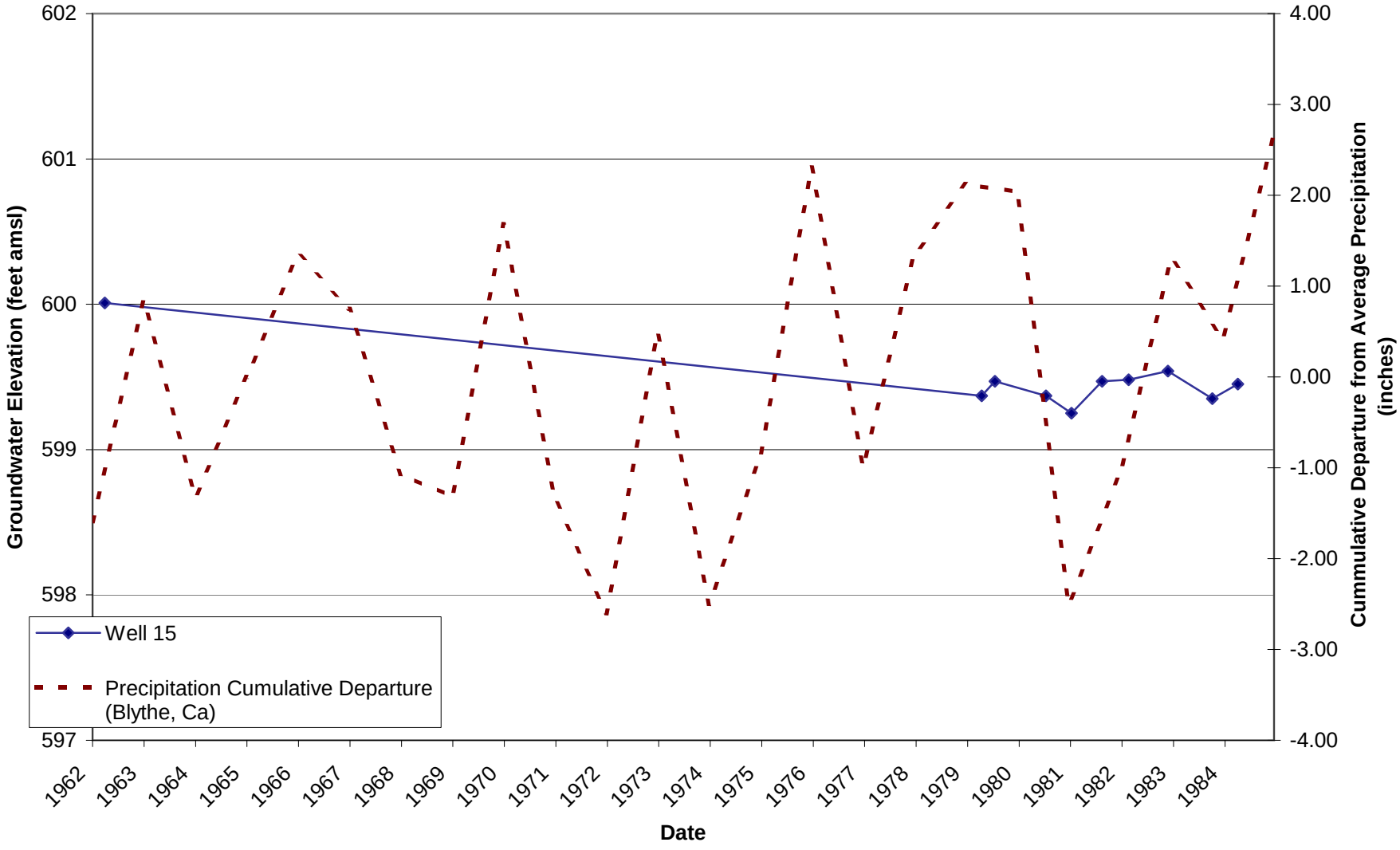
SWL	NB	9/2009
52006721		7

GRAPHS

Graph 1 - Hydrograph of Well 4



Graph 2 - Hydrograph of Well 15



APPENDIX 1

LABORATORY ANALYTICAL REPORTS

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: 52006711 Project Number: [none] Project Manager: Nat Beal	**Reported:** 01/09/09 10:15

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
RICE 2-650-121108	0812327-01	Water	12/11/08 10:35	12/12/08 13:05

CASE NARRATIVE

SAMPLE RECEIPT:	Samples were received intact, at 4 °C, and accompanied by chain of custody documentation.
PRESERVATION:	Samples requiring preservation were verified prior to sample preparation and analysis.
HOLDING TIMES:	All holding times were met, unless otherwise noted in the report with data qualifiers.
QA/QC CRITERIA:	All quality objective criteria were met, except as noted in the report with data qualifiers.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: 52006711 Project Number: [none] Project Manager: Nat Beal	**Reported:** 01/09/09 10:15

Conventional Chemistry Parameters by APHA/EPA Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE 2-650-121108 (0812327-01) Water Sampled: 12/11/08 10:35 Received: 12/12/08 13:05									
Total Alkalinity	**70.0**	0.400	mg/L	1	B9A0701	12/12/08	12/12/08 16:00	EPA 310.1	
Carbonate Alkalinity	**16.0**	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**54.0**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Ammonia as N	**0.470**	0.100	"	"	"	"	"	EPA 350.1	
Chloride	**684**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**2950**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Cyanide (total)	ND	0.0200	mg/L	"	"	"	"	EPA 335.2	
Fluoride	**2.40**	0.0200	"	"	"	"	"	EPA 340.1	
Total Hardness	**249**	0.400	"	"	"	"	"	SM 2340	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	
Nitrite as N	**0.0680**	0.0200	"	"	"	"	"	SM4500-NO2B	
Nitrate/Nitrite as N	**2.50**	0.0200	"	"	"	"	"	EPA 353.3	
pH	**8.32**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Orthophosphate as P	ND	0.0500	mg/L	"	"	"	"	EPA 365.2	
Phosphorus	ND	0.0500	"	"	"	"	"	"	
Reactive Silica	**7.55**	0.500	"	5	"	"	"	SM 4500-Si E	
Sulfate as SO4	**470**	0.500	"	1	"	"	"	EPA 375.4	
Sulfide	ND	0.0500	"	"	"	"	"	EPA 376.1	
Total Dissolved Solids	**1960**	1.00	"	"	"	"	"	EPA 160.1	
Temperature	**17.0**	0.100	°C	"	"	"	"	EPA 170.1	
Total Suspended Solids	**7.00**	1.00	mg/L	"	"	"	"	EPA 160.2	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Anions by EPA Method 300.0

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE 2-650-121108 (0812327-01) Water	**Sampled: 12/11/08 10:35**		**Received: 12/12/08 13:05**						
Nitrate as N	**2.40**	0.0200	mg/L	1	B9A0701	12/12/08	12/12/08 16:00	EPA 300.0	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Total Organic Carbon (TOC) by SM 5310 B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE 2-650-121108 (0812327-01) Water	**Sampled: 12/11/08 10:35**		**Received: 12/12/08 13:05**						
Total Organic Carbon	**13**	0.50	mg/L	1	B8L1828	12/18/08	12/18/08 18:58	SM 5310 B	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: 52006711 Project Number: [none] Project Manager: Nat Beal	**Reported:** 01/09/09 10:15

Metals (Dissolved) by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE 2-650-121108 (0812327-01) Water Sampled: 12/11/08 10:35 Received: 12/12/08 13:05									
Silver	ND	0.0030	mg/L	1	B8L1810	12/18/08	12/31/08 00:10	EPA 200.7	
Aluminum	ND	0.063	"	"	"	"	"	"	
Arsenic	ND	0.025	"	"	"	"	"	"	
Arsenic	ND	4.0	µg/L	2	B8L2322	12/23/08	12/30/08 17:55	EPA 200.8	
Boron	**1.9**	0.066	mg/L	1	B8L1810	12/18/08	12/31/08 00:10	EPA 200.7	
Barium	**0.032**	0.019	"	"	"	"	"	"	
Beryllium	ND	0.0090	"	"	"	"	"	"	
Calcium	**70**	0.53	"	"	"	"	12/31/08 00:08	"	
Cadmium	ND	0.0040	"	"	"	"	12/31/08 00:10	"	
Cobalt	ND	0.0060	"	"	"	"	"	"	
Chromium	ND	0.0060	"	"	"	"	"	"	
Copper	ND	0.012	"	"	"	"	"	"	
Iron	ND	0.064	"	"	"	"	"	"	
Mercury	ND	0.00030	"	"	B8L2323	12/23/08	12/23/08 18:09	EPA 245.1	
Potassium	**7.4**	0.90	"	"	B8L1810	12/18/08	12/31/08 00:08	EPA 200.7	
Magnesium	**18**	0.41	"	"	"	"	"	"	
Manganese	**0.025**	0.011	"	"	"	"	12/31/08 00:10	"	
Molybdenum	**0.028**	0.028	"	"	"	"	"	"	
Sodium	**550**	0.71	"	"	"	"	12/31/08 00:08	"	
Nickel	ND	0.010	"	"	"	"	12/31/08 00:10	"	
Lead	ND	0.019	"	"	"	"	"	"	
Antimony	ND	0.023	"	"	"	"	"	"	
Selenium	ND	0.026	"	"	"	"	"	"	
Selenium	**14**	4.0	µg/L	2	B8L2322	12/23/08	12/30/08 17:55	EPA 200.8	
Silicon	**20**	0.10	mg/L	1	B8L1810	12/18/08	12/31/08 00:10	EPA 200.7	
Strontium	**2.1**	0.089	"	"	"	"	12/31/08 00:08	"	
Thallium	ND	0.011	"	"	"	"	12/31/08 00:10	"	
Vanadium	ND	0.012	"	"	"	"	"	"	
Zinc	ND	0.024	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: 52006711 Project Number: [none] Project Manager: Nat Beal	**Reported:** 01/09/09 10:15

Volatile Organic Compounds by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE 2-650-121108 (0812327-01) Water Sampled: 12/11/08 10:35 Received: 12/12/08 13:05									
Benzene	ND	1.0	µg/L	1	B8L1520	12/15/08	12/15/08 14:43	EPA 8260B	
Bromobenzene	ND	1.0	"	"	"	"	"	"	
Bromochloromethane	ND	1.0	"	"	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
Dibromomethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	

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Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Volatile Organic Compounds by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE 2-650-121108 (0812327-01) Water Sampled: 12/11/08 10:35 Received: 12/12/08 13:05									
Methyl tert-butyl ether	ND	1.0	µg/L	1	B8L1520	12/15/08	12/15/08 14:43	EPA 8260B	
Naphthalene	ND	1.0	"	"	"	"	"	"	
n-Propylbenzene	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	ND	1.0	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	
Trichloroethene	ND	1.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	1.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*103 %*	*86-118*		"	"	"	"	
Surrogate: Toluene-d8		*100 %*	*88-110*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98.0 %*	*86-115*		"	"	"	"	

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Total Organic Carbon (TOC) by SM 5310 B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L1828 - Organic Carbon										
Blank (B8L1828-BLK1)				Prepared & Analyzed: 12/18/08						
Total Organic Carbon	ND	0.50	mg/L							

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Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L1810 - EPA 200 Series										
Blank (B8L1810-BLK1)				Prepared: 12/18/08 Analyzed: 12/31/08						
Aluminum	ND	0.063	mg/L							
Antimony	ND	0.023	"							
Arsenic	ND	0.025	"							
Barium	ND	0.019	"							
Beryllium	ND	0.0090	"							
Boron	ND	0.066	"							
Cadmium	ND	0.0040	"							
Calcium	ND	0.53	"							
Chromium	ND	0.0060	"							
Cobalt	ND	0.0060	"							
Copper	ND	0.012	"							
Iron	ND	0.064	"							
Lead	ND	0.019	"							
Magnesium	ND	0.41	"							
Manganese	ND	0.011	"							
Molybdenum	ND	0.028	"							
Nickel	ND	0.010	"							
Potassium	ND	0.90	"							
Selenium	ND	0.026	"							
Silicon	ND	0.10	"							
Silver	ND	0.0030	"							
Sodium	ND	0.71	"							
Strontium	ND	0.089	"							
Thallium	ND	0.011	"							
Vanadium	ND	0.012	"							
Zinc	ND	0.024	"							
LCS (B8L1810-BS1)				Prepared: 12/18/08 Analyzed: 12/31/08						
Aluminum	0.185	0.063	mg/L	0.200		92.5	85-115			
Antimony	0.208	0.023	"	0.200		104	85-115			
Arsenic	0.202	0.025	"	0.200		101	85-115			
Barium	0.212	0.019	"	0.200		106	85-115			
Beryllium	0.207	0.0090	"	0.200		104	85-115			
Boron	0.206	0.066	"	0.200		103	85-115			
Cadmium	0.204	0.0040	"	0.200		102	85-115			
Calcium	9.86	0.53	"	10.2		96.7	85-115			
Chromium	0.206	0.0060	"	0.200		103	85-115			

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: 52006711 Project Number: [none] Project Manager: Nat Beal	**Reported:** 01/09/09 10:15

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L1810 - EPA 200 Series										
LCS (B8L1810-BS1)				Prepared: 12/18/08	Analyzed: 12/31/08					
Cobalt	0.208	0.0060	mg/L	0.200		104	85-115			
Copper	0.213	0.012	"	0.200		106	85-115			
Iron	0.212	0.064	"	0.200		106	80-120			
Lead	0.209	0.019	"	0.200		104	85-115			
Magnesium	10.4	0.41	"	10.2		102	85-115			
Manganese	0.211	0.011	"	0.200		106	85-115			
Molybdenum	0.205	0.028	"	0.200		102	85-115			
Nickel	0.206	0.010	"	0.200		103	85-115			
Potassium	10.8	0.90	"	10.2		106	85-115			
Selenium	0.196	0.026	"	0.200		98.0	85-115			
Silicon	0.230	0.10	"	0.200		115	80-120			
Silver	0.205	0.0030	"	0.200		102	85-115			
Sodium	9.90	0.71	"	10.2		97.1	85-115			
Strontium	0.188	0.089	"	0.200		94.0	75-125			
Thallium	0.200	0.011	"	0.200		100	85-115			
Vanadium	0.196	0.012	"	0.200		98.0	85-115			
Zinc	0.221	0.024	"	0.200		110	85-115			
Matrix Spike (B8L1810-MS1)		**Source: 0812327-01**		Prepared: 12/18/08	Analyzed: 12/31/08					
Aluminum	0.206	0.063	mg/L	0.200	ND	103	70-130			
Antimony	0.216	0.023	"	0.200	ND	108	70-130			
Arsenic	0.212	0.025	"	0.200	0.011	100	70-130			
Barium	0.232	0.019	"	0.200	0.032	100	70-130			
Beryllium	0.197	0.0090	"	0.200	ND	98.5	70-130			
Boron	2.15	0.066	"	0.200	1.9	125	70-130			
Cadmium	0.196	0.0040	"	0.200	ND	98.0	70-130			
Calcium	79.2	0.53	"	10.2	70	90.2	70-130			
Chromium	0.188	0.0060	"	0.200	ND	94.0	70-130			
Cobalt	0.194	0.0060	"	0.200	ND	97.0	70-130			
Copper	0.214	0.012	"	0.200	ND	107	70-130			
Iron	0.265	0.064	"	0.200	ND	132	70-130			QM-07
Lead	0.195	0.019	"	0.200	ND	97.5	70-130			
Magnesium	28.3	0.41	"	10.2	18	101	70-130			
Manganese	0.222	0.011	"	0.200	0.025	98.5	70-130			
Molybdenum	0.225	0.028	"	0.200	0.028	98.5	70-130			
Nickel	0.197	0.010	"	0.200	ND	98.5	70-130			
Potassium	20.1	0.90	"	10.2	7.4	125	70-130			

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Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L1810 - EPA 200 Series										
Matrix Spike (B8L1810-MS1)		**Source: 0812327-01**		Prepared: 12/18/08	Analyzed: 12/31/08					
Selenium	0.195	0.026	mg/L	0.200	ND	97.5	70-130			
Silicon	21.7	0.10	"	0.200	20	850	70-130			QM-07
Silver	0.200	0.0030	"	0.200	ND	100	70-130			
Sodium	567	0.71	"	10.2	550	167	70-130			QM-07
Strontium	2.32	0.089	"	0.200	2.1	110	70-130			
Thallium	0.162	0.011	"	0.200	ND	81.0	70-130			
Vanadium	0.181	0.012	"	0.200	ND	90.5	70-130			
Zinc	0.226	0.024	"	0.200	0.015	106	70-130			
Matrix Spike Dup (B8L1810-MSD1)		**Source: 0812327-01**		Prepared: 12/18/08	Analyzed: 12/31/08					
Aluminum	0.206	0.063	mg/L	0.200	ND	103	70-130	0.00	20	
Antimony	0.205	0.023	"	0.200	ND	102	70-130	5.23	20	
Arsenic	0.211	0.025	"	0.200	0.011	100	70-130	0.473	20	
Barium	0.230	0.019	"	0.200	0.032	99.0	70-130	0.866	20	
Beryllium	0.194	0.0090	"	0.200	ND	97.0	70-130	1.53	20	
Boron	2.17	0.066	"	0.200	1.9	135	70-130	0.926	20	QM-07
Cadmium	0.192	0.0040	"	0.200	ND	96.0	70-130	2.06	20	
Calcium	81.2	0.53	"	10.2	70	110	70-130	2.49	20	
Chromium	0.184	0.0060	"	0.200	ND	92.0	70-130	2.15	20	
Cobalt	0.189	0.0060	"	0.200	ND	94.5	70-130	2.61	20	
Copper	0.210	0.012	"	0.200	ND	105	70-130	1.89	20	
Iron	0.211	0.064	"	0.200	ND	106	70-130	22.7	20	QM-07
Lead	0.190	0.019	"	0.200	ND	95.0	70-130	2.60	20	
Magnesium	28.9	0.41	"	10.2	18	107	70-130	2.10	20	
Manganese	0.219	0.011	"	0.200	0.025	97.0	70-130	1.36	20	
Molybdenum	0.221	0.028	"	0.200	0.028	96.5	70-130	1.79	20	
Nickel	0.193	0.010	"	0.200	ND	96.5	70-130	2.05	20	
Potassium	20.3	0.90	"	10.2	7.4	126	70-130	0.990	20	
Selenium	0.186	0.026	"	0.200	ND	93.0	70-130	4.72	20	
Silicon	21.8	0.10	"	0.200	20	900	70-130	0.460	20	QM-07
Silver	0.197	0.0030	"	0.200	ND	98.5	70-130	1.51	20	
Sodium	568	0.71	"	10.2	550	176	70-130	0.176	20	QM-07
Strontium	2.31	0.089	"	0.200	2.1	105	70-130	0.432	20	
Thallium	0.163	0.011	"	0.200	ND	81.5	70-130	0.615	20	
Vanadium	0.179	0.012	"	0.200	ND	89.5	70-130	1.11	20	
Zinc	0.221	0.024	"	0.200	0.015	103	70-130	2.24	20	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: 52006711 Project Number: [none] Project Manager: Nat Beal	**Reported:** 01/09/09 10:15

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L2322 - EPA 200 Series										
Blank (B8L2322-BLK1)				Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	ND	4.0	µg/L							
Selenium	ND	4.0	"							
Blank (B8L2322-BLK2)				Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	ND	4.0	µg/L							
Selenium	ND	4.0	"							
LCS (B8L2322-BS1)				Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	90.1	4.0	µg/L	100		90.1	85-115			
Selenium	94.7	4.0	"	100		94.7	85-115			
LCS (B8L2322-BS2)				Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	92.6	4.0	µg/L	100		92.6	85-115			
Selenium	97.1	4.0	"	100		97.1	85-115			
Matrix Spike (B8L2322-MS1)	**Source: 0812327-01**			Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	93.5	4.0	µg/L	100	0.49	93.0	70-130			
Selenium	105	4.0	"	100	14	91.0	70-130			
Matrix Spike (B8L2322-MS2)	**Source: 0812371-03**			Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	89.2	4.0	µg/L	100	ND	89.2	70-130			
Selenium	95.4	4.0	"	100	ND	95.4	70-130			
Matrix Spike Dup (B8L2322-MSD1)	**Source: 0812327-01**			Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	94.0	4.0	µg/L	100	0.49	93.5	70-130	0.533	20	
Selenium	106	4.0	"	100	14	92.0	70-130	0.948	20	
Matrix Spike Dup (B8L2322-MSD2)	**Source: 0812371-03**			Prepared: 12/23/08	Analyzed: 12/30/08					
Arsenic	92.5	4.0	µg/L	100	ND	92.5	70-130	3.63	20	
Selenium	96.4	4.0	"	100	ND	96.4	70-130	1.04	20	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: 52006711 Project Number: [none] Project Manager: Nat Beal	**Reported:** 01/09/09 10:15

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L2323 - EPA 200 Series										
Blank (B8L2323-BLK1)				Prepared & Analyzed: 12/23/08						
Mercury	ND	0.00030	mg/L							
LCS (B8L2323-BS1)				Prepared & Analyzed: 12/23/08						
Mercury	0.00205	0.00030	mg/L	0.00200		102	80-120			
Matrix Spike (B8L2323-MS1)		**Source: 0812327-01**		Prepared & Analyzed: 12/23/08						
Mercury	0.00170	0.00030	mg/L	0.00200	ND	85.0	80-120			
Matrix Spike Dup (B8L2323-MSD1)		**Source: 0812327-01**		Prepared & Analyzed: 12/23/08						
Mercury	0.00171	0.00030	mg/L	0.00200	ND	85.5	80-120	0.587	20	

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Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L1520 - EPA 5030B P & T										
Blank (B8L1520-BLK1)				Prepared & Analyzed: 12/15/08						
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	"							
Bromochloromethane	ND	1.0	"							
Bromodichloromethane	ND	1.0	"							
Bromoform	ND	1.0	"							
Bromomethane	ND	1.0	"							
n-Butylbenzene	ND	1.0	"							
sec-Butylbenzene	ND	1.0	"							
tert-Butylbenzene	ND	1.0	"							
Carbon tetrachloride	ND	1.0	"							
Chlorobenzene	ND	1.0	"							
Chloroethane	ND	1.0	"							
Chloroform	ND	1.0	"							
Chloromethane	ND	1.0	"							
2-Chlorotoluene	ND	1.0	"							
4-Chlorotoluene	ND	1.0	"							
Dibromochloromethane	ND	1.0	"							
1,2-Dibromo-3-chloropropane	ND	5.0	"							
1,2-Dibromoethane (EDB)	ND	1.0	"							
Dibromomethane	ND	1.0	"							
1,2-Dichlorobenzene	ND	1.0	"							
1,3-Dichlorobenzene	ND	1.0	"							
1,4-Dichlorobenzene	ND	1.0	"							
Dichlorodifluoromethane	ND	1.0	"							
1,1-Dichloroethane	ND	1.0	"							
1,2-Dichloroethane	ND	1.0	"							
1,1-Dichloroethene	ND	1.0	"							
cis-1,2-Dichloroethene	ND	1.0	"							
trans-1,2-Dichloroethene	ND	1.0	"							
1,2-Dichloropropane	ND	1.0	"							
1,3-Dichloropropane	ND	1.0	"							
2,2-Dichloropropane	ND	1.0	"							
1,1-Dichloropropene	ND	1.0	"							
cis-1,3-Dichloropropene	ND	1.0	"							
trans-1,3-Dichloropropene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Hexachlorobutadiene	ND	1.0	"							

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Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L1520 - EPA 5030B P & T										
Blank (B8L1520-BLK1)				Prepared & Analyzed: 12/15/08						
Isopropylbenzene	ND	1.0	µg/L							
p-Isopropyltoluene	ND	1.0	"							
Methylene chloride	ND	1.0	"							
Methyl tert-butyl ether	ND	1.0	"							
Naphthalene	ND	1.0	"							
n-Propylbenzene	ND	1.0	"							
Styrene	ND	1.0	"							
1,1,1,2-Tetrachloroethane	ND	1.0	"							
1,1,2,2-Tetrachloroethane	ND	1.0	"							
Tetrachloroethene	ND	1.0	"							
Toluene	ND	1.0	"							
1,2,3-Trichlorobenzene	ND	1.0	"							
1,2,4-Trichlorobenzene	ND	1.0	"							
1,1,1-Trichloroethane	ND	1.0	"							
1,1,2-Trichloroethane	ND	1.0	"							
Trichloroethene	ND	1.0	"							
Trichlorofluoromethane	ND	1.0	"							
1,2,3-Trichloropropane	ND	1.0	"							
1,2,4-Trimethylbenzene	ND	1.0	"							
1,3,5-Trimethylbenzene	ND	1.0	"							
Vinyl chloride	ND	1.0	"							
m,p-Xylene	ND	1.0	"							
o-Xylene	ND	1.0	"							
Surrogate: Dibromofluoromethane	*51.9*		*"*	*50.0*		*104*	*86-118*			
Surrogate: Toluene-d8	*50.1*		*"*	*50.0*		*100*	*88-110*			
Surrogate: 4-Bromofluorobenzene	*49.9*		*"*	*50.0*		*99.8*	*86-115*			
LCS (B8L1520-BS1)				Prepared & Analyzed: 12/15/08						
Benzene	51.7	1.0	µg/L	50.0		103	80-120			
Chlorobenzene	55.2	1.0	"	50.0		110	80-120			
1,1-Dichloroethene	59.3	1.0	"	50.0		119	80-120			
Toluene	53.9	1.0	"	50.0		108	80-120			
Trichloroethene	57.1	1.0	"	50.0		114	80-120			

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Worley Parsons Komex	Project: 52006711	
3901 Via Oro Avenue, Suite 100	Project Number: [none]	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Nat Beal	01/09/09 10:15

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8L1520 - EPA 5030B P & T										
Matrix Spike (B8L1520-MS1)		**Source: 0812327-01**		Prepared & Analyzed: 12/15/08						
Benzene	40.4	1.0	µg/L	50.0	ND	80.8	37-151			
Chlorobenzene	50.6	1.0	"	50.0	ND	101	37-160			
1,1-Dichloroethene	38.2	1.0	"	50.0	ND	76.4	50-150			
Toluene	47.2	1.0	"	50.0	ND	94.4	47-150			
Trichloroethene	48.9	1.0	"	50.0	ND	97.8	71-157			
Matrix Spike Dup (B8L1520-MSD1)		**Source: 0812327-01**		Prepared & Analyzed: 12/15/08						
Benzene	43.9	1.0	µg/L	50.0	ND	87.8	37-151	8.30	30	
Chlorobenzene	54.4	1.0	"	50.0	ND	109	37-160	7.24	30	
1,1-Dichloroethene	41.8	1.0	"	50.0	ND	83.6	50-150	9.00	30	
Toluene	50.2	1.0	"	50.0	ND	100	47-150	6.16	30	
Trichloroethene	52.3	1.0	"	50.0	ND	105	71-157	6.72	30	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Notes and Definitions

H-01	Sample received without sufficient time to complete analysis within recommended holding time.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data Package Prepared For

Sierra Analytical Labs, Inc.

Radiochemical Analysis By

TestAmerica

2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.

Assigned Laboratory Code: TARL

Data Package Contains 17 *Pages*

Report No.: 40652

Results in this report relate only to the sample(s) analyzed.

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
39019		0812327-01	J8L220123-1	K45GF2AA	9K45GF20	9015102

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Certificate of Analysis

January 20, 2009

Sierra Analytical Labs, Inc
26052 Merit Circle, Ste 105
Laguna Hills, CA 92653

Attention: Marcheal Brady

Date Received by Lab	:	December 19, 2008
Sample Number/Matrix	:	One (1) Water
SDG Number	:	39019
Sample Code	:	0812327-01

CASE NARRATIVE

I. Introduction

On December 19, 2008 one water sample was received at the TestAmerica laboratory for radiochemical analysis. Upon receipt, the sample was assigned the TestAmerica identification number as described on the cover page of the Analytical Data Package. The sample was assigned the Lot Number J8L220123.

II. Sample Receipt

The sample was received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical uncertainties.

The analyses requested were:

Gas Proportional Detectors
Gross Alpha by method (RL-GPC-001) Formally RICH-RC-5014 (EPA 900.0)

2800 George Washington Way Richland, WA 99355-1613 **tel** 509.375.3131 **fax** 509.375.5590 **www.testamericainc.com**

IV. Quality Control

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

V. Comments

The information to complete the state of California forms was not included or requested.

Gross Alpha Analysis:
The batch was reanalyzed due to low LCS recovery. Except as noted; the LCS, batch blank, matrix spike, sample and sample duplicate results are within acceptance limits.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

for Megan Rhyne
Don Petty
RPL Manager

Drinking Water Method Cross References

	DRINKING WATER ASTM METHOD CROSS REFERENCES	
Referenced Method	**Isotope(s)**	**TestAmerica Richland's SOP No.**
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 00-02	Gross Alpha (Coprecipitation)	RICH-RC-5021
EPA 903.0	Total Alpha Radium (Ra-226)	RICH-RC-5027
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr-89/90	RICH-RC-5006
ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007

Results in this report relate only to the sample(s) analyzed.

Uncertainty Estimation

TestAmerica Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z....). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value ($S/\sqrt{n}$), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or TestAmerica.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) *u_c - Combined Uncertainty.*	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result. *u_c the combined uncertainty.* The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or TestAmerica "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC|MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the **Work Order** Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by TestAmerica upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the 5 ple such as Pu-242 used to trace a Pu-239/40 method.

Isotope	Richland SOP #	Old Richland SOP #	Method Reference	Title
Asbestos	RL-ASB-001	N/A	NIOSH 7400	Fiber Counting by Phase Contrast Microscopy based on NIOSH 7400
Asbestos	RL-ASB-002	N/A	NIOSH 9002	Sample Prep and Analysis for Asbestos (bulk) by Polarized Light Microsopy based on NIOSH 9002
Alpha - Gross	ARCHIVED	RICH-RB-5035	Liquid Scintillation Anal/ Packard	DETERMINATION OF GROSS ALPHA IN NASAL SMEARS BY LIQUID SCINTILLATION COUNTING
Alpha - Gross	RL-GPC-001	RICH-RC-5014	9310 / EPA SW846 900.0 / EPA 600	DETERMINATION OF GROSS ALPHA AND GROSS BETA IN WATER BY METHOD 9310
Alpha - Gross	RL-GPC-007	RICH-RC-5020	SM 7110B EPA 680	DETERMINATION OF GROSS ALPHA AND GROSS BETA IN SOIL, SHORELINE SOIL, FOOD AND VEGETATION
Alpha - Gross	RL-GPC-002	RICH-RC-5021	00-02 EPA 520	DETERMINATION OF GROSS ALPHA ACTIVITY IN WATER BY COPRECIPITATION
Alpha - Gross	RL-GPC-008	RICH-RC-5036	ER100 / LANL	PREPARATION OF AIR FILTERS FOR GROSS ALPHA/BETA AND COMPOSITING AIR FILTERS
Am	RL-ALP-003	RICH-RC-5072	Mod RP 725 / DOE0089T EXT Chromatography	SEPARATION OF AMERICIUM, CURIUM, AND URANIUM BY EXTRACTION CHROMATOGRAPHY
Am	RL-ALP-010	RICH-RC-5080	Am03/Pu11HASL 300 NAS-NS-3006	SEQUENTIAL SEPARATION OF PLUTONIUM AND AMERICIUM
Beta - Gross	RL-GPC-001	RICH-RC-5014	9310 / EPA SW846 900.0 / EPA 600	DETERMINATION OF GROSS ALPHA AND GROSS BETA IN WATER BY METHOD 9310
Beta - Gross	RL-GPC-007	RICH-RC-5020	SM 7110B EPA 680	DETERMINATION OF GROSS ALPHA AND GROSS BETA IN SOIL, SHORELINE SOIL, FOOD AND VEGETATION
Beta - Gross	RL-GPC-008	RICH-RC-5036	ER100 / LANL	PREPARATION OF AIR FILTERS FOR GROSS ALPHA/BETA AND COMPOSITING AIR FILTERS
C14	RL-LSC-001	RICH-RB-5013	Mod H-02 / EPA 520	TRITIUM, CARBON-14, NICKEL-63 OR PHOSPHORUS-32 ANALYSIS IN URINE
C14	RL-LSC-008	RICH-RC-5022	EPA C-01 / EPA 520	CARBON 14 BY DIGESTION METHOD
C14	RL-LSC-009	RICH-RC-5040	Mod C14 / EPA 680	DETERMINATION OF CARBON-14 BY BENZENE SYNTHESIS
C14	RL-LSC-010	RICH-RC-5046	EPA C-01 / EPA 520	DETERMINATION OF CARBON-14 IN GRAPHITE AND SOIL
C14	RL-LSC-011	RICH-RC-5047	Mod H-02 / EPA 520	DETERMINATION OF CARBON-14 IN WATER BY DIRECT COUNTING
Cm	RL-ALP-003	RICH-RC-5072	Mod RP 725 / DOE0089T EXT Chromatography	SEPARATION OF AMERICIUM, CURIUM, AND URANIUM BY EXTRACTION CHROMATOGRAPHY
Coliform	RL-WC-001	RICH-WC-5001	9222B	DETERMINATION OF TOTAL COLIFORM: MULTIPLE TUBE FERMENTATION TECHNIQUE
Coliform	RL-WC-002	RICH-WC-5002	9131	TOTAL COLIFORMS BY MEMBRANE FILTRATION
Coliform	RL-WC-005	RICH-WC-5007	9223	TOTAL COLIFORM BY THE COLILERT METHOD
Cr6+	RL-WC-003	RICH-WC-5003	7196A, SW846	DETERMINATION OF HEXAVALENT CHROMIUM [Cr(VI)] IN WATER, SOIL, AND SIMILAR MATRICES
Cr6+	RL-WC-004	RICH-WC-5005	3060 / SW846	DETERMINATION OF HEXAVALENT CHROMIUM (CrVI) IN SOLID MATRICES WITH ALKALINE DIGESTION
Fe	RL-LSC-015	RICH-RC-5074	EXT Chromatography ModFe55/PNL-ALO-435	SEPARATION OF IRON AND NICKEL BY EXTRACTION CHROMATOGRAPHY
Fe55	RL-LSC-016	RICH-RC-5023	R4-73-014 / EPA HASL 300	DETERMINATION OF IRON-55 AND IRON-59 IN WATER
Fe59	RL-LSC-016	RICH-RC-5023	R4-73-014 / EPA HASL 300	DETERMINATION OF IRON-55 AND IRON-59 IN WATER
Gamma	RL-GAM-001	RICH-RC-5017	901.0 / HASL 300 ASTM D3649	PREPARATION OF ALL MATRICES FOR ANALYSIS BY GAMMA SPECTROSCOPY
H3	RL-LSC-001	RICH-RB-5013	Mod H-02 / EPA 520	TRITIUM, CARBON-14, NICKEL-63 OR PHOSPHORUS-32 ANALYSIS IN URINE
H3	RL-LSC-003	RICH-RB-5034	7500-3 / SM	DETERMINATION OF TRITIUM IN URINE BY DISTILLATION
H3	RL-LSC-004	RICH-RC-5004	H3 / EPA LV539	DETERMINATION OF TRITIUM IN AIR
H3	RL-LSC-005	RICH-RC-5007	Mod '906.0 / EPA 600	SEPARATION OF TRITIUM IN WATER AND AQUEOUS COMPONENT OF WINE
H3	RL-LSC-007	RICH-RC-5024	H-3 by EE EPA LV539 / HASL 300	DETERMINATION OF LOW LEVEL TRITIUM IN WATER BY ELECTROLYTIC ENRICHMENT
H3	RL-LSC-002	RICH-RC-5037	H-3 in Water/Tissue / LV 539	DETERMINATION OF TRITIUM BY CRYOGENIC DISTILLATION

Isotope	Richland SOP #	Old Richland SOP #	Method Reference	Title
H3	RL-LSC-006	RICH-RC-5048	H-3 in Water/Tissue / LV 539	TRITIUM PREPARATION IN MILK SAMPLES
I129	RL-GAM-002	RICH-RC-5025	R4-73-0141/EPA ASTM D2334 (Discontinued)	DETERMINATION OF IODINE-131 AND 129 IN WATER BY SOLVENT EXTRACTION METHOD
I131	RL-GAM-002	RICH-RC-5025	R4-73-0141/EPA ASTM D2334 (Discontinued)	DETERMINATION OF IODINE-131 AND 129 IN WATER BY SOLVENT EXTRACTION METHOD
I131	ARCHIVED	RICH-RC-5049	HASL 300 (1983)	DETERMINATION OF IODINE-131 IN MILK BY BATCH ION-EXCHANGE
Metals	ARCHIVED	BHI-MT-0001	6010	ICP-AE SPECTROSCOPY, SPECTROMETRIC METHOD FOR TRACE ELEMENT ANALYSIS, METHOD 6010A FOR Bechtel
Metals	RL-MT-001	RICH-MT-0001	6010B	ICP-AES for TRACE ELEMENT ANALYSIS, METHOD 6010B
Metals	RL-MT-002	RICH-MT-0002	SW486 3050B	ACID DIGESTION FOR ICP ANALYSIS
Metals	RL-MT-003	RICH-MT-0003	NIOSH 7300	DIGESTION PREP based on METHOD NIOSH 7300
Ni	RL-LSC-015	RICH-RC-5074	EXT Chromatography ModFe55/PNL-ALO-435	SEPARATION OF IRON AND NICKEL BY EXTRACTION CHROMATOGRAPHY
Ni63	RL-LSC-001	RICH-RB-5013	Mod H-02 / EPA 520	TRITIUM, CARBON-14, NICKEL-63 OR PHOSPHORUS-32 ANALYSIS IN URINE
Ni63	RL-LSC-017	RICH-RC-5069	EXT Chromatography Mod RP300 / DOE0089T	SEPARATION OF Ni-63 BY EXTRACTION CHROMATOGRAPHY
Np	RL-ALP-013	RICH-RC-5009	NAS-NS-3060	DETERMINATION OF NEPTUNIUM-237 BY LIQUID-LIQUID EXTRACTION IN ALL MATRICES
Np	RL-ALP-006	RICH-RC-5064	EXT Chromatography	SEPARATION OF NEPTUNIUM BY EXTRACTION CHROMATOGRAPHY
P32	RL-LSC-001	RICH-RB-5013	Mod H-02 / EPA 520	TRITIUM, CARBON-14, NICKEL-63 OR PHOSPHORUS-32 ANALYSIS IN URINE
Pb	RL-ALP-011	RICH-RC-5076	EXT Chromatography	DETERMINATION OF LEAD-210 BY EXTRACTION CHROMATOGRAPHY
Po	RL-ALP-007	RICH-RB-5001	NAS-NS-3037 HASL 300	DETERMINATION OF POLONIUM-210 IN URINE
Po	RL-ALP-012	RICH-RC-5012	Po-01 / HASL 300 Mod U01 HASL 300	SEPARATION OF ISOTOPIC URANIUM AND POLONIUM-210 IN WATER, SOIL AND FILTERS
Prep - Bioassay	ARCHIVED	RICH-RB-0001		PREPARATION FOR RAPID BIOASSAY ANALYSES
Prep - Bioassay	RL-PRP-001	RICH-RB-5002	Mod Pu06 / HASL 300	PREPARATION OF URINE AND BLOOD SAMPLES
Prep - Bioassay	ARCHIVED	RICH-RB-5004	ASTM D1429-95	DETERMINATION OF SPECIFIC GRAVITY OF URINE
Prep - Bioassay	RL-RPL-002	RICH-RB-5036	Pub 6490,6601 / PNL	PREPARATION OF SYNTHETIC URINE AND FECES USING RECIPES FROM HPS N13.30 PREFORMANCE TESTING
Prep - Bioassay	RL-PRP-002	RICH-RB-5037	LA-10300-M R200 ASTM D3865	PREPARATION OF FECAL SAMPLES USING HYDROFLUORIC ACID DIGESTION
Prep - Bioassay	RL-RPL-003	RICH-RC-5028	ICRP Publication 23	PREPARATION OF SYNTHETIC URINE AND FECES
Prep - Count	RL-ALP-016	RICH-RC-5003	G-03 / HASL 300	COPRECIPITATION OF SOME ACTINIDES ON NEODYMIUM FLUORIDE FOR ALPHA-PARTICLE SPECTROMETRY
Prep - Count	RL-ALP-015	RICH-RC-5039	G-03 / HASL 300 Anal Chem 1972	ELECTRODEPOSITION OF ACTINIDES
Prep - Count	RL-ALP-014	RICH-RC-5085	Morrison & Freiser NAS-NS-3050	ANHYDROUS ETHER EXTRACTION OF URANIUM
Prep - Env	RL-KPA-001	RICH-RC-5015	ASTM / D5174-97	ENVIRONMENTAL SAMPLE PREPARATION FOR URANIUM BY LASER-INDUCED PHOSPHORESCENCE
Prep - Env	RL-PRP-004	RICH-RC-5016	Sr02 / HASL 300	PREPARATION OF ENVIRONMENTAL MATRICES
Prep - Env	RL-PRP-007	RICH-RC-5045	Mod Pu02 / HASL 300	PREPARATION OF MIXED BED RESINS AND PRE-FILTERS
Prep - Env	RL-PRP-008	RICH-RC-5068	Mod ER100 / LA10300	PREPARATION OF SOIL, VEGETATION AND AIR FILTERS BY MIXED STRONG ACID LEACHING
Prep - Resin	RL-ALP-017	RICH-RC-5018	Mod Pu11 / Mod 300	ION-EXCHANGE PREPARATION
Prep - Soil	RL-PRP-003	RICH-RC-5013	Pu02A / HASL 300	PREPARATION OF SOIL SAMPLES
Prep - Soil	RL-PRP-005	RICH-RC-5019	D5259 / ASTM SW 846/3015/3051/3052	PREPARATION AND DISSOLUTION OF SEDIMENTS AND SOIL BY MICROWAVE BOMB DIGESTION

Isotope	Richland SOP #	Old Richland SOP #	Method Reference	Title
Prep - Soil	RL-PRP-006	RICH-RC-5032	Pu02A / HASL 300	COMPLETE DISSOLUTION BY MIXED ACIDS IN A TEFLON BEAKER
Prep - Soil	RL-PRP-009	RICH-RC-5077	Mod ER100 / LA10300	PREPARATION OF SMALL SOIL SAMPLES FOR GAMMA SPEC AND/OR RADIOCHEM ANAL BY ACID DIGESTION
Prep - Urine	RL-PRP-010	RICH-RC-5086	AnalyticaChemActa1992 RP800 / DOE00089T	URINE AND WATER SAMPLE PREPARATION BY CALCIUM PHOSPHATE PRECIPITATION
Prep - Water	RL-PRP-010	RICH-RC-5086	AnalyticaChemActa1992 RP800 / DOE00089T	URINE AND WATER SAMPLE PREPARATION BY CALCIUM PHOSPHATE PRECIPITATION
Pu	ARCHIVED	RICH-RB-5015	Pu11 / HASL 300	RAPID DETERMINATION OF PLUTONIUM IN FECES
Pu	RL-ALP-002	RICH-RC-5010	Pu11 / HASL 300	DETERMINATION OF ISOTOPIC PLUTONIUM IN ALL MATRICES
Pu	RL-ALP-010	RICH-RC-5080	Am03 HASL 300 Pu11 / HASL 300	SEQUENTIAL SEPARATION OF PLUTONIUM AND AMERICIUM
Pu	RL-ALP-001	RICH-RC-5087	AnalyticaChemActa1992 RP800 / DOE00089T	DETERMINATION OF PLUTONIUM BY EXTRACTION CHROMATOGRAPHY
Ra	RL-RA-001	RICH-RC-5005	903.1 / EPA 600	RADIUM-226 AND RADIUM-228 SEPARATION IN RADIOCHEMICAL MATRICES - ADAPTED FROM EPA 903.1 AND 904.0
Ra	RL-RA-001	RICH-RC-5005	904.0 / EPA 600	RADIUM-226 AND RADIUM-228 SEPARATION IN RADIOCHEMICAL MATRICES - ADAPTED FROM EPA 903.1 AND 904.0
Ra	RL-RA-002	RICH-RC-5027	Mod D2460/ ASTM 903.0 / EPA 600	DETERMINATION OF TOTAL RADIUM
Rn	RL-LSC-019	RICH-RC-5082	913.0 / EPA	DETERMINATION OF RADON-222 - ADAPTED FROM METHOD 913.0
S35	ARCHIVED	RICH-RB-5020	Hillebrand, Lundeell, Bright, Hoffman 1953	DETERMINATION OF SULFUR-35 IN URINE
Se79	RL-LSC-012	RICH-RC-5043	Selenium / NAS-NS-3030	RADIOCHEMICAL DETERMINATION OF SELENIUM-79
Solubility	ARCHIVED	RICH-RC-5035	Kalfward&Thomas PNL3716	DETERMINATION OF SOLUBILITY OF RADIOACTIVE PARTICLE CONSTITUENTS
Sr	RL-GPC-005	RICH-RB-5007	Mod Sr02 / HASL 300 Mod 905.0 / EPA 600	DETERMINATION OF TOTAL STRONTIUM IN URINE
Sr	RL-GPC-006	RICH-RB-5021	Mod Sr02 / HASL300 Mod 905.0 / EPA 600	DETERMINATION OF STRONTIUM IN FECES
Sr	ARCHIVED	RICH-RB-5022	Mod Sr02 / HASL300 Mod 905.0 / EPA 600	DETERMINATION OF TOTAL STRONTIUM IN URINE FOR RAPID ANALYSIS
Sr	ARCHIVED	RICH-RB-5031	Mod Sr02 / HASL300 Mod 905.0 / EPA 600	RAPID DETERMINATION OF TOTAL STRONTIUM IN FECES
Sr	RL-GPC-003	RICH-RC-5006	Mod Sr02 / HASL300 Mod 905.0 / EPA 600	STRONTIUM SEPARATION IN ENVIROMENTAL MATRICES
Sr - Yt	RL-GPC-004	RICH-RC-5071	Mod Sr02 / HASL300 Mod 905.0 / EPA 600	YTTRIUM-90 SEPARATION FOR STRONTIUM-90 DETERMINATION IN ALL MATRICES
Tc	RL-LSC-014	RICH-RC-5065	EXT Chromatography Mod RP550 / DOE0089T	DETERMINATION OF TECHNETIUM-99 BY EXTRACTION CHROMATOGRAPHY
Tc	RL-LSC-013	RICH-RC-5078	Tc01 / HASL 300	SEPARATION OF TECHNETIUM-99 IN ALL MATRICES
Th	RL-ALP-008	RICH-RB-5006	Mod Th01 / HASL 300	SEPARATION OF THORIUM FROM URINE AND FECAL SAMPLES
Th	RL-ALP-005	RICH-RC-5084	Mod Th01 / HASL 300 Anal Chim Acta 1982	DETERMINATION OF THORIUM ISOTOPIC IN ENVIRONMENTAL MATRICES
U	RL-ALP-012	RICH-RC-5012	Po-01 / HASL 300 Mod U01 / HASL 300	SEPARATION OF ISOTOPIC URANIUM AND POLONIUM-210 IN WATER, SOIL AND FILTERS
U	RL-KPA-002	RICH-RC-5031	Mod U01 / HASL 300	SEPARATION OF TOTAL URANIUM IN WATER AND URINE
U	RL-KPA-003	RICH-RC-5058	D5174 / ASTM	DETERMINATION OF URANIUM BY PHOSPHORESCENCE ANALYSIS
U	RL-ALP-004	RICH-RC-5067	EXT Chromatography Mod RP725 / DOE0089T	SEPARATION OF URANIUM BY EXTRACTION CHROMATOGRAPHY
U	RL-ALP-003	RICH-RC-5072	EXT Chrom Mod RP725 & 800 / DOE0089T	SEPARATION OF AMERICIUM, CURIUM, AND URANIUM BY EXTRACTION CHROMATOGRAPHY
U	RL-ALP-009	RICH-RC-5079	EXT Chromatography Mod RP725 / DOE0089T	DETERMINATION OF ISOTOPIC URANIUM IN ALL MATRICES

Sample Results Summary

TestAmerica TARL

Ordered by Method, Batch No., Client Sample ID.

Date: 20-Jan-09

Report No. : 40652

SDG No: 39019

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDC or MDA	CRDL	RER
9015102	RICHRC5014								
	0812327-01								
	K45GF2AA	ALPHA	1.26 +- 3.69	U	pCi/L	100%	7.85	3.0	
	0812327-01 DUP								
	K45GF2AD	ALPHA	1.95 +- 2.80	U	pCi/L	100%	5.27	3.0	0.

No. of Results: 2

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for but not detected above limitir iteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identifiec gamma scan software.

QC Results Summary

TestAmerica TARL

Ordered by Method, Batch No, QC Type,.

Date: 20-Jan-09

Report No. : 40652

SDG No.: 39019

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDC|M
RICHRC5014								
9015102 MATRIX SPIKE, 0812327-01								
K45GF2AC	ALPHA	694.0 +- 147.0		pCi/L	100%	113%	0.1	5.16
9015102 BLANK QC,								
K47D32AA	ALPHA	0.0362 +- 0.099	U	pCi/L	100%			0.222
9015102 LCS,								
K47D33AC	ALPHA	34.3 +- 7.22		pCi/L	100%	84%	-0.2	0.501

No. of Results: 3

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

U Qual - Analyzed for but not detected above limitin 10 iteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified gamma scan software.

FORM I

SAMPLE RESULTS

Date: 20-Jan-09

Lab Name:	TestAmerica	SDG:	39019	Collection Date:	12/11/2008 10:35:00 AM
Lot-Sample No.:	J8L220123-1	Report No. :	40652	Received Date:	12/19/2008 11:25:00 AM
Client Sample ID:	0812327-01	COC No. :		Matrix:	WATER

Ordered by Client Sample ID, Batch N

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Prim Dete
Batch: 9015102	RICHRC5014			Work Order: K45GF2AA			Report DB ID: 9K45GF20					
ALPHA	**1.26**	U	3.7	3.7	7.85	pCi/L	100%	*0.16*	1/17/09 08:09 a		0.0225	GPC
						3.27	3.0	*0.68*			L	

No. of Results: 1 Comments:

11

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

FORM II

Date: 20-Jan-09

DUPLICATE RESULTS

Lab Name:	TestAmerica	SDG:	39019	Collection Date:	12/11/2008 10:35:00 AM
Lot-Sample No.:	J8L220123-1	Report No. :	40652	Received Date:	12/19/2008 11:25:00 AM
Client Sample ID:	0812327-01 DUP	COC No. :		Matrix:	WATER

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detecto
Batch: 9015102	RICHRC5014			Work Order: K45GF2AD		Report DB ID: K45GF2DR			Orig Sa DB ID: 9K45GF20			
ALPHA	1.95	U	2.8	2.8	5.27	pCi/L	100%	0.37	1/17/09 08:09 a		0.0225	GPC10
	1.26	U	RER2 0.3			3.0		(1.4)			L	

No. of Results: 1 Comments:

12

TestAmerica
rptSTLRchDupV5.2
.2 A2002

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

FORM II

BLANK RESULTS

Date: 20-Jan-09

Lab Name: TestAmerica

Matrix: WATER

SDG: 39019

Report No. : 40652

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 9015102	RICHRC5014			Work Order:	K47D32AA		Report DB ID:	K47D32AB				
ALPHA	0.0362	U	0.099	0.099	0.222	pCi/L	100%	0.16	1/17/09 08:09 a		0.2	GPC10F
					0.0762	3.0		0.73			L	

No. of Results: 1 Comments:

13

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

FORM II

LCS RESULTS

Date: 20-Jan-09

Lab Name: TestAmerica

Matrix: WATER

SDG: 39019

Report No. : 40652

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detecto.
Batch: 9015102	RICHRC5014			Work Order:	K47D33AC		Report DB ID:	K47D33CS					
ALPHA	34.3		1.9	7.2	0.501	pCi/L	100%	41.1	0.86	84%	1/17/09 08:09 a	0.2	GPC1(
							Rec Limits:	70	130	-0.2		L	

No. of Results: 1 Comments:

14

FORM II

Date: 20-Jan-09

MATRIX SPIKE RESULTS

Lab Name: TestAmerica

SDG: 39019

Lot-Sample No.: J8L220123-1, 0812327-01

Report No. : 40652

Matrix: WATER

Parameter	SpikeResult, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Rpt Unit, CRDL	Yield	Rec-overy	Expected, Uncert	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 9015102	Work Order: K45GF2AC			Report DB ID: K45GF2CW			Orig Sa DB ID: 9K45GF20					
ALPHA	694.0		32.0	150.0	5.16	pCi/L	100%	113.47%	611.0	1/17/09 08:09 a	0.0225	RICHRC5014
	1.26								13.0		L	GPC10D

Number of Results: 1

Comments:

15

TestAmerica
rptSTLRchMs
V5.2.2 A2002

RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

SUBCONTRACT ORDER

Sierra Analytical Labs, Inc.

Sierra Project #: 0812327

Comments

SENDING LABORATORY:

Sierra Analytical Labs, Inc.
26052 Merit Circle, Suite 105
Laguna Hills, CA 92653
Phone: (949) 348-9389
Fax: (949) 348-9115
Laboratory Contact: Nick Forsyth

Turn Around Time Requested:
- [x] Normal
- [ ] 24 Hour
- [ ] 48 Hour
- [ ] 72 Hour
- [ ] 4 Day
- [ ] 5 Day

RECEIVING LABORATORY:

TestAmerica (STL). - Richland
2800 George Washington Way
Richland, WA 99354
Phone : (509) 375-3131
Fax: (509) 375-5590

Analysis	Expires	Sampled:	Laboratory ID	Comments
Sample ID: RICE 2-650-121108 (0812327-01)	**Liquid**	**12/11/08 10:35**	K45GF	
Radioactivity-Gross Alpha	12/11/09 10:35			

Containers Supplied:
1L Poly (A)

J8L 220123
39019
Due 01.16.09

Special Instructions :

- [ ] Intact
- [ ] Sample Seals
- [ ] Properly Labeled
- [ ] Chilled TEMP (°C) _____
- [ ] Appropriate Container
- [ ] Preservatives - Verified By _____

Relinquished By	Date / Time	Received By	Date / Time
	12-6-08 / 1500		12-19-08 1125
Relinquished By	Date / Time	Received By	Date / Time
Relinquished By	Date / Time	Received By	Date / Time

116

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sample Check-in List

Date/Time Received: 12-19-08 1125 GM Screen Result .01

Client: Sierra SDG #: 39019 NA[ ] SAF #: _____ NA [ ]

Work Order Number: JTL220123 Chain of Custody # 0812327

Shipping Container ID: _____ Air Bill # _____

1. Custody Seals on shipping container intact? NA [ ] Yes [✓] No [ ]
2. Custody Seals dated and signed? NA [ ] Yes [✓] No [ ]
3. Chain of Custody record present? NA [ ] Yes [✓] No [ ]
4. Cooler Temperature: _____ NA [✓] 5. Vermiculite/packing materials is NA [ ] Wet [ ] Dry [✓]
6. Number of samples in shipping container: 1
7. Sample holding times exceeded? NA [ ] Yes [ ] No [✓]
8. Samples have:
   _____ Tape
   _____ Custody Seals
   _____ Hazard Lables
   1 Appropriate Sample Lables
9. Samples are:
   1 In Good Condition
   _____ Broken
   _____ Leaking
   _____ Have Air Bubbles
   (Only for samples requiring no head space.)
10. Sample pH taken? NA [ ] pH<2 [✓] pH>2 [ ] pH>9 [ ] Amount HNO_3 Added 1mL
11. Sample Location, Sample Collector Listed? *
    *For documentation only. No corrective action needed.
12. Were any anomalies identified in sample receipt? Yes [ ] No [✓]
13. Description of anomalies (include sample numbers): _____

Sample Custodian: Nuyen Rifari Date: 12-19-08

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on _____ by _____ Person Contacted _____

[ ] No action necessary; process as is.

Project Manager _____ Date _____

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
RICE1-310-021309	0902261-01	Liquid	02/13/09 13:25	02/17/09 10:00
RICE2-750-021309	0902261-02	Liquid	02/13/09 09:20	02/17/09 10:00
RICE2-850-021309	0902261-03	Liquid	02/13/09 08:10	02/17/09 10:00
RICE2-950-021209	0902261-04	Liquid	02/12/09 17:10	02/17/09 10:00

CASE NARRATIVE

SAMPLE RECEIPT:	Samples were received intact, at 4 °C, and accompanied by chain of custody documentation.
PRESERVATION:	Samples requiring preservation were verified prior to sample preparation and analysis.
HOLDING TIMES:	All holding times were met, unless otherwise noted in the report with data qualifiers.
QA/QC CRITERIA:	All quality objective criteria were met, except as noted in the report with data qualifiers.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Conventional Chemistry Parameters by APHA/EPA Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE1-310-021309 (0902261-01) Liquid	**Sampled: 02/13/09 13:25**		**Received: 02/17/09 10:00**						
Total Alkalinity	**101**	0.400	mg/L	1	B9B2342	02/17/09	02/17/09 13:30	EPA 310.1	
Carbonate Alkalinity	ND	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**101**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Ammonia as N	**0.750**	0.100	"	"	"	"	"	SM 4500-NH3	
Chloride	**938**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**3560**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Cyanide (total)	ND	0.0200	mg/L	"	"	"	"	EPA 335.2	
Fluoride	**2.70**	0.0200	"	"	"	"	"	EPA 340.1	
Total Hardness	**320**	0.400	"	"	"	"	"	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	H-01
Nitrite as N	ND	0.0200	"	"	"	"	"	SM4500-NO2B	H-01
Nitrate as N	**3.30**	0.0200	"	"	"	"	"	EPA 353.3	H-01
Nitrate/Nitrite as N	**3.31**	0.0200	"	"	"	"	"	"	H-01
pH	**7.44**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Orthophosphate as P	**0.210**	0.0500	mg/L	"	"	"	"	EPA 365.2	H-01
Phosphorus	**0.240**	0.0500	"	"	"	"	"	"	
Reactive Silica	**2.83**	0.100	"	"	"	"	"	SM 4500-Si E	
Sulfate as SO4	**370**	0.500	"	"	"	"	"	EPA 375.4	
Sulfide	ND	0.05	"	"	"	"	"	EPA 376.1	
Total Dissolved Solids	**2370**	1.00	"	"	"	"	"	EPA 160.1	
Temperature	**18.1**	0.100	°C	"	"	"	"	EPA 170.1	
Total Suspended Solids	**3.00**	1.00	mg/L	"	"	"	"	EPA 160.2	
RICE2-750-021309 (0902261-02) Liquid	**Sampled: 02/13/09 09:20**		**Received: 02/17/09 10:00**						
Total Alkalinity	**72.4**	0.400	mg/L	1	B9B2342	02/17/09	02/17/09 13:30	EPA 310.1	
Carbonate Alkalinity	ND	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**72.4**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Ammonia as N	**0.500**	0.100	"	"	"	"	"	SM 4500-NH3	
Chloride	**508**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**2010**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Fluoride	**3.05**	0.0200	mg/L	"	"	"	"	EPA 340.1	
Total Hardness	**142**	0.400	"	"	"	"	"	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	H-01
Nitrite as N	**0.0280**	0.0200	"	"	"	"	"	SM4500-NO2B	H-01
Nitrate as N	**2.70**	0.0200	"	"	"	"	"	EPA 353.3	H-01
Nitrate/Nitrite as N	**2.74**	0.0200	"	"	"	"	"	"	H-01
pH	**7.99**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Orthophosphate as P	**0.180**	0.0500	mg/L	"	"	"	"	EPA 365.2	H-01

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Conventional Chemistry Parameters by APHA/EPA Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE2-750-021309 (0902261-02) Liquid	**Sampled: 02/13/09 09:20**		**Received: 02/17/09 10:00**						
Phosphorus	**0.200**	0.0500	mg/L	1	B9B2342	02/17/09	02/17/09 13:30	EPA 365.2	
Reactive Silica	**1.65**	0.100	"	"	"	"	"	SM 4500-Si E	
Sulfate as SO4	**240**	0.500	"	"	"	"	"	EPA 375.4	
Sulfide	ND	0.05	"	"	"	"	"	EPA 376.1	
Total Dissolved Solids	**1330**	1.00	"	"	"	"	"	EPA 160.1	
Temperature	**17.9**	0.100	°C	"	"	"	"	EPA 170.1	
Total Suspended Solids	**2.00**	1.00	mg/L	"	"	"	"	EPA 160.2	
RICE2-850-021309 (0902261-03) Liquid	**Sampled: 02/13/09 08:10**		**Received: 02/17/09 10:00**						
Total Alkalinity	**75.6**	0.400	mg/L	1	B9B2342	02/17/09	02/17/09 13:30	EPA 310.1	
Carbonate Alkalinity	ND	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**75.6**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Ammonia as N	**0.510**	0.100	"	"	"	"	"	SM 4500-NH3	
Chloride	**618**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**2690**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Fluoride	**7.00**	0.0200	mg/L	"	"	"	"	EPA 340.1	
Total Hardness	**209**	0.400	"	"	"	"	"	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	H-01
Nitrite as N	**0.155**	0.0200	"	"	"	"	"	SM4500-NO2B	H-01
Nitrate as N	**2.30**	0.0200	"	"	"	"	"	EPA 353.3	H-01
Nitrate/Nitrite as N	**2.50**	0.0200	"	"	"	"	"	"	H-01
pH	**7.61**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Orthophosphate as P	**0.0900**	0.0500	mg/L	"	"	"	"	EPA 365.2	H-01
Phosphorus	**0.100**	0.0500	"	"	"	"	"	"	
Reactive Silica	**4.88**	0.100	"	"	"	"	"	SM 4500-Si E	
Sulfate as SO4	**420**	0.500	"	"	"	"	"	EPA 375.4	
Sulfide	ND	0.05	"	"	"	"	"	EPA 376.1	
Total Dissolved Solids	**1800**	1.00	"	"	"	"	"	EPA 160.1	
Temperature	**18.2**	0.100	°C	"	"	"	"	EPA 170.1	
Total Suspended Solids	**3.00**	1.00	mg/L	"	"	"	"	EPA 160.2	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Conventional Chemistry Parameters by APHA/EPA Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE2-950-021209 (0902261-04) Liquid	**Sampled: 02/12/09 17:10**		**Received: 02/17/09 10:00**						
Total Alkalinity	**52.0**	0.400	mg/L	1	B9B2342	02/17/09	02/17/09 13:30	EPA 310.1	
Carbonate Alkalinity	ND	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**52.0**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Ammonia as N	**0.530**	0.100	"	"	"	"	"	SM 4500-NH3	
Chloride	**610**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**2500**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Fluoride	**1.15**	0.0200	mg/L	"	"	"	"	EPA 340.1	
Total Hardness	**202**	0.400	"	"	"	"	"	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	H-01
Nitrite as N	ND	0.0200	"	"	"	"	"	SM4500-NO2B	H-01
Nitrate as N	**1.70**	0.0200	"	"	"	"	"	EPA 353.3	H-01
Nitrate/Nitrite as N	**1.71**	0.0200	"	"	"	"	"	"	H-01
pH	**7.62**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Orthophosphate as P	**0.0900**	0.0500	mg/L	"	"	"	"	EPA 365.2	H-01
Phosphorus	**0.110**	0.0500	"	"	"	"	"	"	
Reactive Silica	**1.80**	0.100	"	"	"	"	"	SM 4500-Si E	
Sulfate as SO4	**340**	0.500	"	"	"	"	"	EPA 375.4	
Sulfide	ND	0.05	"	"	"	"	"	EPA 376.1	
Total Dissolved Solids	**1700**	1.00	"	"	"	"	"	EPA 160.1	
Temperature	**18.4**	0.100	°C	"	"	"	"	EPA 170.1	
Total Suspended Solids	**2.00**	1.00	mg/L	"	"	"	"	EPA 160.2	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Total Organic Carbon (TOC) by SM 5310 B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE1-310-021309 (0902261-01) Liquid	**Sampled: 02/13/09 13:25**		**Received: 02/17/09 10:00**						
Total Organic Carbon	**6.7**	0.50	mg/L	1	B9B1821	02/20/09	02/20/09 12:59	SM 5310 B	
RICE2-750-021309 (0902261-02) Liquid	**Sampled: 02/13/09 09:20**		**Received: 02/17/09 10:00**						
Total Organic Carbon	**3.8**	0.50	mg/L	1	B9B1821	02/20/09	02/20/09 13:20	SM 5310 B	
RICE2-850-021309 (0902261-03) Liquid	**Sampled: 02/13/09 08:10**		**Received: 02/17/09 10:00**						
Total Organic Carbon	**4.1**	0.50	mg/L	1	B9B1821	02/20/09	02/20/09 13:40	SM 5310 B	
RICE2-950-021209 (0902261-04) Liquid	**Sampled: 02/12/09 17:10**		**Received: 02/17/09 10:00**						
Total Organic Carbon	**2.8**	0.50	mg/L	1	B9B1821	02/20/09	02/20/09 13:59	SM 5310 B	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE1-310-021309 (0902261-01) Liquid	**Sampled: 02/13/09 13:25**		**Received: 02/17/09 10:00**						
Calcium	**84**	0.53	mg/L	1	B9B1914	02/19/09	02/19/09 18:16	EPA 200.7	
Copper	ND	0.011	"	"	"	"	02/19/09 18:19	"	
Iron	**23**	0.052	"	"	"	"	02/19/09 18:18	"	
Potassium	**11**	0.90	"	"	"	"	02/19/09 18:16	"	
Magnesium	**27**	0.41	"	"	"	"	"	"	
Manganese	**0.11**	0.0060	"	"	"	"	02/19/09 18:18	"	
Sodium	**670**	0.71	"	"	"	"	02/19/09 18:16	"	
Zinc	**0.29**	0.013	"	"	"	"	02/19/09 18:19	"	
RICE2-750-021309 (0902261-02) Liquid	**Sampled: 02/13/09 09:20**		**Received: 02/17/09 10:00**						
Calcium	**42**	0.53	mg/L	1	B9B1914	02/19/09	02/19/09 18:33	EPA 200.7	
Copper	ND	0.011	"	"	"	"	02/19/09 18:35	"	
Iron	**6.1**	0.052	"	"	"	"	"	"	
Potassium	**5.9**	0.90	"	"	"	"	02/19/09 18:33	"	
Magnesium	**9.1**	0.41	"	"	"	"	"	"	
Manganese	**0.064**	0.0060	"	"	"	"	02/19/09 18:35	"	
Sodium	**390**	0.71	"	"	"	"	02/19/09 18:33	"	
Zinc	**1.1**	0.013	"	"	"	"	02/19/09 18:35	"	
RICE2-850-021309 (0902261-03) Liquid	**Sampled: 02/13/09 08:10**		**Received: 02/17/09 10:00**						
Calcium	**59**	0.53	mg/L	1	B9B1914	02/19/09	02/19/09 18:58	EPA 200.7	
Copper	ND	0.011	"	"	"	"	02/19/09 19:00	"	
Iron	**9.9**	0.052	"	"	"	"	"	"	
Potassium	**7.4**	0.90	"	"	"	"	02/19/09 18:58	"	
Magnesium	**15**	0.41	"	"	"	"	"	"	
Manganese	**0.14**	0.0060	"	"	"	"	02/19/09 19:00	"	
Sodium	**520**	0.71	"	"	"	"	02/19/09 18:58	"	
Zinc	**2.0**	0.013	"	"	"	"	02/19/09 19:00	"	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE2-950-021209 (0902261-04) Liquid Sampled: 02/12/09 17:10 Received: 02/17/09 10:00									
Calcium	**56**	0.53	mg/L	1	B9B1914	02/19/09	02/19/09 19:13	EPA 200.7	
Copper	ND	0.011	"	"	"	"	02/19/09 19:16	"	
Iron	**28**	0.052	"	"	"	"	02/19/09 19:15	"	
Potassium	**8.5**	0.90	"	"	"	"	02/19/09 19:13	"	
Magnesium	**15**	0.41	"	"	"	"	"	"	
Manganese	**0.16**	0.0060	"	"	"	"	02/19/09 19:15	"	
Sodium	**470**	0.71	"	"	"	"	02/19/09 19:13	"	
Zinc	**0.52**	0.013	"	"	"	"	02/19/09 19:16	"	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals (Dissolved) by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE1-310-021309 (0902261-01) Liquid	**Sampled: 02/13/09 13:25**		**Received: 02/17/09 10:00**						
Silver	ND	0.0040	mg/L	1	B9B1920	02/19/09	02/20/09 13:59	EPA 200.7	
Arsenic	ND	0.015	"	"	"	"	"	"	
Barium	**0.029**	0.021	"	"	"	"	"	"	
Beryllium	ND	0.0010	"	"	"	"	"	"	
Cadmium	ND	0.0040	"	"	"	"	"	"	
Cobalt	ND	0.0070	"	"	"	"	"	"	
Chromium	ND	0.0060	"	"	"	"	"	"	
Copper	ND	0.011	"	"	"	"	"	"	
Mercury	ND	0.00030	"	"	B9B2008	02/20/09	02/20/09 16:38	EPA 245.1	
Molybdenum	**0.034**	0.015	"	"	B9B1920	02/19/09	02/20/09 13:59	EPA 200.7	
Nickel	ND	0.0090	"	"	"	"	"	"	
Lead	ND	0.015	"	"	"	"	"	"	
Antimony	ND	0.031	"	"	"	"	"	"	
Selenium	ND	0.018	"	"	"	"	"	"	
Thallium	ND	0.0070	"	"	"	"	"	"	
Vanadium	ND	0.0070	"	"	"	"	"	"	
Zinc	**0.15**	0.013	"	"	"	"	"	"	
RICE2-750-021309 (0902261-02) Liquid	**Sampled: 02/13/09 09:20**		**Received: 02/17/09 10:00**						
Silver	ND	0.0040	mg/L	1	B9B1920	02/19/09	02/20/09 14:26	EPA 200.7	
Arsenic	ND	0.015	"	"	"	"	02/20/09 14:27	"	
Barium	**0.035**	0.021	"	"	"	"	"	"	
Beryllium	ND	0.0010	"	"	"	"	02/20/09 14:26	"	
Cadmium	ND	0.0040	"	"	"	"	02/20/09 14:27	"	
Cobalt	ND	0.0070	"	"	"	"	"	"	
Chromium	ND	0.0060	"	"	"	"	"	"	
Copper	ND	0.011	"	"	"	"	02/20/09 14:26	"	
Mercury	ND	0.00030	"	"	B9B2008	02/20/09	02/20/09 16:45	EPA 245.1	
Molybdenum	**0.025**	0.015	"	"	B9B1920	02/19/09	02/20/09 14:27	EPA 200.7	
Nickel	ND	0.0090	"	"	"	"	"	"	
Lead	ND	0.015	"	"	"	"	"	"	
Antimony	ND	0.031	"	"	"	"	"	"	
Selenium	ND	0.018	"	"	"	"	"	"	
Thallium	ND	0.0070	"	"	"	"	"	"	
Vanadium	ND	0.0070	"	"	"	"	02/20/09 14:26	"	
Zinc	**0.39**	0.013	"	"	"	"	"	"	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals (Dissolved) by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE2-850-021309 (0902261-03) Liquid	**Sampled: 02/13/09 08:10**		**Received: 02/17/09 10:00**						
Silver	ND	0.0040	mg/L	1	B9B1920	02/19/09	02/20/09 14:31	EPA 200.7	
Arsenic	ND	0.015	"	"	"	"	02/20/09 14:32	"	
Barium	**0.062**	0.021	"	"	"	"	02/20/09 14:31	"	
Beryllium	ND	0.0010	"	"	"	"	"	"	
Cadmium	ND	0.0040	"	"	"	"	02/20/09 14:32	"	
Cobalt	ND	0.0070	"	"	"	"	"	"	
Chromium	ND	0.0060	"	"	"	"	"	"	
Copper	ND	0.011	"	"	"	"	02/20/09 14:31	"	
Mercury	ND	0.00030	"	"	B9B2008	02/20/09	02/20/09 16:51	EPA 245.1	
Molybdenum	**0.024**	0.015	"	"	B9B1920	02/19/09	02/20/09 14:32	EPA 200.7	
Nickel	ND	0.0090	"	"	"	"	"	"	
Lead	ND	0.015	"	"	"	"	"	"	
Antimony	ND	0.031	"	"	"	"	"	"	
Selenium	ND	0.018	"	"	"	"	"	"	
Thallium	ND	0.0070	"	"	"	"	"	"	
Vanadium	ND	0.0070	"	"	"	"	02/20/09 14:31	"	
Zinc	**0.98**	0.013	"	"	"	"	"	"	
RICE2-950-021209 (0902261-04) Liquid	**Sampled: 02/12/09 17:10**		**Received: 02/17/09 10:00**						
Silver	ND	0.0040	mg/L	1	B9B1920	02/19/09	02/20/09 14:36	EPA 200.7	
Arsenic	ND	0.015	"	"	"	"	02/20/09 14:37	"	
Barium	**0.043**	0.021	"	"	"	"	02/20/09 14:36	"	
Beryllium	ND	0.0010	"	"	"	"	"	"	
Cadmium	ND	0.0040	"	"	"	"	02/20/09 14:37	"	
Cobalt	ND	0.0070	"	"	"	"	"	"	
Chromium	ND	0.0060	"	"	"	"	"	"	
Copper	ND	0.011	"	"	"	"	02/20/09 14:36	"	
Mercury	ND	0.00030	"	"	B9B2008	02/20/09	02/20/09 16:53	EPA 245.1	
Molybdenum	**0.020**	0.015	"	"	B9B1920	02/19/09	02/20/09 14:37	EPA 200.7	
Nickel	ND	0.0090	"	"	"	"	"	"	
Lead	ND	0.015	"	"	"	"	"	"	
Antimony	ND	0.031	"	"	"	"	"	"	
Selenium	ND	0.018	"	"	"	"	"	"	
Thallium	ND	0.0070	"	"	"	"	"	"	
Vanadium	ND	0.0070	"	"	"	"	02/20/09 14:36	"	
Zinc	**0.13**	0.013	"	"	"	"	02/20/09 14:37	"	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Volatile Organic Compounds by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE1-310-021309 (0902261-01) Liquid Sampled: 02/13/09 13:25 Received: 02/17/09 10:00									
Benzene	ND	1.0	µg/L	1	B9B1910	02/18/09	02/19/09 09:12	EPA 8260B	
Bromobenzene	ND	1.0	"	"	"	"	"	"	
Bromochloromethane	ND	1.0	"	"	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
Dibromomethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Volatile Organic Compounds by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RICE1-310-021309 (0902261-01) Liquid Sampled: 02/13/09 13:25 Received: 02/17/09 10:00									
Methyl tert-butyl ether	ND	1.0	µg/L	1	B9B1910	02/18/09	02/19/09 09:12	EPA 8260B	
Naphthalene	ND	1.0	"	"	"	"	"	"	
n-Propylbenzene	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	ND	1.0	"	"	"	"	"	"	
Toluene	**20**	1.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	
Trichloroethene	ND	1.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	1.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*105 %*	*86-118*		"	"	"	"	
Surrogate: Toluene-d8		*108 %*	*88-110*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*113 %*	*86-115*		"	"	"	"	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Total Organic Carbon (TOC) by SM 5310 B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1821 - Organic Carbon										
Blank (B9B1821-BLK1)				Prepared & Analyzed: 02/20/09						
Total Organic Carbon	ND	0.50	mg/L							

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1914 - EPA 200 Series										
Blank (B9B1914-BLK1)				Prepared & Analyzed: 02/19/09						
Calcium	ND	0.53	mg/L							
Copper	ND	0.011	"							
Iron	ND	0.052	"							
Magnesium	ND	0.41	"							
Manganese	ND	0.0060	"							
Potassium	ND	0.90	"							
Sodium	ND	0.71	"							
Zinc	ND	0.013	"							
Blank (B9B1914-BLK2)				Prepared & Analyzed: 02/19/09						
Calcium	ND	0.53	mg/L							
Copper	ND	0.011	"							
Iron	ND	0.052	"							
Magnesium	ND	0.41	"							
Manganese	ND	0.0060	"							
Potassium	ND	0.90	"							
Sodium	ND	0.71	"							
Zinc	ND	0.013	"							
LCS (B9B1914-BS1)				Prepared & Analyzed: 02/19/09						
Calcium	9.59	0.53	mg/L	10.2		94.0	80-120			
Copper	0.195	0.011	"	0.200		97.5	85-115			
Iron	0.205	0.052	"	0.200		102	70-130			
Magnesium	10.0	0.41	"	10.2		98.0	80-120			
Manganese	0.197	0.0060	"	0.200		98.5	85-115			
Potassium	11.0	0.90	"	10.2		108	80-120			
Sodium	9.60	0.71	"	10.2		94.1	80-120			
Zinc	0.195	0.013	"	0.200		97.5	85-115			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1914 - EPA 200 Series										
LCS (B9B1914-BS2)				Prepared & Analyzed: 02/19/09						
Calcium	9.34	0.53	mg/L	10.2		91.6	80-120			
Copper	0.198	0.011	"	0.200		99.0	85-115			
Iron	0.203	0.052	"	0.200		102	70-130			
Magnesium	10.2	0.41	"	10.2		100	80-120			
Manganese	0.201	0.0060	"	0.200		100	85-115			
Potassium	11.3	0.90	"	10.2		111	80-120			
Sodium	9.57	0.71	"	10.2		93.8	80-120			
Zinc	0.203	0.013	"	0.200		102	85-115			
Matrix Spike (B9B1914-MS1)		**Source: 0902213-01**		Prepared & Analyzed: 02/19/09						
Calcium	28.8	0.53	mg/L	10.2	19	96.1	70-130			
Copper	0.204	0.011	"	0.200	0.0026	101	70-130			
Iron	0.230	0.052	"	0.200	0.032	99.0	70-130			
Magnesium	15.3	0.41	"	10.2	5.1	100	70-130			
Manganese	0.203	0.0060	"	0.200	0.0051	99.0	70-130			
Potassium	12.8	0.90	"	10.2	1.7	109	70-130			
Sodium	21.1	0.71	"	10.2	12	89.2	70-130			
Zinc	0.203	0.013	"	0.200	0.0072	97.9	70-130			
Matrix Spike (B9B1914-MS2)		**Source: 0902261-03**		Prepared & Analyzed: 02/19/09						
Calcium	59.7	0.53	mg/L	10.2	59	6.86	70-130			QM-07
Copper	0.205	0.011	"	0.200	0.0054	99.8	70-130			
Iron	9.54	0.052	"	0.200	9.9	NR	70-130			QM-07
Magnesium	22.8	0.41	"	10.2	15	76.5	70-130			
Manganese	0.322	0.0060	"	0.200	0.14	91.0	70-130			
Potassium	18.7	0.90	"	10.2	7.4	111	70-130			
Sodium	481	0.71	"	10.2	520	NR	70-130			QM-07
Zinc	2.16	0.013	"	0.200	2.0	80.0	70-130			

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1914 - EPA 200 Series										
Matrix Spike Dup (B9B1914-MSD1)		**Source: 0902213-01**		Prepared & Analyzed: 02/19/09						
Calcium	28.8	0.53	mg/L	10.2	19	96.1	70-130	0.00	20	
Copper	0.199	0.011	"	0.200	0.0026	98.2	70-130	2.48	20	
Iron	0.226	0.052	"	0.200	0.032	97.0	70-130	1.75	20	
Magnesium	15.2	0.41	"	10.2	5.1	99.0	70-130	0.656	20	
Manganese	0.201	0.0060	"	0.200	0.0051	98.0	70-130	0.990	20	
Potassium	12.7	0.90	"	10.2	1.7	108	70-130	0.784	20	
Sodium	20.9	0.71	"	10.2	12	87.3	70-130	0.952	20	
Zinc	0.197	0.013	"	0.200	0.0072	94.9	70-130	3.00	20	
Matrix Spike Dup (B9B1914-MSD2)		**Source: 0902261-03**		Prepared & Analyzed: 02/19/09						
Calcium	65.6	0.53	mg/L	10.2	59	64.7	70-130	9.42	20	QM-07
Copper	0.218	0.011	"	0.200	0.0054	106	70-130	6.15	20	
Iron	9.79	0.052	"	0.200	9.9	NR	70-130	2.59	20	QM-07
Magnesium	24.1	0.41	"	10.2	15	89.2	70-130	5.54	20	
Manganese	0.346	0.0060	"	0.200	0.14	103	70-130	7.19	20	
Potassium	20.2	0.90	"	10.2	7.4	125	70-130	7.71	20	
Sodium	482	0.71	"	10.2	520	NR	70-130	0.208	20	QM-07
Zinc	2.20	0.013	"	0.200	2.0	100	70-130	1.83	20	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1920 - EPA 200 Series										
Blank (B9B1920-BLK1)				Prepared: 02/19/09 Analyzed: 02/20/09						
Antimony	ND	0.031	mg/L							
Arsenic	ND	0.015	"							
Barium	ND	0.021	"							
Beryllium	ND	0.0010	"							
Cadmium	ND	0.0040	"							
Chromium	ND	0.0060	"							
Cobalt	ND	0.0070	"							
Copper	ND	0.011	"							
Lead	ND	0.015	"							
Molybdenum	ND	0.015	"							
Nickel	ND	0.0090	"							
Selenium	ND	0.018	"							
Silver	ND	0.0040	"							
Thallium	ND	0.0070	"							
Vanadium	ND	0.0070	"							
Zinc	ND	0.013	"							
LCS (B9B1920-BS1)				Prepared: 02/19/09 Analyzed: 02/20/09						
Antimony	0.190	0.031	mg/L	0.200		95.0	85-115			
Arsenic	0.186	0.015	"	0.200		93.0	85-115			
Barium	0.196	0.021	"	0.200		98.0	85-115			
Beryllium	0.184	0.0010	"	0.200		92.0	85-115			
Cadmium	0.182	0.0040	"	0.200		91.0	85-115			
Chromium	0.185	0.0060	"	0.200		92.5	85-115			
Cobalt	0.185	0.0070	"	0.200		92.5	85-115			
Copper	0.178	0.011	"	0.200		89.0	85-115			
Lead	0.187	0.015	"	0.200		93.5	85-115			
Molybdenum	0.184	0.015	"	0.200		92.0	85-115			
Nickel	0.195	0.0090	"	0.200		97.5	85-115			
Selenium	0.188	0.018	"	0.200		94.0	85-115			
Silver	0.185	0.0040	"	0.200		92.5	85-115			
Thallium	0.179	0.0070	"	0.200		89.5	85-115			
Vanadium	0.176	0.0070	"	0.200		88.0	85-115			
Zinc	0.209	0.013	"	0.200		104	85-115			

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1920 - EPA 200 Series										
Matrix Spike (B9B1920-MS1)		**Source: 0902261-01**		Prepared: 02/19/09	Analyzed: 02/20/09					
Antimony	0.213	0.031	mg/L	0.200	ND	106	70-130			
Arsenic	0.208	0.015	"	0.200	0.0042	102	70-130			
Barium	0.227	0.021	"	0.200	0.029	99.0	70-130			
Beryllium	0.183	0.0010	"	0.200	0.00044	91.3	70-130			
Cadmium	0.184	0.0040	"	0.200	ND	92.0	70-130			
Chromium	0.181	0.0060	"	0.200	ND	90.5	70-130			
Cobalt	0.183	0.0070	"	0.200	ND	91.5	70-130			
Copper	0.196	0.011	"	0.200	ND	98.0	70-130			
Lead	0.182	0.015	"	0.200	ND	91.0	70-130			
Molybdenum	0.228	0.015	"	0.200	0.034	97.0	70-130			
Nickel	0.189	0.0090	"	0.200	ND	94.5	70-130			
Selenium	0.187	0.018	"	0.200	0.017	85.0	70-130			
Silver	0.191	0.0040	"	0.200	ND	95.5	75-125			
Thallium	0.154	0.0070	"	0.200	ND	77.0	75-125			
Vanadium	0.184	0.0070	"	0.200	0.0047	89.6	75-125			
Zinc	0.391	0.013	"	0.200	0.15	120	70-130			
Matrix Spike Dup (B9B1920-MSD1)		**Source: 0902261-01**		Prepared: 02/19/09	Analyzed: 02/20/09					
Antimony	0.184	0.031	mg/L	0.200	ND	92.0	70-130	14.6	20	
Arsenic	0.187	0.015	"	0.200	0.0042	91.4	70-130	10.6	20	
Barium	0.215	0.021	"	0.200	0.029	93.0	70-130	5.43	20	
Beryllium	0.172	0.0010	"	0.200	0.00044	85.8	70-130	6.20	20	
Cadmium	0.175	0.0040	"	0.200	ND	87.5	70-130	5.01	20	
Chromium	0.171	0.0060	"	0.200	ND	85.5	70-130	5.68	20	
Cobalt	0.169	0.0070	"	0.200	ND	84.5	70-130	7.95	20	
Copper	0.186	0.011	"	0.200	ND	93.0	70-130	5.24	20	
Lead	0.172	0.015	"	0.200	ND	86.0	70-130	5.65	20	
Molybdenum	0.212	0.015	"	0.200	0.034	89.0	70-130	7.27	20	
Nickel	0.175	0.0090	"	0.200	ND	87.5	70-130	7.69	20	
Selenium	0.183	0.018	"	0.200	0.017	83.0	70-130	2.16	20	
Silver	0.180	0.0040	"	0.200	ND	90.0	75-125	5.93	20	
Thallium	0.150	0.0070	"	0.200	ND	75.0	75-125	2.63	20	
Vanadium	0.175	0.0070	"	0.200	0.0047	85.2	75-125	5.01	20	
Zinc	0.364	0.013	"	0.200	0.15	107	70-130	7.15	20	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B2008 - EPA 200 Series										
Blank (B9B2008-BLK1)				Prepared & Analyzed: 02/20/09						
Mercury	ND	0.00030	mg/L							
LCS (B9B2008-BS1)				Prepared & Analyzed: 02/20/09						
Mercury	0.00105	0.00030	mg/L	0.00100		105	80-120			
Matrix Spike (B9B2008-MS1)		**Source: 0902261-01**		Prepared & Analyzed: 02/20/09						
Mercury	0.00084	0.00030	mg/L	0.00100	ND	84.0	80-120			
Matrix Spike Dup (B9B2008-MSD1)		**Source: 0902261-01**		Prepared & Analyzed: 02/20/09						
Mercury	0.00083	0.00030	mg/L	0.00100	ND	83.0	80-120	1.20	20	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1910 - EPA 5030B P & T										
Blank (B9B1910-BLK1)				Prepared: 02/18/09 Analyzed: 02/19/09						
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	"							
Bromochloromethane	ND	1.0	"							
Bromodichloromethane	ND	1.0	"							
Bromoform	ND	1.0	"							
Bromomethane	ND	1.0	"							
n-Butylbenzene	ND	1.0	"							
sec-Butylbenzene	ND	1.0	"							
tert-Butylbenzene	ND	1.0	"							
Carbon tetrachloride	ND	1.0	"							
Chlorobenzene	ND	1.0	"							
Chloroethane	ND	1.0	"							
Chloroform	ND	1.0	"							
Chloromethane	ND	1.0	"							
2-Chlorotoluene	ND	1.0	"							
4-Chlorotoluene	ND	1.0	"							
Dibromochloromethane	ND	1.0	"							
1,2-Dibromo-3-chloropropane	ND	5.0	"							
1,2-Dibromoethane (EDB)	ND	1.0	"							
Dibromomethane	ND	1.0	"							
1,2-Dichlorobenzene	ND	1.0	"							
1,3-Dichlorobenzene	ND	1.0	"							
1,4-Dichlorobenzene	ND	1.0	"							
Dichlorodifluoromethane	ND	1.0	"							
1,1-Dichloroethane	ND	1.0	"							
1,2-Dichloroethane	ND	1.0	"							
1,1-Dichloroethene	ND	1.0	"							
cis-1,2-Dichloroethene	ND	1.0	"							
trans-1,2-Dichloroethene	ND	1.0	"							
1,2-Dichloropropane	ND	1.0	"							
1,3-Dichloropropane	ND	1.0	"							
2,2-Dichloropropane	ND	1.0	"							
1,1-Dichloropropene	ND	1.0	"							
cis-1,3-Dichloropropene	ND	1.0	"							
trans-1,3-Dichloropropene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Hexachlorobutadiene	ND	1.0	"							

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1910 - EPA 5030B P & T										
Blank (B9B1910-BLK1)				Prepared: 02/18/09 Analyzed: 02/19/09						
Isopropylbenzene	ND	1.0	µg/L							
p-Isopropyltoluene	ND	1.0	"							
Methylene chloride	ND	1.0	"							
Methyl tert-butyl ether	ND	1.0	"							
Naphthalene	ND	1.0	"							
n-Propylbenzene	ND	1.0	"							
Styrene	ND	1.0	"							
1,1,1,2-Tetrachloroethane	ND	1.0	"							
1,1,2,2-Tetrachloroethane	ND	1.0	"							
Tetrachloroethene	ND	1.0	"							
Toluene	ND	1.0	"							
1,2,3-Trichlorobenzene	ND	1.0	"							
1,2,4-Trichlorobenzene	ND	1.0	"							
1,1,1-Trichloroethane	ND	1.0	"							
1,1,2-Trichloroethane	ND	1.0	"							
Trichloroethene	ND	1.0	"							
Trichlorofluoromethane	ND	1.0	"							
1,2,3-Trichloropropane	ND	1.0	"							
1,2,4-Trimethylbenzene	ND	1.0	"							
1,3,5-Trimethylbenzene	ND	1.0	"							
Vinyl chloride	ND	1.0	"							
m,p-Xylene	ND	1.0	"							
o-Xylene	ND	1.0	"							
Surrogate: Dibromofluoromethane	*58.0*		*"*	*50.0*		*116*	*86-118*			
Surrogate: Toluene-d8	*55.1*		*"*	*50.0*		*110*	*88-110*			
Surrogate: 4-Bromofluorobenzene	*56.1*		*"*	*50.0*		*112*	*86-115*			
LCS (B9B1910-BS1)				Prepared: 02/18/09 Analyzed: 02/19/09						
Benzene	55.1	1.0	µg/L	50.0		110	80-120			
Chlorobenzene	52.8	1.0	"	50.0		106	80-120			
1,1-Dichloroethene	46.9	1.0	"	50.0		93.8	80-120			
Toluene	59.5	1.0	"	50.0		119	80-120			
Trichloroethene	51.7	1.0	"	50.0		103	80-120			

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006711 Project Manager: Nat Beal	**Reported:** 02/26/09 08:41

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9B1910 - EPA 5030B P & T										
Matrix Spike (B9B1910-MS1)		**Source: 0902261-01**		Prepared: 02/18/09	Analyzed: 02/19/09					
Benzene	51.0	1.0	µg/L	50.0	ND	102	37-151			
Chlorobenzene	40.4	1.0	"	50.0	ND	80.8	37-160			
1,1-Dichloroethene	40.4	1.0	"	50.0	ND	80.8	50-150			
Toluene	45.4	1.0	"	50.0	20	50.8	47-150			
Trichloroethene	43.9	1.0	"	50.0	ND	87.8	71-157			
Matrix Spike Dup (B9B1910-MSD1)		**Source: 0902261-01**		Prepared: 02/18/09	Analyzed: 02/19/09					
Benzene	59.4	1.0	µg/L	50.0	ND	119	37-151	15.2	30	
Chlorobenzene	47.9	1.0	"	50.0	ND	95.8	37-160	17.0	30	
1,1-Dichloroethene	41.4	1.0	"	50.0	ND	82.8	50-150	2.44	30	
Toluene	53.9	1.0	"	50.0	20	67.8	47-150	17.1	30	
Trichloroethene	59.3	1.0	"	50.0	ND	119	71-157	29.8	30	

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Notes and Definitions

H-01	Sample received without sufficient time to complete analysis within recommended holding time.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Rice2-1-062709	0906592-01	Liquid	06/27/09 08:30	06/30/09 14:45
Rice2-2-062809	0906592-02	Liquid	06/28/09 20:30	06/30/09 14:45
Rice2-3-062909	0906592-03	Liquid	06/29/09 12:45	06/30/09 14:45
Rice2-4-063009	0906592-04	Liquid	06/30/09 08:00	06/30/09 14:45

CASE NARRATIVE

SAMPLE RECEIPT:	Samples were received intact, at 4 °C, and accompanied by chain of custody documentation.
PRESERVATION:	Samples requiring preservation were verified prior to sample preparation and analysis.
HOLDING TIMES:	All holding times were met, unless otherwise noted in the report with data qualifiers.
QA/QC CRITERIA:	All quality objective criteria were met, except as noted in the report with data qualifiers.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Conventional Chemistry Parameters by APHA/EPA Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Rice2-1-062709 (0906592-01) Liquid Sampled: 06/27/09 08:30 Received: 06/30/09 14:45									
Total Alkalinity	**71.6**	0.400	mg/L	1	B9G0147	06/30/09	06/30/09 15:00	EPA 310.1	
Carbonate Alkalinity	ND	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**71.6**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Chloride	**472**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**1850**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Total Hardness	**126**	0.400	mg/L	"	"	"	"	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	H-01
pH	**7.62**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Sulfate as SO4	**210**	0.500	mg/L	"	"	"	"	EPA 375.4	
Total Dissolved Solids	**1220**	1.00	"	"	"	"	"	EPA 160.1	
Rice2-2-062809 (0906592-02) Liquid Sampled: 06/28/09 20:30 Received: 06/30/09 14:45									
Total Alkalinity	**61.2**	0.400	mg/L	1	B9G0147	06/30/09	06/30/09 15:00	EPA 310.1	
Carbonate Alkalinity	ND	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**61.2**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Chloride	**340**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**1350**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Total Hardness	**47.0**	0.400	mg/L	"	"	"	"	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	
pH	**8.19**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Sulfate as SO4	**160**	0.500	mg/L	"	"	"	"	EPA 375.4	
Total Dissolved Solids	**900**	1.00	"	"	"	"	"	EPA 160.1	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Conventional Chemistry Parameters by APHA/EPA Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Rice2-3-062909 (0906592-03) Liquid Sampled: 06/29/09 12:45 Received: 06/30/09 14:45									
Total Alkalinity	**69.2**	0.400	mg/L	1	B9G0147	06/30/09	06/30/09 15:00	EPA 310.1	
Carbonate Alkalinity	ND	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**69.2**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Chloride	**778**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**3060**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Fluoride	**2.47**	0.0200	mg/L	"	"	"	"	EPA 340.1	
Total Hardness	**280**	0.400	"	"	"	"	"	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	
Nitrite as N	ND	0.0200	"	"	"	"	"	SM4500-NO2B	
Nitrate as N	**1.50**	0.0200	"	"	"	"	"	EPA 353.3	
pH	**8.00**	0.100	pH Units	"	"	"	"	EPA 150.1	H-01
Orthophosphate as P	**0.640**	0.0500	mg/L	"	"	"	"	EPA 365.2	
Phosphorus	**0.670**	0.0500	"	"	"	"	"	"	
Reactive Silica	**7.00**	0.100	"	"	"	"	"	SM 4500-Si E	
Sulfate as SO4	**440**	0.500	"	"	"	"	"	EPA 375.4	
Sulfide	ND	0.05	"	"	"	"	"	EPA 376.1	
Total Dissolved Solids	**2060**	1.00	"	"	"	"	"	EPA 160.1	
Rice2-4-063009 (0906592-04) Liquid Sampled: 06/30/09 08:00 Received: 06/30/09 14:45									
Total Alkalinity	**69.2**	0.400	mg/L	1	B9G0147	06/30/09	06/30/09 15:00	EPA 310.1	
Carbonate Alkalinity	**11.2**	0.400	"	"	"	"	"	"	
Bicarbonate Alkalinity	**58.0**	0.400	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	0.400	"	"	"	"	"	"	
Chloride	**342**	0.500	"	"	"	"	"	SM 4500-Cl- B	
Specific Conductance (EC)	**1290**	0.100	µmhos/cm	"	"	"	"	EPA 120.1	
Fluoride	**4.55**	0.100	mg/L	5	"	07/14/09	07/14/09 15:00	EPA 340.1	
Total Hardness	**44.0**	0.400	"	1	"	06/30/09	06/30/09 15:00	SM 2340 C	
Methylene Blue Active Substances	ND	0.100	"	"	"	"	"	EPA 425.1	
Nitrite as N	ND	0.0200	"	"	"	07/14/09	07/14/09 15:00	SM4500-NO2B	H-02
Nitrate as N	**2.70**	0.0200	"	"	"	"	"	EPA 353.3	H-02
pH	**8.25**	0.100	pH Units	"	"	06/30/09	06/30/09 15:00	EPA 150.1	
Orthophosphate as P	**0.100**	0.0500	mg/L	"	"	07/14/09	07/14/09 15:00	EPA 365.2	H-02
Phosphorus	**0.120**	0.0500	"	"	"	"	"	"	
Reactive Silica	**13.7**	0.100	"	"	"	06/30/09	06/30/09 15:00	SM 4500-Si E	
Sulfate as SO4	**140**	0.500	"	"	"	"	"	EPA 375.4	
Sulfide	ND	0.05	"	"	"	07/14/09	07/14/09 15:00	EPA 376.1	H-02
Total Dissolved Solids	**885**	1.00	"	"	"	06/30/09	06/30/09 15:00	EPA 160.1	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Total Organic Carbon (TOC) by SM 5310 B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Rice2-3-062909 (0906592-03) Liquid Sampled: 06/29/09 12:45 Received: 06/30/09 14:45									
Total Organic Carbon	**0.69**	0.50	mg/L	1	B9F3014	06/30/09	06/30/09 15:06	SM 5310 B	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Rice2-1-062709 (0906592-01) Liquid Sampled: 06/27/09 08:30 Received: 06/30/09 14:45									
Calcium	**37**	0.53	mg/L	1	B9G0103	06/30/09	07/01/09 12:55	EPA 200.7	
Copper	ND	0.011	"	"	"	"	07/01/09 12:57	"	
Iron	**1.5**	0.052	"	"	"	"	"	"	
Potassium	**4.1**	0.90	"	"	"	"	07/01/09 12:55	"	
Magnesium	**8.1**	0.41	"	"	"	"	"	"	
Manganese	**0.025**	0.0060	"	"	"	"	07/01/09 12:57	"	
Sodium	**360**	0.71	"	"	"	"	07/01/09 12:55	"	
Zinc	**0.11**	0.013	"	"	"	"	07/01/09 12:57	"	
Rice2-2-062809 (0906592-02) Liquid Sampled: 06/28/09 20:30 Received: 06/30/09 14:45									
Calcium	**17**	0.53	mg/L	1	B9G0103	06/30/09	07/01/09 13:10	EPA 200.7	
Copper	ND	0.011	"	"	"	"	07/01/09 13:12	"	
Iron	**0.13**	0.052	"	"	"	"	"	"	
Potassium	**2.7**	0.90	"	"	"	"	07/01/09 13:10	"	
Magnesium	**1.2**	0.41	"	"	"	"	"	"	
Manganese	ND	0.0060	"	"	"	"	07/01/09 13:12	"	
Sodium	**270**	0.71	"	"	"	"	07/01/09 13:10	"	
Zinc	**0.040**	0.013	"	"	"	"	07/01/09 13:13	"	
Rice2-3-062909 (0906592-03) Liquid Sampled: 06/29/09 12:45 Received: 06/30/09 14:45									
Calcium	**79**	0.53	mg/L	1	B9G0103	06/30/09	07/01/09 13:15	EPA 200.7	
Copper	ND	0.011	"	"	"	"	07/01/09 13:17	"	
Iron	**1.4**	0.052	"	"	"	"	"	"	
Potassium	**7.4**	0.90	"	"	"	"	07/01/09 13:15	"	
Magnesium	**20**	0.41	"	"	"	"	"	"	
Manganese	**0.18**	0.0060	"	"	"	"	07/01/09 13:17	"	
Sodium	**580**	0.71	"	"	"	"	07/01/09 13:15	"	
Silica (SiO2)	**8.1**	0.15	"	"	"	"	"	"	
Zinc	ND	0.013	"	"	"	"	07/01/09 13:18	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex	Project: Rice Airfield	
3901 Via Oro Avenue, Suite 100	Project Number: 52006721	**Reported:**
Long Beach CA, 90810-1800	Project Manager: Mike Tietze	07/15/09 10:24

Metals by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Rice2-4-063009 (0906592-04) Liquid Sampled: 06/30/09 08:00 Received: 06/30/09 14:45									
Calcium	**16**	0.53	mg/L	1	B9G0103	06/30/09	07/01/09 13:22	EPA 200.7	
Copper	ND	0.011	"	"	"	"	07/01/09 13:24	"	
Iron	**0.13**	0.052	"	"	"	"	"	"	
Potassium	**2.6**	0.90	"	"	"	"	07/01/09 13:21	"	
Magnesium	**0.97**	0.41	"	"	"	"	07/01/09 13:22	"	
Manganese	ND	0.0060	"	"	"	"	07/01/09 13:24	"	
Sodium	**260**	0.71	"	"	"	"	07/01/09 13:21	"	
Silica (SiO2)	**16**	0.15	"	"	"	"	"	"	
Zinc	**0.035**	0.013	"	"	"	"	07/01/09 13:25	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals (Dissolved) by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Rice2-1-062709 (0906592-01) Liquid Sampled: 06/27/09 08:30 Received: 06/30/09 14:45									
Silver	ND	0.0030	mg/L	1	B9G0105	06/30/09	07/01/09 11:48	EPA 200.7	
Arsenic	ND	0.025	"	"	"	"	07/01/09 11:49	"	
Barium	**0.034**	0.019	"	"	"	"	07/01/09 11:48	"	
Beryllium	ND	0.0090	"	"	"	"	"	"	
Cadmium	ND	0.0040	"	"	"	"	07/01/09 11:49	"	
Cobalt	ND	0.0060	"	"	"	"	"	"	
Chromium	ND	0.0060	"	"	"	"	"	"	
Copper	**0.029**	0.012	"	"	"	"	07/01/09 11:48	"	
Mercury	ND	0.00030	"	"	B9G0139	07/01/09	07/01/09 11:34	EPA 245.1	
Molybdenum	**0.029**	0.028	"	"	B9G0105	06/30/09	07/01/09 11:49	EPA 200.7	
Nickel	ND	0.010	"	"	"	"	"	"	
Lead	ND	0.019	"	"	"	"	"	"	
Antimony	ND	0.023	"	"	"	"	"	"	
Selenium	ND	0.026	"	"	"	"	"	"	
Thallium	ND	0.011	"	"	"	"	"	"	
Vanadium	**0.013**	0.012	"	"	"	"	07/01/09 11:48	"	
Zinc	**0.068**	0.024	"	"	"	"	07/01/09 11:49	"	
Rice2-2-062809 (0906592-02) Liquid Sampled: 06/28/09 20:30 Received: 06/30/09 14:45									
Silver	ND	0.0030	mg/L	1	B9G0105	06/30/09	07/01/09 12:03	EPA 200.7	
Arsenic	ND	0.025	"	"	"	"	07/01/09 12:04	"	
Barium	**0.031**	0.019	"	"	"	"	07/01/09 12:03	"	
Beryllium	ND	0.0090	"	"	"	"	"	"	
Cadmium	ND	0.0040	"	"	"	"	07/01/09 12:04	"	
Cobalt	ND	0.0060	"	"	"	"	"	"	
Chromium	**0.011**	0.0060	"	"	"	"	"	"	
Copper	**0.019**	0.012	"	"	"	"	07/01/09 12:03	"	
Mercury	ND	0.00030	"	"	B9G0139	07/01/09	07/01/09 11:36	EPA 245.1	
Molybdenum	**0.031**	0.028	"	"	B9G0105	06/30/09	07/01/09 12:04	EPA 200.7	
Nickel	ND	0.010	"	"	"	"	"	"	
Lead	ND	0.019	"	"	"	"	"	"	
Antimony	ND	0.023	"	"	"	"	"	"	
Selenium	ND	0.026	"	"	"	"	"	"	
Thallium	ND	0.011	"	"	"	"	"	"	
Vanadium	**0.020**	0.012	"	"	"	"	07/01/09 12:03	"	
Zinc	**0.038**	0.024	"	"	"	"	07/01/09 12:04	"	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals (Dissolved) by EPA 200 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Rice2-3-062909 (0906592-03) Liquid Sampled: 06/29/09 12:45 Received: 06/30/09 14:45									
Silver	ND	0.0030	mg/L	1	B9G0105	06/30/09	07/01/09 12:09	EPA 200.7	
Arsenic	ND	0.025	"	"	"	"	"	"	
Barium	**0.077**	0.019	"	"	"	"	07/01/09 12:08	"	
Beryllium	ND	0.0090	"	"	"	"	"	"	
Cadmium	ND	0.0040	"	"	"	"	07/01/09 12:09	"	
Cobalt	ND	0.0060	"	"	"	"	"	"	
Chromium	ND	0.0060	"	"	"	"	"	"	
Copper	**0.015**	0.012	"	"	"	"	07/01/09 12:08	"	
Iron	ND	0.064	"	"	"	"	07/01/09 12:09	"	
Mercury	ND	0.00030	"	"	B9G0139	07/01/09	07/01/09 11:26	EPA 245.1	
Molybdenum	ND	0.028	"	"	B9G0105	06/30/09	07/01/09 12:09	EPA 200.7	
Nickel	ND	0.010	"	"	"	"	"	"	
Lead	ND	0.019	"	"	"	"	"	"	
Antimony	ND	0.023	"	"	"	"	"	"	
Selenium	ND	0.026	"	"	"	"	"	"	
Thallium	ND	0.011	"	"	"	"	"	"	
Vanadium	ND	0.012	"	"	"	"	07/01/09 12:08	"	
Zinc	ND	0.024	"	"	"	"	07/01/09 12:09	"	
Rice2-4-063009 (0906592-04) Liquid Sampled: 06/30/09 08:00 Received: 06/30/09 14:45									
Silver	ND	0.0030	mg/L	1	B9G0105	06/30/09	07/01/09 12:15	EPA 200.7	
Arsenic	ND	0.025	"	"	"	"	07/01/09 12:16	"	
Barium	**0.030**	0.019	"	"	"	"	07/01/09 12:15	"	
Beryllium	ND	0.0090	"	"	"	"	"	"	
Cadmium	ND	0.0040	"	"	"	"	07/01/09 12:16	"	
Cobalt	ND	0.0060	"	"	"	"	"	"	
Chromium	**0.011**	0.0060	"	"	"	"	"	"	
Copper	ND	0.012	"	"	"	"	07/01/09 12:15	"	
Mercury	ND	0.00030	"	"	B9G0139	07/01/09	07/01/09 11:32	EPA 245.1	
Molybdenum	**0.029**	0.028	"	"	B9G0105	06/30/09	07/01/09 12:16	EPA 200.7	
Nickel	ND	0.010	"	"	"	"	"	"	
Lead	ND	0.019	"	"	"	"	"	"	
Antimony	ND	0.023	"	"	"	"	"	"	
Selenium	ND	0.026	"	"	"	"	"	"	
Thallium	ND	0.011	"	"	"	"	"	"	
Vanadium	**0.019**	0.012	"	"	"	"	07/01/09 12:15	"	
Zinc	**0.033**	0.024	"	"	"	"	07/01/09 12:16	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Total Organic Carbon (TOC) by SM 5310 B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9F3014 - Organic Carbon										
Blank (B9F3014-BLK1)				Prepared & Analyzed: 06/30/09						
Total Organic Carbon	ND	0.50	mg/L							

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9G0103 - EPA 200 Series										
Blank (B9G0103-BLK1)				Prepared: 06/30/09 Analyzed: 07/01/09						
Calcium	ND	0.53	mg/L							
Copper	ND	0.011	"							
Iron	ND	0.052	"							
Magnesium	ND	0.41	"							
Manganese	ND	0.0060	"							
Potassium	ND	0.90	"							
Silica (SiO2)	ND	0.15	"							
Sodium	ND	0.71	"							
Zinc	ND	0.013	"							
Blank (B9G0103-BLK2)				Prepared: 06/30/09 Analyzed: 07/01/09						
Calcium	ND	0.53	mg/L							
Copper	ND	0.011	"							
Iron	ND	0.052	"							
Magnesium	ND	0.41	"							
Manganese	ND	0.0060	"							
Potassium	ND	0.90	"							
Silica (SiO2)	ND	0.15	"							
Sodium	ND	0.71	"							
Zinc	ND	0.013	"							
LCS (B9G0103-BS1)				Prepared: 06/30/09 Analyzed: 07/01/09						
Calcium	8.73	0.53	mg/L	10.2		85.6	80-120			
Copper	0.196	0.011	"	0.200		98.0	85-115			
Iron	0.205	0.052	"	0.200		102	70-130			
Magnesium	9.08	0.41	"	10.2		89.0	80-120			
Manganese	0.210	0.0060	"	0.200		105	85-115			
Potassium	8.55	0.90	"	10.2		83.8	80-120			
Silica (SiO2)	0.209	0.15	"	0.200		104	60-140			
Sodium	8.73	0.71	"	10.2		85.6	80-120			
Zinc	0.197	0.013	"	0.200		98.5	85-115			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9G0103 - EPA 200 Series										
LCS (B9G0103-BS2)				Prepared: 06/30/09	Analyzed: 07/01/09					
Calcium	8.89	0.53	mg/L	10.2		87.2	80-120			
Copper	0.197	0.011	"	0.200		98.5	85-115			
Iron	0.261	0.052	"	0.200		130	70-130			
Magnesium	9.19	0.41	"	10.2		90.1	80-120			
Manganese	0.206	0.0060	"	0.200		103	85-115			
Potassium	8.60	0.90	"	10.2		84.3	80-120			
Silica (SiO2)	0.212	0.15	"	0.200		106	60-140			
Sodium	8.70	0.71	"	10.2		85.3	80-120			
Zinc	0.192	0.013	"	0.200		96.0	85-115			
Matrix Spike (B9G0103-MS1)		**Source: 0906592-01**		Prepared: 06/30/09	Analyzed: 07/01/09					
Calcium	45.8	0.53	mg/L	10.2	37	86.3	70-130			
Copper	0.220	0.011	"	0.200	0.0098	105	70-130			
Iron	1.65	0.052	"	0.200	1.5	75.0	70-130			
Magnesium	17.0	0.41	"	10.2	8.1	87.3	70-130			
Manganese	0.223	0.0060	"	0.200	0.025	99.0	70-130			
Potassium	13.2	0.90	"	10.2	4.1	89.2	70-130			
Silica (SiO2)	15.1	0.15	"	0.200	14	550	60-140			QM-07
Sodium	370	0.71	"	10.2	360	98.0	70-130			
Zinc	0.302	0.013	"	0.200	0.11	96.0	70-130			
Matrix Spike (B9G0103-MS2)		**Source: 0906576-03**		Prepared: 06/30/09	Analyzed: 07/01/09					
Calcium	40.6	0.53	mg/L	10.2	32	84.3	70-130			
Copper	0.208	0.011	"	0.200	ND	104	70-130			
Iron	0.195	0.052	"	0.200	ND	97.5	70-130			
Magnesium	17.2	0.41	"	10.2	8.1	89.2	70-130			
Manganese	0.204	0.0060	"	0.200	ND	102	70-130			
Potassium	9.73	0.90	"	10.2	1.0	85.6	70-130			
Silica (SiO2)	6.16	0.15	"	0.200	5.6	280	60-140			QM-07
Sodium	77.8	0.71	"	10.2	69	86.3	70-130			
Zinc	0.187	0.013	"	0.200	0.0045	91.2	70-130			

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E-Mail: sierralabs @ sierralabs.net

Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9G0103 - EPA 200 Series										
Matrix Spike Dup (B9G0103-MSD1)		**Source: 0906592-01**		Prepared: 06/30/09	Analyzed: 07/01/09					
Calcium	45.0	0.53	mg/L	10.2	37	78.4	70-130	1.76	20	
Copper	0.223	0.011	"	0.200	0.0098	107	70-130	1.35	20	
Iron	1.68	0.052	"	0.200	1.5	90.0	70-130	1.80	20	
Magnesium	16.8	0.41	"	10.2	8.1	85.3	70-130	1.18	20	
Manganese	0.221	0.0060	"	0.200	0.025	98.0	70-130	0.901	20	
Potassium	13.3	0.90	"	10.2	4.1	90.2	70-130	0.755	20	
Silica (SiO2)	15.1	0.15	"	0.200	14	550	60-140	0.00	40	QM-07
Sodium	373	0.71	"	10.2	360	127	70-130	0.808	20	
Zinc	0.307	0.013	"	0.200	0.11	98.5	70-130	1.64	20	
Matrix Spike Dup (B9G0103-MSD2)		**Source: 0906576-03**		Prepared: 06/30/09	Analyzed: 07/01/09					
Calcium	41.0	0.53	mg/L	10.2	32	88.2	70-130	0.980	20	
Copper	0.208	0.011	"	0.200	ND	104	70-130	0.00	20	
Iron	0.193	0.052	"	0.200	ND	96.5	70-130	1.03	20	
Magnesium	17.3	0.41	"	10.2	8.1	90.2	70-130	0.580	20	
Manganese	0.203	0.0060	"	0.200	ND	102	70-130	0.491	20	
Potassium	9.72	0.90	"	10.2	1.0	85.5	70-130	0.103	20	
Silica (SiO2)	6.08	0.15	"	0.200	5.6	240	60-140	1.31	40	QM-07
Sodium	77.1	0.71	"	10.2	69	79.4	70-130	0.904	20	
Zinc	0.186	0.013	"	0.200	0.0045	90.8	70-130	0.536	20	

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9G0105 - EPA 200 Series										
Blank (B9G0105-BLK1)				Prepared: 06/30/09 Analyzed: 07/01/09						
Antimony	ND	0.023	mg/L							
Arsenic	ND	0.025	"							
Barium	ND	0.019	"							
Beryllium	ND	0.0090	"							
Cadmium	ND	0.0040	"							
Chromium	ND	0.0060	"							
Cobalt	ND	0.0060	"							
Copper	ND	0.012	"							
Iron	ND	0.064	"							
Lead	ND	0.019	"							
Molybdenum	ND	0.028	"							
Nickel	ND	0.010	"							
Selenium	ND	0.026	"							
Silver	ND	0.0030	"							
Thallium	ND	0.011	"							
Vanadium	ND	0.012	"							
Zinc	ND	0.024	"							
LCS (B9G0105-BS1)				Prepared: 06/30/09 Analyzed: 07/01/09						
Antimony	0.209	0.023	mg/L	0.200		104	85-115			
Arsenic	0.193	0.025	"	0.200		96.5	85-115			
Barium	0.198	0.019	"	0.200		99.0	85-115			
Beryllium	0.197	0.0090	"	0.200		98.5	85-115			
Cadmium	0.188	0.0040	"	0.200		94.0	85-115			
Chromium	0.197	0.0060	"	0.200		98.5	85-115			
Cobalt	0.198	0.0060	"	0.200		99.0	85-115			
Copper	0.216	0.012	"	0.200		108	85-115			
Iron	0.217	0.064	"	0.200		108	80-120			
Lead	0.199	0.019	"	0.200		99.5	85-115			
Molybdenum	0.203	0.028	"	0.200		102	85-115			
Nickel	0.201	0.010	"	0.200		100	85-115			
Selenium	0.183	0.026	"	0.200		91.5	85-115			
Silver	0.194	0.0030	"	0.200		97.0	85-115			
Thallium	0.188	0.011	"	0.200		94.0	85-115			
Vanadium	0.198	0.012	"	0.200		99.0	85-115			
Zinc	0.193	0.024	"	0.200		96.5	85-115			

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Worley Parsons Komex 3901 Via Oro Avenue, Suite 100 Long Beach CA, 90810-1800	Project: Rice Airfield Project Number: 52006721 Project Manager: Mike Tietze	**Reported:** 07/15/09 10:24

Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9G0105 - EPA 200 Series										
Matrix Spike (B9G0105-MS1)		**Source: 0906592-01**		Prepared: 06/30/09	Analyzed: 07/01/09					
Antimony	0.200	0.023	mg/L	0.200	ND	100	70-130			
Arsenic	0.201	0.025	"	0.200	0.0078	96.6	70-130			
Barium	0.220	0.019	"	0.200	0.034	93.0	70-130			
Beryllium	0.186	0.0090	"	0.200	ND	93.0	70-130			
Cadmium	0.182	0.0040	"	0.200	ND	91.0	70-130			
Chromium	0.182	0.0060	"	0.200	0.0036	89.2	70-130			
Cobalt	0.186	0.0060	"	0.200	ND	93.0	70-130			
Copper	0.236	0.012	"	0.200	0.029	104	70-130			
Iron	0.226	0.064	"	0.200	0.016	105	70-130			
Lead	0.187	0.019	"	0.200	0.0046	91.2	70-130			
Molybdenum	0.220	0.028	"	0.200	0.029	95.5	70-130			
Nickel	0.186	0.010	"	0.200	ND	93.0	70-130			
Selenium	0.177	0.026	"	0.200	0.010	83.5	70-130			
Silver	0.185	0.0030	"	0.200	ND	92.5	70-130			
Thallium	0.168	0.011	"	0.200	ND	84.0	70-130			
Vanadium	0.202	0.012	"	0.200	0.013	94.5	70-130			
Zinc	0.256	0.024	"	0.200	0.068	94.0	70-130			
Matrix Spike Dup (B9G0105-MSD1)		**Source: 0906592-01**		Prepared: 06/30/09	Analyzed: 07/01/09					
Antimony	0.198	0.023	mg/L	0.200	ND	99.0	70-130	1.01	20	
Arsenic	0.201	0.025	"	0.200	0.0078	96.6	70-130	0.00	20	
Barium	0.220	0.019	"	0.200	0.034	93.0	70-130	0.00	20	
Beryllium	0.186	0.0090	"	0.200	ND	93.0	70-130	0.00	20	
Cadmium	0.182	0.0040	"	0.200	ND	91.0	70-130	0.00	20	
Chromium	0.182	0.0060	"	0.200	0.0036	89.2	70-130	0.00	20	
Cobalt	0.186	0.0060	"	0.200	ND	93.0	70-130	0.00	20	
Copper	0.228	0.012	"	0.200	0.029	99.5	70-130	3.45	20	
Iron	0.214	0.064	"	0.200	0.016	99.0	70-130	5.45	20	
Lead	0.187	0.019	"	0.200	0.0046	91.2	70-130	0.00	20	
Molybdenum	0.221	0.028	"	0.200	0.029	96.0	70-130	0.454	20	
Nickel	0.187	0.010	"	0.200	ND	93.5	70-130	0.536	20	
Selenium	0.180	0.026	"	0.200	0.010	85.0	70-130	1.68	20	
Silver	0.185	0.0030	"	0.200	ND	92.5	70-130	0.00	20	
Thallium	0.169	0.011	"	0.200	ND	84.5	70-130	0.593	20	
Vanadium	0.202	0.012	"	0.200	0.013	94.5	70-130	0.00	20	
Zinc	0.261	0.024	"	0.200	0.068	96.5	70-130	1.93	20	

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Metals (Dissolved) by EPA 200 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9G0139 - EPA 200 Series										
Blank (B9G0139-BLK1)				Prepared & Analyzed: 07/01/09						
Mercury	ND	0.00030	mg/L							
LCS (B9G0139-BS1)				Prepared & Analyzed: 07/01/09						
Mercury	0.00107	0.00030	mg/L	0.00100		107	80-120			
Matrix Spike (B9G0139-MS1)		**Source: 0906592-03**		Prepared & Analyzed: 07/01/09						
Mercury	0.00090	0.00030	mg/L	0.00100	ND	90.0	80-120			
Matrix Spike Dup (B9G0139-MSD1)		**Source: 0906592-03**		Prepared & Analyzed: 07/01/09						
Mercury	0.00090	0.00030	mg/L	0.00100	ND	90.0	80-120	0.00	20	

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Notes and Definitions

H-01	Sample received without sufficient time to complete analysis within recommended holding time.
H-02	Analysis performed outside of the recommended holding time per client request.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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Alpha Analytical, Inc.

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ANALYTICAL REPORT

Worley Parsons Komex
2330 E. Bidwell St.
Folsom, CA 95630

Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Anions by IC
EPA Method 300.0 / 9056

	Parameter	Concentration		Reporting Limit	Date / Time Sampled	Date / Time Analyzed
Client ID : **Rice #1 082009**	Fluoride	2.7		0.25 mg/L	08/20/09 18:20	08/25/09 19:34
Lab ID : WPK09082552-01A	Nitrite (NO2) - N	ND	*	0.25 mg/L	08/20/09 18:20	08/25/09 22:39
	Nitrate (NO3) - N	5.6	*	0.25 mg/L	08/20/09 18:20	08/25/09 22:39
	Phosphate, ortho - P	ND	**	0.25 mg/L	08/20/09 18:20	08/25/09 19:34
Client ID : **Rice #2 082109**	Fluoride	4.1		0.13 mg/L	08/21/09 17:20	08/25/09 20:11
Lab ID : WPK09082552-02A	Nitrite (NO2) - N	ND	**	0.25 mg/L	08/21/09 17:20	08/25/09 20:11
	Nitrate (NO3) - N	2.3	**	0.25 mg/L	08/21/09 17:20	08/25/09 20:11
	Phosphate, ortho - P	ND	**	0.50 mg/L	08/21/09 17:20	08/25/09 20:11
Client ID : **Rice #1 082109**	Fluoride	2.7		0.50 mg/L	08/21/09 17:30	08/25/09 21:25
Lab ID : WPK09082552-03A	Nitrite (NO2) - N	ND	**	0.25 mg/L	08/21/09 17:30	08/25/09 21:06
	Nitrate (NO3) - N	5.6	**	0.25 mg/L	08/21/09 17:30	08/25/09 21:06
	Phosphate, ortho - P	ND	**	0.25 mg/L	08/21/09 17:30	08/25/09 21:06

**These samples were received outside the 48 hour holding time.

*Nitrite and Nitrate are analyzed on a preserved sample. The accuracy of Nitrite may be biased low and the Nitrate biased high due to the possible oxidation of Nitrite to Nitrate.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer
Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 736-7522 / info@alpha-analytical.com

Alpha Analytical, Inc. currently holds appropriate and available California (#2019) and NELAC (01154CA) certifications for the data reported. Test results relate only to reported samples.

8/26/09
Report Date

Alpha Analytical, Inc.

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ANALYTICAL REPORT

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Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Anions by IC
EPA Method 300.0 / 9056

		Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**					
Lab ID :	WPK09082552-01A	Chloride	1,100	25 mg/L	08/20/09	08/26/09
		Sulfate (SO4)	920	25 mg/L	08/20/09	08/26/09
Client ID :	**Rice #2 082109**					
Lab ID :	WPK09082552-02A	Chloride	350	5.0 mg/L	08/21/09	08/25/09
		Sulfate (SO4)	200	5.0 mg/L	08/21/09	08/25/09
Client ID :	**Rice #1 082109**					
Lab ID :	WPK09082552-03A	Chloride	1,100	25 mg/L	08/21/09	08/26/09
		Sulfate (SO4)	920	25 mg/L	08/21/09	08/26/09

Roger Scholl Randy Gardner Walter Hinchman

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ANALYTICAL REPORT

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Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Alkalinity
SM2320B

		Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**					
Lab ID :	WPK09082552-01A	Alkalinity, Bicarbonate (As CaCO3)	78	10 mg/L	08/20/09	08/26/09
		Alkalinity, Carbonate (As CaCO3)	ND	10 mg/L	08/20/09	08/26/09
		Alkalinity, Hydroxide (As CaCO3)	ND	10 mg/L	08/20/09	08/26/09
		Alkalinity, Total (As CaCO3 at pH 4.5)	78	10 mg/L	08/20/09	08/26/09
Client ID :	**Rice #2 082109**					
Lab ID :	WPK09082552-02A	Alkalinity, Bicarbonate (As CaCO3)	60	10 mg/L	08/21/09	08/26/09
		Alkalinity, Carbonate (As CaCO3)	ND	10 mg/L	08/21/09	08/26/09
		Alkalinity, Hydroxide (As CaCO3)	ND	10 mg/L	08/21/09	08/26/09
		Alkalinity, Total (As CaCO3 at pH 4.5)	64	10 mg/L	08/21/09	08/26/09
Client ID :	**Rice #1 082109**					
Lab ID :	WPK09082552-03A	Alkalinity, Bicarbonate (As CaCO3)	68	10 mg/L	08/21/09	08/26/09
		Alkalinity, Carbonate (As CaCO3)	ND	10 mg/L	08/21/09	08/26/09
		Alkalinity, Hydroxide (As CaCO3)	ND	10 mg/L	08/21/09	08/26/09
		Alkalinity, Total (As CaCO3 at pH 4.5)	68	10 mg/L	08/21/09	08/26/09

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

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Report Date

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ANALYTICAL REPORT

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Folsom, CA 95630

Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Specific Conductance at 25°C
EPA Method 120.1 / SM2510B / SW9050A

		Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**					
Lab ID :	WPK09082552-01A	Specific Conductance (at 25°C)	4,700	10 µS/cm	08/20/09	08/25/09
Client ID :	**Rice #2 082109**					
Lab ID :	WPK09082552-02A	Specific Conductance (at 25°C)	1,600	10 µS/cm	08/21/09	08/25/09
Client ID :	**Rice #1 082109**					
Lab ID :	WPK09082552-03A	Specific Conductance (at 25°C)	4,800	10 µS/cm	08/21/09	08/25/09

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ANALYTICAL REPORT

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2330 E. Bidwell St.
Folsom, CA 95630

Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Hardness
SM2340B

		Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**					
Lab ID :	WPK09082552-01A	Magnesium (Mg)	36	0.50 mg/L	08/20/09	08/25/09
		Calcium (Ca)	130	0.50 mg/L	08/20/09	08/25/09
		Hardness, Total (calc as CaCO3)	480	2.5 mg/L	08/20/09	08/25/09
Client ID :	**Rice #2 082109**					
Lab ID :	WPK09082552-02A	Magnesium (Mg)	0.92	0.50 mg/L	08/21/09	08/25/09
		Calcium (Ca)	19	0.50 mg/L	08/21/09	08/25/09
		Hardness, Total (calc as CaCO3)	52	2.5 mg/L	08/21/09	08/25/09
Client ID :	**Rice #1 082109**					
Lab ID :	WPK09082552-03A	Magnesium (Mg)	39	0.50 mg/L	08/21/09	08/25/09
		Calcium (Ca)	120	0.50 mg/L	08/21/09	08/25/09
		Hardness, Total (calc as CaCO3)	470	2.5 mg/L	08/21/09	08/25/09

Roger Scholl Randy Gardner Walter Hinchman

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Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 736-7522 / info@alpha-analytical.com

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8/26/09
Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Worley Parsons Komex
2330 E. Bidwell St.
Folsom, CA 95630

Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Metals by ICPMS
EPA Method SW6020 / SW6020A

		Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**					
Lab ID :	WPK09082552-01A	Beryllium (Be)	ND	0.0040 mg/L	08/20/09	08/25/09
		Sodium (Na)	870	0.50 mg/L	08/20/09	08/25/09
		Potassium (K)	9.2	0.50 mg/L	08/20/09	08/25/09
		Silica (SiO2)	22	0.50 mg/L	08/20/09	08/25/09
		Chromium (Cr)	0.017	0.0050 mg/L	08/20/09	08/25/09
		Iron (Fe)	0.41	0.30 mg/L	08/20/09	08/25/09
		Cobalt (Co)	ND	0.0050 mg/L	08/20/09	08/25/09
		Nickel (Ni)	ND	0.010 mg/L	08/20/09	08/25/09
		Copper (Cu)	ND	0.010 mg/L	08/20/09	08/25/09
		Zinc (Zn)	0.11	0.10 mg/L	08/20/09	08/25/09
		Arsenic (As)	ND	0.0050 mg/L	08/20/09	08/25/09
		Selenium (Se)	0.022	0.0050 mg/L	08/20/09	08/25/09
		Molybdenum (Mo)	0.040	0.0050 mg/L	08/20/09	08/25/09
		Silver (Ag)	ND	0.0050 mg/L	08/20/09	08/25/09
		Cadmium (Cd)	ND	0.0050 mg/L	08/20/09	08/25/09
		Antimony (Sb)	ND	0.0050 mg/L	08/20/09	08/25/09
		Barium (Ba)	0.021	0.0050 mg/L	08/20/09	08/25/09
		Mercury (Hg)	ND	0.0010 mg/L	08/20/09	08/25/09
		Thallium (Tl)	ND	0.0020 mg/L	08/20/09	08/25/09
		Lead (Pb)	ND	0.0050 mg/L	08/20/09	08/25/09
Client ID :	**Rice #2 082109**					
Lab ID :	WPK09082552-02A	Beryllium (Be)	ND	0.0040 mg/L	08/21/09	08/25/09
		Sodium (Na)	310	0.50 mg/L	08/21/09	08/25/09
		Potassium (K)	2.9	0.50 mg/L	08/21/09	08/25/09
		Silica (SiO2)	19	0.50 mg/L	08/21/09	08/25/09
		Chromium (Cr)	0.011	0.0050 mg/L	08/21/09	08/25/09
		Iron (Fe)	ND	0.30 mg/L	08/21/09	08/25/09
		Cobalt (Co)	ND	0.0050 mg/L	08/21/09	08/25/09
		Nickel (Ni)	ND	0.010 mg/L	08/21/09	08/25/09
		Copper (Cu)	ND	0.010 mg/L	08/21/09	08/25/09
		Zinc (Zn)	ND	0.10 mg/L	08/21/09	08/25/09
		Arsenic (As)	0.0090	0.0050 mg/L	08/21/09	08/25/09
		Selenium (Se)	ND	0.0050 mg/L	08/21/09	08/25/09
		Molybdenum (Mo)	0.025	0.0050 mg/L	08/21/09	08/25/09
		Silver (Ag)	ND	0.0050 mg/L	08/21/09	08/25/09
		Cadmium (Cd)	ND	0.0050 mg/L	08/21/09	08/25/09
		Antimony (Sb)	ND	0.0050 mg/L	08/21/09	08/25/09
		Barium (Ba)	0.031	0.0050 mg/L	08/21/09	08/25/09
		Mercury (Hg)	ND	0.0010 mg/L	08/21/09	08/25/09
		Thallium (Tl)	ND	0.0020 mg/L	08/21/09	08/25/09
		Lead (Pb)	ND	0.0050 mg/L	08/21/09	08/25/09

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Client ID : **Rice #1 082109**

Lab ID :					
WPK09082552-03A	Beryllium (Be)	ND	0.0040 mg/L	08/21/09	08/25/09
	Sodium (Na)	930	0.50 mg/L	08/21/09	08/25/09
	Potassium (K)	10	0.50 mg/L	08/21/09	08/25/09
	Silica (SiO2)	23	0.50 mg/L	08/21/09	08/25/09
	Chromium (Cr)	0.024	0.0050 mg/L	08/21/09	08/25/09
	Iron (Fe)	0.32	0.30 mg/L	08/21/09	08/25/09
	Cobalt (Co)	ND	0.0050 mg/L	08/21/09	08/25/09
	Nickel (Ni)	ND	0.010 mg/L	08/21/09	08/25/09
	Copper (Cu)	ND	0.010 mg/L	08/21/09	08/25/09
	Zinc (Zn)	0.13	0.10 mg/L	08/21/09	08/25/09
	Arsenic (As)	ND	0.0050 mg/L	08/21/09	08/25/09
	Selenium (Se)	0.025	0.0050 mg/L	08/21/09	08/25/09
	Molybdenum (Mo)	0.038	0.0050 mg/L	08/21/09	08/25/09
	Silver (Ag)	ND	0.0050 mg/L	08/21/09	08/25/09
	Cadmium (Cd)	ND	0.0050 mg/L	08/21/09	08/25/09
	Antimony (Sb)	ND	0.0050 mg/L	08/21/09	08/25/09
	Barium (Ba)	0.019	0.0050 mg/L	08/21/09	08/25/09
	Mercury (Hg)	ND	0.0010 mg/L	08/21/09	08/25/09
	Thallium (Tl)	ND	0.0020 mg/L	08/21/09	08/25/09
	Lead (Pb)	ND	0.0050 mg/L	08/21/09	08/25/09

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer

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8/26/09

Report Date

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ANALYTICAL REPORT

Worley Parsons Komex
2330 E. Bidwell St.
Folsom, CA 95630

Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Dissolved Metals by ICPMS
EPA Method SW6020 / SW6020A

		Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**					
Lab ID :	WPK09082552-01A	Silica (SiO2), Dissolved	22	0.50 mg/L	08/20/09	08/25/09
Client ID :	**Rice #2 082109**					
Lab ID :	WPK09082552-02A	Silica (SiO2), Dissolved	20	0.50 mg/L	08/21/09	08/25/09
Client ID :	**Rice #1 082109**					
Lab ID :	WPK09082552-03A	Silica (SiO2), Dissolved	20	0.50 mg/L	08/21/09	08/25/09

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Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

pH (Range 1.7 to 12.4)
EPA Method 150.2 / SM4500HB / SW9040C

	Parameter	Concentration	Reporting Limit	Date / Time Sampled	Date / Time Analyzed
Client ID : **Rice #1 082009**	pH	7.8	1.7 pH Units	08/20/09 18:20	08/25/09 14:39
Lab ID : WPK09082552-01A	pH - Temperature	20	1.0 °C	08/20/09 18:20	08/25/09 14:39
Client ID : **Rice #2 082109**	pH	8.5	1.7 pH Units	08/21/09 17:20	08/25/09 14:40
Lab ID : WPK09082552-02A	pH - Temperature	20	1.0 °C	08/21/09 17:20	08/25/09 14:40
Client ID : **Rice #1 082109**	pH	7.9	1.7 pH Units	08/21/09 17:30	08/25/09 14:41
Lab ID : WPK09082552-03A	pH - Temperature	20	1.0 °C	08/21/09 17:30	08/25/09 14:41

The EPA has established an analytical holding time of 15 minutes for this method as documented in the Methods Update Rule, Federal Register, Vol 72, No 47, March 2007. This holding time will always be exceeded, unless samples are analyzed in the field.

The laboratory performed this analysis in the shortest practical holding time after sample receipt.

Roger Scholl Randy Gardner Walter Hinchman

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Folsom, CA 95630

Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Phosphorus
EPA Method 365.3 / SM4500PE

		Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**					
Lab ID :	WPK09082552-01A	Phosphorus, Total (As P)	ND	0.10 mg/L	08/20/09	08/26/09
Client ID :	**Rice #2 082109**					
Lab ID :	WPK09082552-02A	Phosphorus, Total (As P)	ND	0.10 mg/L	08/21/09	08/26/09
Client ID :	**Rice #1 082109**					
Lab ID :	WPK09082552-03A	Phosphorus, Total (As P)	ND	0.10 mg/L	08/21/09	08/26/09

ND = Not Detected

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Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Sulfide
SM4500-S D

	Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**				
Lab ID :	WPK09082552-01A Sulfide	ND	0.10 mg/L	08/20/09	08/26/09
Client ID :	**Rice #2 082109**				
Lab ID :	WPK09082552-02A Sulfide	ND	0.10 mg/L	08/21/09	08/26/09
Client ID :	**Rice #1 082109**				
Lab ID :	WPK09082552-03A Sulfide	ND	0.10 mg/L	08/21/09	08/26/09

ND = Not Detected

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Report Date

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2330 E. Bidwell St.
Folsom, CA 95630

Attn: Mike Tietze
Phone: (916) 817-3931
Fax: (916) 983-1935
Date Received : 08/25/09

Job#: Rice Groundwater

Total Dissolved Solids (TDS)
SM2540C

	Parameter	Concentration	Reporting Limit	Date Sampled	Date Analyzed
Client ID :	**Rice #1 082009**				
Lab ID : WPK09082552-01A	Solids, Total Dissolved (TDS)	2,900	25 mg/L	08/20/09	08/26/09
Client ID :	**Rice #2 082109**				
Lab ID : WPK09082552-02A	Solids, Total Dissolved (TDS)	890	10 mg/L	08/21/09	08/26/09
Client ID :	**Rice #1 082109**				
Lab ID : WPK09082552-03A	Solids, Total Dissolved (TDS)	3,000	25 mg/L	08/21/09	08/26/09

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8/26/09
Report Date

AMENDED

CA

Billing Information :

CHAIN-OF-CUSTODY RECORD

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21 Sparks, Nevada 89431-5778
TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder : WPK09082552

Report Due By : 5:00 PM On : 26-Aug-09

RUSH

Client:
Worley Parsons Komex
2330 E. Bidwell St.
#150
Folsom, CA 95630

Report Attention	Phone Number	EMail Address
Mike Tietze	(916) 817-3931 x	mike.tietze@worleyparsons.com

EDD Required : **No**

Sampled by : Michele Scott

PO : Rice Groundwater

Client's COC # : 26305 Job : Rice Groundwater

Cooler Temp	Samples Received	Date Printed
4 °C	25-Aug-09	**25-Aug-09**

QC Level : S3 = Final Rpt, MBLK, LCS, MS/MSD With Surrogates

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	300_0(A)_W	300_0(B)_W	300_0(C)_W	ALKALINITY_W	CONDUCTIVITY	HARDNESS_W	METALS_AQ	METALS_DS	Sample Remarks
							Requested Tests								
WPK09082552-01A	Rice #1 082009	AQ	08/20/09 18:20	5	2	10	CA	CA	CA	CA	CA	CA	CA	SiO2	Sample ID logged in per sample bottles rec'd.
WPK09082552-02A	Rice #2 082109	AQ	08/21/09 17:20	4	2	10	CA	CA	CA	CA	CA	CA	CA	SiO2	
WPK09082552-03A	Rice #1 082109	AQ	08/21/09 17:30	4	2	10	CA	CA	CA	CA	CA	CA	CA	SiO2	

Comments: 24hr TAT. Security seals intact. Frozen ice. Gross Alpha subbed to Energy Labs due ASAP, per Ryan Farrell. Polys for Gross Alpha rec'd in non-preserved polys, added HNO3 perservative to extend holdtime, per Randy. NO2, NO3, PO4 rec'd outside : 48hr holding time for non-preserved sample, analyzed on H2SO4 poly for sample -01A. Analyze samples -02A & -03A on non-preserved sample (No H2SO4 sample provided) for NO2,tNO3, PO4 and footnote report, per Ryan. See work order info.

	Signature	Print Name	Company	Date/Time
Logged in by:	Tara Dickinson	Tara Dickinson	Alpha Analytical, Inc.	8/25/09 1500

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.
The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.
Matrix Type : AQ(Aqueous) AR(Air) SO(Soil) WS(Waste) DW(Drinking Water) OT(Other) Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Billing Information :

CHAIN-OF-CUSTODY RECORD

AMENDED CA

Page: 2 of 2

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21 Sparks, Nevada 89431-5778
TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder : WPK09082552

Report Due By : 5:00 PM On : 26-Aug-09

RUSH

Report Attention	Phone Number	EMail Address
Mike Tietze	(916) 817-3931 x	mike.tietze@worleyparsons.com

Client:
Worley Parsons Komex
2330 E. Bidwell St.
#150
Folsom, CA 95630

EDD Required : **No**

Sampled by : Michele Scott

PO : Rice Groundwater

Client's COC # : 26305 Job : Rice Groundwater

Cooler Temp	Samples Received	Date Printed
4 °C	25-Aug-09	25-Aug-09

QC Level : S3 = Final Rpt, MBLK, LCS, MS/MSD With Surrogates

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	PH_W	PHOSPHORUS_W	SULFIDE_W	TDS					Sample Remarks
							Requested Tests								
WPK09082552-01A	Rice #1 082009	AQ	08/20/09 18:20	5	2	10	CA	Total	Sulfide	CA					Sample ID logged in per sample bottles rec'd.
WPK09082552-02A	Rice #2 082109	AQ	08/21/09 17:20	4	2	10	CA	Total	Sulfide	CA					
WPK09082552-03A	Rice #1 082109	AQ	08/21/09 17:30	4	2	10	CA	Total	Sulfide	CA					

Comments: 24hr TAT. Security seals intact. Frozen ice. Gross Alpha subbed to Energy Labs due ASAP, per Ryan Farrell. Polys for Gross Alpha rec'd in non-preserved polys, added HNO3 perservative to extend holdtime, per Randy. NO2, NO3, PO4 rec'd outside : 48hr holding time for non-preserved sample, analyzed on H2SO4 poly for sample -01A. Analyze samples -02A & -03A on non-preserved sample (No H2SO4 sample provided) for NO2, NO3, PO4 and footnote report, per Ryan. See work order info.

	Signature	Print Name	Company	Date/Time
Logged in by:	Dave Dickinson	Dave Dickinson	Alpha Analytical, Inc.	8/25/09 1500

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.
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Matrix Type : AQ(Aqueous) AR(Air) SO(Soil) WS(Waste) DW(Drinking Water) OT(Other) Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

RUSH

Work Order Information

AMENDED

WPK09082552

Tuesday, August 25, 2009 03:01 PM

No H2SO4 provided for samples -02A & -03A, preserved in lab for Total Phos. analysis. Amended 8/25/09 @ 15:00 to remove Gross Alpha analysis from samples -01A, -02A & -03A as it is not needed, per Mike Tietze. TD.

RUSH

CA

Billing Information :

CHAIN-OF-CUSTODY RECORD

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21 Sparks, Nevada 89431-5778
TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder : WPK09082552

Report Due By : 5:00 PM On : 26-Aug-09

Client:
Worley Parsons Komex
2330 E. Bidwell St.
#150
Folsom, CA 95630

Report Attention	Phone Number	EMail Address
Mike Tietze	(916) 817-3931 x	mike.tietze@worleyparsons.com

EDD Required : **No**

Sampled by : Michele Scott

PO : Rice Groundwater

Client's COC # : 26305 Job : Rice Groundwater

Cooler Temp	Samples Received	Date Printed
4 °C	25-Aug-09	25-Aug-09

QC Level : S3 = Final Rpt, MBLK, LCS, MS/MSD With Surrogates

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	300_0(A)_W	300_0(B)_W	300_0(C)_W	ALKALINITY_W	CONDUCTIVITY	G_ALPHABETA_W	HARDNESS_W	METALS_AQ	Sample Remarks
WPK09082552-01A	Rice #1 082009	AQ	08/20/09 18:20	5	2	10	CA	CA	CA	CA	CA	Gross Alpha	CA	CA	Sample ID logged in per sample bottles rec'd.
WPK09082552-02A	Rice #2 082109	AQ	08/21/09 17:20	4	2	10	CA	CA	CA	CA	CA	Gross Alpha	CA	CA	
WPK09082552-03A	Rice #1 082109	AQ	08/21/09 17:30	4	2	10	CA	CA	CA	CA	CA	Gross Alpha	CA	CA	

Comments: 24hr TAT. Security seals intact. Frozen ice. Gross Alpha subbed to Energy Labs due ASAP, per Ryan Farrell. Polys for Gross Alpha rec'd in non-preserved polys, added HNO3 perservative to extend holdtime, per Randy. NO2, NO3, PO4 rec'd outside : 48hr holding time for non-preserved sample, analyzed on H2SO4 poly for sample -01A. Analyze samples -02A & -03A on non-preserved sample (No H2SO4 sample provided) for NO2, NO3, PO4 and footnote report, per Ryan. See work order info.

	Signature	Print Name	Company	Date/Time
Logged in by:	Jane Dickinson	Jane Dickinson	Alpha Analytical, Inc.	8/25/09 1000

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Matrix Type : AQ(Aqueous) AR(Air) SO(Soil) WS(Waste) DW(Drinking Water) OT(Other) Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Billing Information :

CHAIN-OF-CUSTODY RECORD

RUSH CA

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21 Sparks, Nevada 89431-5778
TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder : WPK09082552

Report Due By : 5:00 PM On : 26-Aug-09

Client:
Worley Parsons Komex
2330 E. Bidwell St.
#150
Folsom, CA 95630

Report Attention	Phone Number	EMail Address
Mike Tietze	(916) 817-3931 x	mike.tietze@worleyparsons.com

EDD Required : **No**

Sampled by : Michele Scott

PO : Rice Groundwater

Client's COC # : 26305 Job : Rice Groundwater

Cooler Temp	Samples Received	Date Printed
4 °C	25-Aug-09	25-Aug-09

QC Level : S3 = Final Rpt, MBLK, LCS, MS/MSD With Surrogates

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	METALS_DS	PH_W	PHOSPHORUS_W	SULFIDE_W	TDS				Sample Remarks
WPK09082552-01A	Rice #1 082009	AQ	08/20/09 18:20	5	2	10	SiO2	CA	Total	Sulfide	CA				Sample ID logged in per sample bottles rec'd.
WPK09082552-02A	Rice #2 082109	AQ	08/21/09 17:20	4	2	10	SiO2	CA	Total	Sulfide	CA				
WPK09082552-03A	Rice #1 082109	AQ	08/21/09 17:30	4	2	10	SiO2	CA	Total	Sulfide	CA				

Comments: 24hr TAT. Security seals intact. Frozen ice. Gross Alpha subbed to Energy Labs due ASAP, per Ryan Farrell. Polys for Gross Alpha rec'd in non-preserved polys, added HNO3 perservative to extend holdtime, per Randy. NO2, NO3, PO4 rec'd outside : 48hr holding time for non-preserved sample, analyzed on H2SO4 poly for sample -01A. Analyze samples -02A & -03A on non-preserved sample (No H2SO4 sample provided) for NO2, NO3, PO4 and footnote report, per Ryan. See work order info.

	Signature	Print Name	Company	Date/Time
Logged in by:	Tara Dickinson	Tara Dickinson	Alpha Analytical, Inc.	8/25/09 1000

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.
The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.
Matrix Type : AQ(Aqueous) AR(Air) SO(Soil) WS(Waste) DW(Drinking Water) OT(Other) Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Work Order Information

WPK09082552
Tuesday, August 25, 2009 10:17 AM

No H2SO4 provided for samples -02A & -03A, preserved in lab for Total Phos. analysis.

Billing Information:

Name Mike Tietze
Address 2330 E. Bidwell st #150
City, State, Zip Folsom, CA 95630
Phone Number 916-817-3920 Fax

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21
Sparks, Nevada 89431-5778
Phone (775) 355-1044
Fax (775) 355-0406

Samples Collected From Which State? AZ ___ CA ___ NV ___ WA ___ ID ___ OR ___ OTHER ___

26305

Page # 1 of 1

Client Name: Worley Parsons
Address: Same as above
City, State, Zip:
P.O. #: Rice Groundwater
EMail Address: Mike.tietze@worleyparsons.com
Phone #: 916-817-3931
Job #:
Fax #:

Required QC Level? I II III IV

EDD / EDF? YES ___ NO ___

Global ID # ___

Time Sampled	Date Sampled	Matrix* See Key Below	Sampled by / Lab ID Number (Office Use Only)	Report Attention / Sample Description	TAT	Field Filtered	Total and type of containers ** See below	Title 22 Metals	General Minerals	Total Silica	Dissolved Silica	Anions	Sulfide	Gross Alpha	REMARKS
1620	8/20	AQ	WPK0908255 2-01	Rice #1 082109	24hrs	Y	7	X	X	X	X	X	X	X	
1720	8/21	↓	-02	Rice #2 082109	↓	↓	6	X	X	X	X	X	X	X	
1730	8/21		-03	Rice #1 082109			6	X	X	X	X	X	X	X	

ADDITIONAL INSTRUCTIONS:

General minerals per enclosed list.

	Signature	Print Name	Company	Date	Time
Relinquished by	[signature]	Ryan Farrell	Worley Parsons	8/24/09	09:30
Received by	Nara Jackson	Nara Jackson	Alpha	8/25/09	949
Relinquished by					
Received by					
Relinquished by					
Received by					

*Key: AQ - Aqueous SO - Soil WA - Waste OT - Other AR - Air **: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this coc. The liability of the laboratory is limited to the amount paid for the report.

APPENDIX 2
DETERMINATION OF TDS FROM AN ELECTRICAL GEOPHYSICAL LOG

Determination of Total Dissolved Solids (TDS) from Electrical Resistivity Logs

Theory

The resistivity of a clean (clay free), water-bearing formation is proportional to the resistivity of the fluid with which it is fully saturated (formation water). The constant of proportionality is the formation resistivity factor, F (Schlumberger Wireline and Testing). The formation factor can be related to the recorded deep-investigation resistivity (R_t) and the apparent resistivity of the formation water (R_{wa}) by:

$$R_{wa} = \frac{R_t}{F} \tag{1}$$

For clean, water bearing zones, the R_{wa} value derived from the above equation is equal to the true formation water resistivity (R_w) (Schlumberger Log Interpretation Principals, 1991).

The total dissolved solids (TDS) concentration can be calculated from the formation water resistivity using the assumption that TDS in milligrams per litre (mg/L) is proportional to the conductivity of the formation water (σ_w) in microsiemens per centimetre (µS/cm). The proportionality constant for fluids where chloride is the dominant ion is approximately 0.7.

$$TDS = \sigma_w (0.7) \tag{2}$$

Application

TDS of the formation water was calculated for the geophysical log from well 2 as described below. The following were assumed for the purpose of this interpretation:

- the dominant anion in the formation fluid is chloride;
- the groundwater samples collected at locations 1, 2 and 3 (310 feet below ground surface [bgs], 650 feet bgs and 750 feet bgs, respectively) are better representations of the formation fluid than samples 4 and 5 (850 feet bgs and 950 feet bgs, respectively);
- the proportionality constant between σ_w and TDS is 0.7 for the interval 290 feet bgs to 1,000 feet bgs;
- the formation factor (F) calculated from samples 2 and 3 is representative of the Alluvium materials to a depth of 850 feet bgs;
- the formation factor (F) calculated from samples 2 and 3 can be applied to the formation below 850 feet bgs in the absence of reliable formation fluid samples from this depth;
- the formation is clean (i.e., no significant clay content). If clay is present, then the TDS response may in part be due to the presence of clays and may not be an accurate representation of the formation fluid salinity within that unit (i.e. the calculated TDS may be higher than the actual TDS);
- and the recorded resistivity (R_t) is equal to the true resistivity of the subsurface.

The deep investigation resistivity log (64-inch normal) was corrected to a constant temperature of 77 degrees Fahrenheit (°F). A temperature log was generated using an average temperature gradient of 0.0178°F per foot (°F/ft) as calculated from measured fluid temperatures (Table A).

Table A Recorded Temperature Values

Sample Depth	Recorded Temperature (°F)
310 feet bgs	74.2
650 feet bgs	80.3
750 feet bgs	85.5
850 feet bgs	85.2

Sample Depth	Recorded Temperature (°F)
950 feet bgs	84.1

The average temperature gradient was assumed to remain constant for the full depth of the log. The temperature correction was applied by using:

$$R_{T2} = R_{T1}\left[T1 + 6.77)/(T2 + 6.77)\right] \quad (3)$$

Where R_{T2} is the resistivity at 77°F, R_{T1} is the resistivity as recorded, T1 is the value from the generated temperature log, and T2 is 77°F.

Rearranging Equation 3, specific conductance values from groundwater samples collected at 650 feet bgs and 750 feet bgs, and the temperature corrected resistivity log at the sample depths, were used to calculate formation factor values. The samples collected from 850 feet bgs, and 950 feet bgs were determined to be unreliable due to possible complications with groundwater sampling methods at these depths. Sample 1 from 310 feet bgs was not used in the formation factor calculations as resistivity log data (R_t in Equation 1) was not recorded at 310 feet bgs. It is assumed that the average formation factor calculated from samples 2 and 3 is representative of 310 feet bgs to 1,000 feet bgs. The average calculated formation factor for this interval was 2.7.

Formation fluid resistivity was determined using the calculated formation factor of 2.7 and the temperature corrected resistivity log (Equation 3), and converted to TDS using the proportionality constant of 0.7 (Equation 2).

Reference:

Schlumberger Wireline and Testing,1996. Log Interpretation Principles/Applications. June 1996

WorleyParsons

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APPENDIX 3

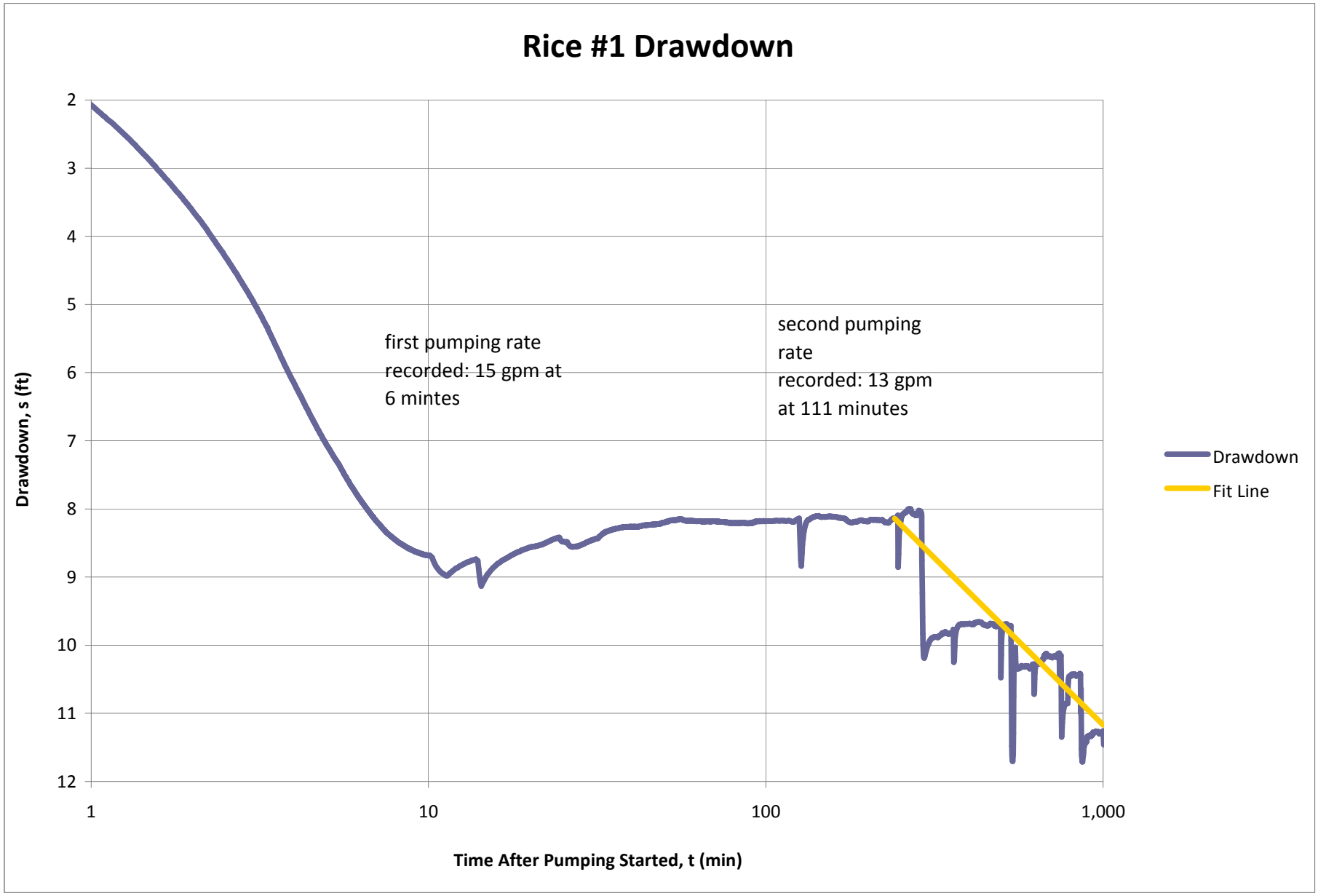
AQUIFER TEST ANALYSIS

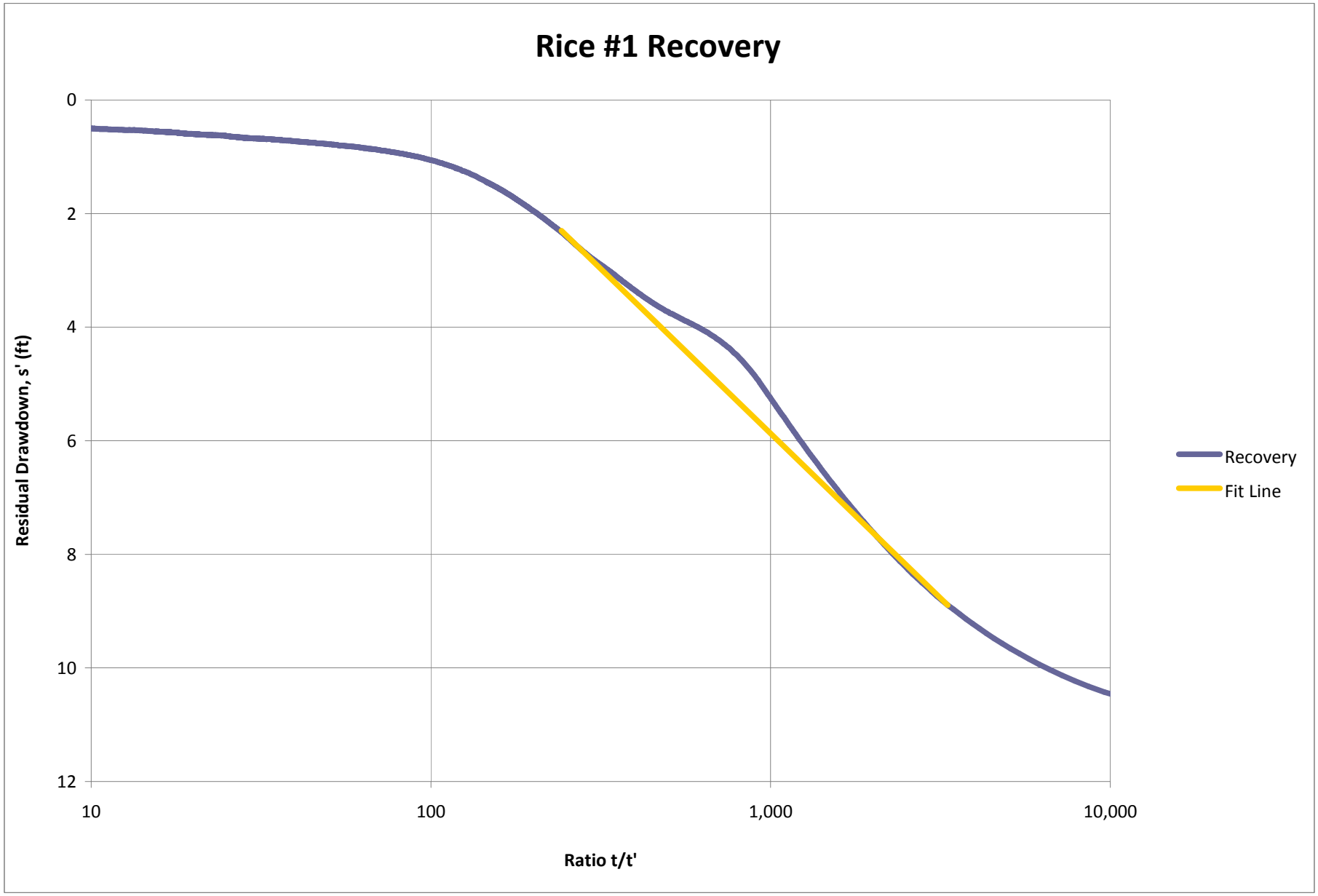
Rice Solar Energy Project Aquifer Test Results

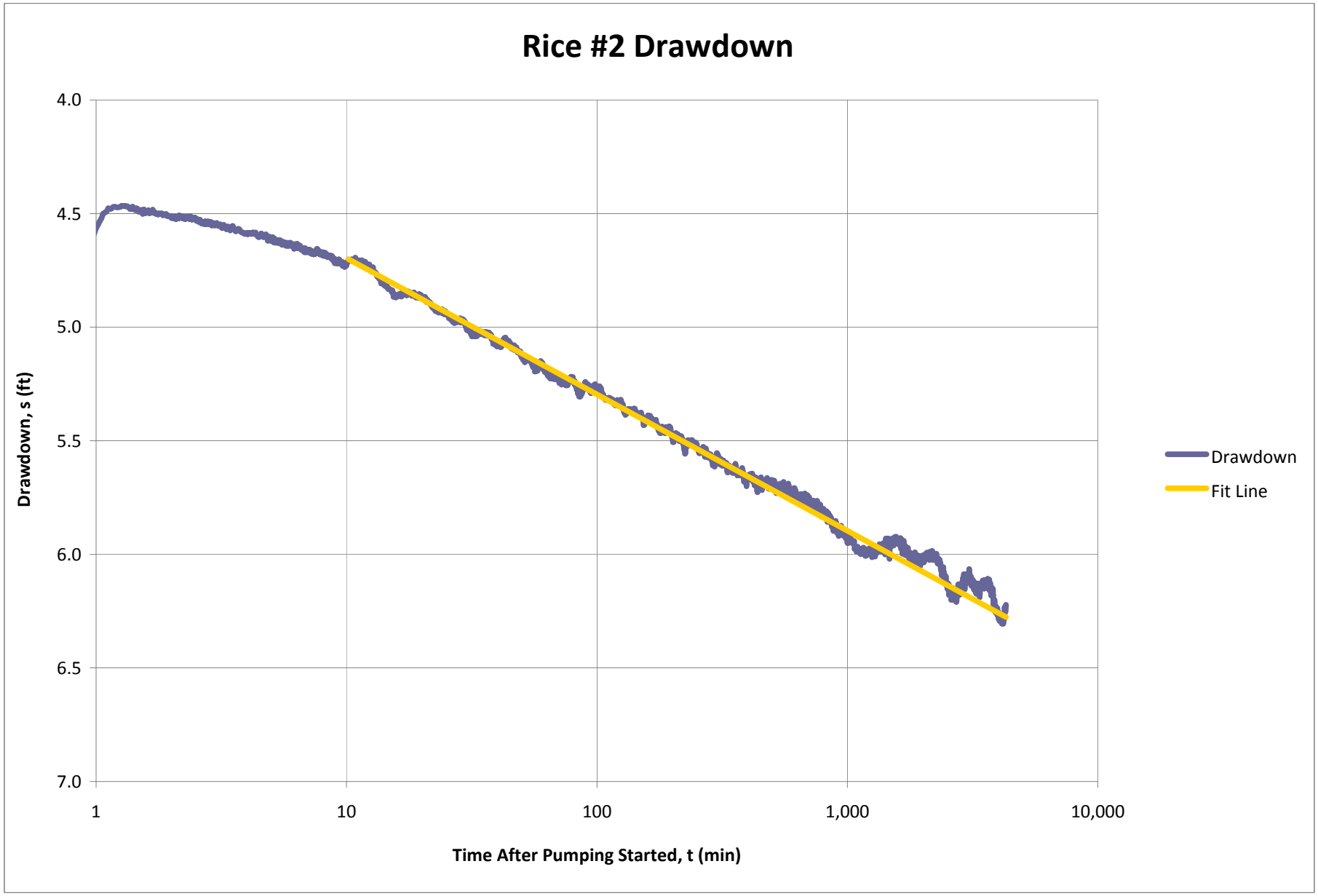
August 31, 2009

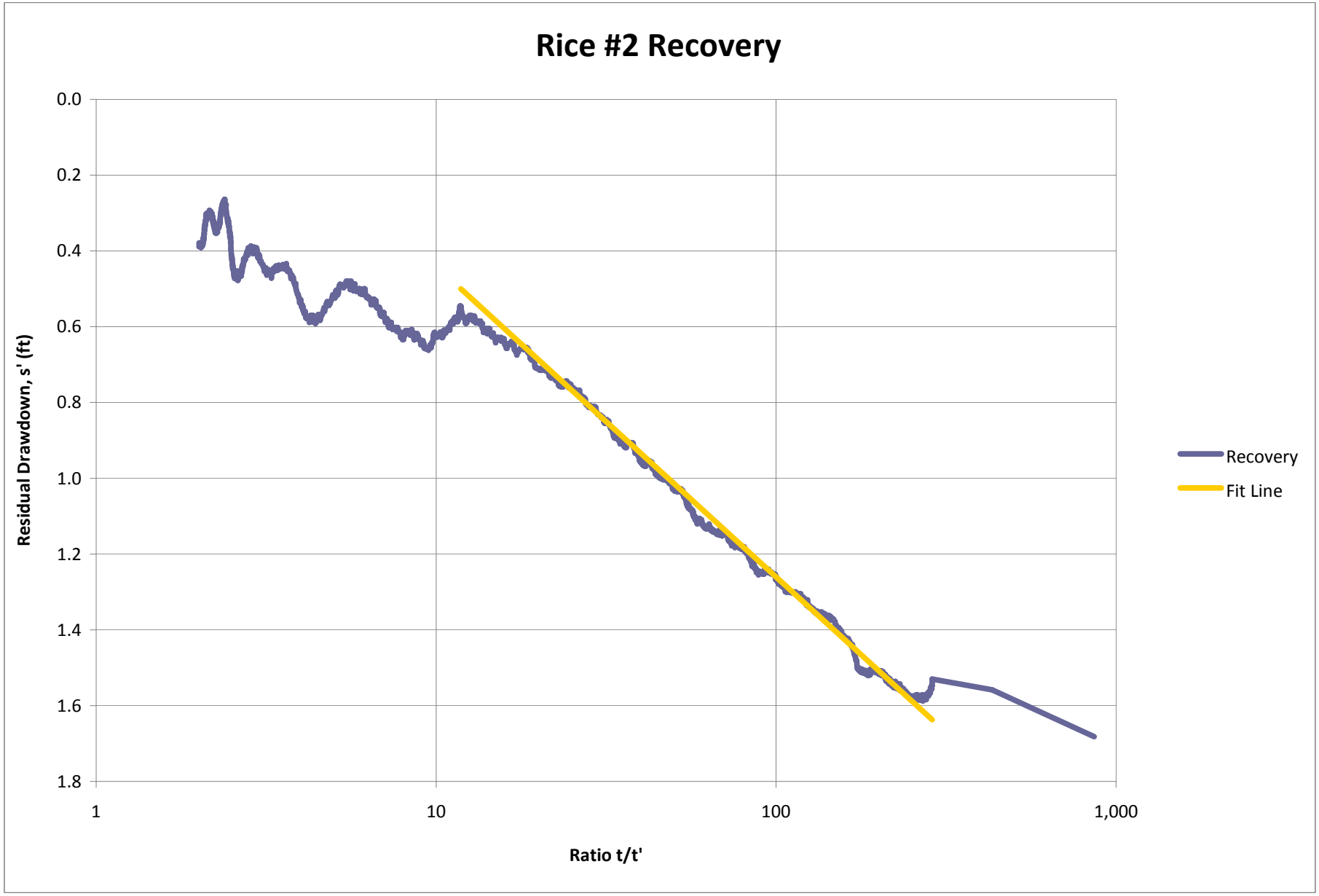
Rice #1	Delta s dd	T dd (gpd/ft)	T dd (ft2/d)	b (ft)	K dd (ft/d)
14.4 gpm	4.9	776	104	315	0.33
290 – 1,000 min					
	Delta s rec	T rec (gpd/ft)	T rec (ft2/d)	b (ft)	K rec (ft/d)
14.4 gpm	5.8	655	88	315	0.28

Rice #2	Delta s dd	T dd (gpd/ft)	T dd (ft2/d)	b (ft)	K dd (ft/d)
100 gpm	0.60	44,000	5,900	170	35.
10 – 4,300 min					
	Delta s rec	T rec (gpd/ft)	T rec (ft2/d)	b (ft)	K rec (ft/d)
100 gpm	0.82	32,200	4,300	170	25.


Rice #1 Drawdown
Drawdown, s (ft)
2
3
4
5
6
7
8
9
10
11
12
1
10
100
1,000
Time After Pumping Started, t (min)
first pumping rate
recorded: 15 gpm at
6 mintes
second pumping
rate
recorded: 13 gpm
at 111 minutes
Drawdown
Fit Line


Rice #1 Recovery
0
2
4
6
8
10
12
Residual Drawdown, s' (ft)
10
100
1,000
10,000
Ratio t/t'
Recovery
Fit Line


Rice #2 Drawdown
4.0
4.5
5.0
5.5
6.0
6.5
7.0
Drawdown, s (ft)
1
10
100
1,000
10,000
Time After Pumping Started, t (min)
Drawdown
Fit Line


Rice #2 Recovery
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
Residual Drawdown, s' (ft)
1
10
100
1,000
Ratio t/t'
Recovery
Fit Line

WorleyParsons
resources & energy
2330 E. Bidwell Street, Suite 150
Folsom, CA 95630
Phone: 916-817-3920 Fax: 916-983-1935

PUMPING TEST FORM

PROJECT NAME: **RICE PUMPING TEST**
PROJECT NO.:
DATE: 8/20 PAGE 1 OF 1
ARRIVE SITE: 8/20 DEPART SITE: 8/21

Rice #1

WORLEYPARSONS PERSONNEL ON-SITE:	CONTRACTOR(S) ON-SITE:
R. Farrell	Azca - Jose Miguel

PUMPING WELL IDENTIFICATION: Rice #1

DATE	TIME	PUMPING RATE	WATER LEVEL	PH	EC	TDS (PPM)	TEMP	Totalizer	NOTES
									Run pump for 10 min before test to ensure pump worked. Begining Totalizer Reading = 0549750 gallons. Turned off for 10 min for recharge. ~~0549750~~ 0549976 @ end
					3183			550590	
8/20/09	18:36	15	--	6.92	~~3189~~	1599	32.7	~~0549976~~	Start test @ 18:20
	8:27	13	--	6.92	3185	1602	32.5	552080	{CALLED RYAN NOTIFIED PUMP NOT GETTING 15 GALLONS PER MINUTE}
	10:27	12	--	6.91	3160	1576	32.1	553090	
8/21	00:23	15	--	6.92	3322	1647	32.0		
	02:40	14	--	6.92	3157	1583	31.5	556990	
	04:40	15.5	--	6.91	3189	1597	31.7	558760	
	06:49	14	--	6.90	~~3254~~	1580	32.1	560550	False pumping rate back to 15 gpm
0841	~~06:49~~	14.5	--	6.92	3190	1595	31.9	562190	false d/to 10.5 gpm
	1203	15.5	--	6.92	3166	1583	32.6	564390	
	1253	15.0	--	6.92	3192	1595	32.5	565790	
	1459	15.0	--	6.91	3144	1575	33.0	567960	
	1652	15.0	--	6.91	3165	1575	32.7	569650	Took Sample @ 1730
	1740	15.0	--	6.92	3189	1593	32.0	570360	
	18:20	End						570926 End	

Signed:

0

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PUMPING TEST FORM

PROJECT NAME: **RICE PUMPING TEST**
PROJECT NO.:
DATE: 8/18/09 PAGE 1 OF 3
ARRIVE SITE: 8/18 DEPART SITE: 8/20

Rice #2

WORLEYPARSONS PERSONNEL ON-SITE:	CONTRACTOR(S) ON-SITE:
R. Farrell	AZCa – Jose, Miguel, Larry.
PUMPING WELL IDENTIFICATION:	

DATE	TIME	PUMPING RATE	WATER LEVEL	PH	EC	TDS (PPM)	TEMP °C	Totalizer x100	DTW Well #1 (TOC)	NOTES (Measured @ 17:55)
8/18	18:15	100	378	6.99	1700	740	36.6	696	264.0	Transducer set @ 393
	18:25	100	~~393~~						287.5	Pump set @ 400'
	18:35	100	--	6.99	1617	809	35.8	514	287.5	
	18:49	105	--	6.99	1643	824	36.1	527	287.5	Turned spray field on
	18:58	105	--	6.99	1666	843	36.3	538	287.5	
	19:15	105	--	6.99	1612	806	36.4	556	287.5	
	20:15	100	--	6.99	1573	803	35.9	622	287.5	Stop Spray field on for 15m
	21:15	100	--	6.99	1505	753	35.7	687	287.52	
	22:15	100	--	6.99	1431	720	36.0	746	287.55	
	23:15	100	--	6.99	1356	683	35.4	813	287.55	
	0:15	100	—	6.99	1370	683	35.3	874	287.56	
8/19	1:15	100	—	6.99	1358	679	35.2	940	287.55	
	2:15	100	—	6.99	1339	673	35.4	1003	287.55	
	3:15	100	—	6.99	1336	669	35.1	1064	287.55	
	4:15	100	—	6.99	1321	659	34.9	1134	287.55	
	5:15	100	—	6.99	1330	665	34.9	1199	287.55	
	6:15	100	—	6.99	1348	673	34.3	1269	287.55	
	7:15	100	—	6.99	1341	672	36.1	1330	287.55	
	8:15	100	—	6.99	1336	673	36.3	1388	287.55	
	9:15	100	--	6.99	1328	665	36.5	1459	287.60	

Signed:

RYAN-916-420-2752

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PUMPING TEST FORM

PROJECT NAME: **RICE PUMPING TEST**
PROJECT NO.:
DATE: 8/19/09 PAGE 2 OF 3
ARRIVE SITE: DEPART SITE:

Rice #2

WORLEYPARSONS PERSONNEL ON-SITE:	CONTRACTOR(S) ON-SITE:
R. Farell	Azca
PUMPING WELL IDENTIFICATION: Rice #2	

DATE	TIME	PUMPING RATE	WATER LEVEL	PH	EC	TDS (ppm)	TEMP	totalizer x100	well #1 DTW	NOTES
8/19/09	10:20	100	--	6.93	1310	653	36.1	1530	287.65	installed pump on #2 @
8/19/09	11:15	100	--	6.92	1294	646	35.9	1589	287.65	10:00
8/19/09	12:20	100	--	6.93	1295	646	36.7	1660	287.63	
"	13:15	100	--	6.92	1290	647	36.8	1719	287.62	
	14:15	100	--	6.93	1296	648	36.9	1784	287.60	
	15:15	100	--	6.93	1300	651	36.8	1847	287.58	
	16:15	100	--	6.92	1287	643	36.9	1913	287.50	
	17:15	100	--	6.93	1296	648	36.7	1977	287.48	
	18:15	100	--	6.92	1296	648	36.8	2043	287.48	
	19:38	100	--	6.92	1297	650	36.2	2132	287.50	
	22:57	100	--	6.93	1325	668	36.2	2281	287.50	
8/20/09	00:56	100	--	6.92	1322	656	35.5	2479	287.50	
	03:50	100	--	6.91	1342	666	35.0	2664	287.50	
	06:01	100	--	6.92	1329	665	34.7	2806	287.50	
	09:01	100	--	6.93	1281	640	36.5	3001	287.55	
	12:14	100		6.93	1279	641	36.9	3208	287.62	
	15:32	100	---	6.92	1297	644	37.6	3422	287.55	

Signed:

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PUMPING TEST FORM

Rice #2

PROJECT NAME: **RICE PUMPING TEST**
PROJECT NO.:
DATE: 8/20 PAGE 3 OF 3
ARRIVE SITE: DEPART SITE:

WORLEYPARSONS PERSONNEL ON-SITE: R. Parrell
CONTRACTOR(S) ON-SITE: AZCA
PUMPING WELL IDENTIFICATION: Rice #2

DATE	TIME	PUMPING RATE	WATER LEVEL	PH	EC	TDS PPM.	TEMP	x100 totalizer	NOTES
8/20	1430	100	--	6.93	1293	646	37.2		
	8:35	100	--	6.92	1304	1505	36.3		
	1024	100	--	6.91	1289	644	35.7		
	00:26	100	--	6.91	1317	656	35.4		
	02:32	100	--	6.92	1285	633	34.5		
	04:49	100	--	6.91	1294	647	35.9	4267	
	0647	100	--	6.91	1283	642	36.0	4341	
	0843	100	--	6.92	1296	648	35.2	4513	
	1059	100	--	6.93	1287	641	35.8	4659	
	1237	100	[illegible]	6.92	1296	649	36.6	4760	
	1501	100	--	6.92	1281	638	36.2	4914	
	1656	100	--	6.91	1288	643	36.3	5036	Took sample @ 1720
	1745	100	--	6.93	1293	647	35.9	5086	
						Turned off	@ 18:00:03		
						end	Totalizer =	5102	

Signed:

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DAILY FIELD REPORT

PROJECT NAME: Rice	
PROJECT NO.:	
DATE: 8/18/09	PAGE 1 OF 1
ARRIVE SITE: 11:00 DEPART SITE: 00:25	

WORLEYPARSONS PERSONNEL ON-SITE:	CONTRACTOR(S) ON-SITE:
R. Furrell	Azca
GENERAL WORK DESCRIPTION:	

TIME	ACTIVITY - WORK PROGRESS
	DTW #2 = 378
11:00	Arrive onsite - drillers pulling pump out of well & Installing new pump.
12:45	I go into town to buy materials.
4:30	Arrive back onsite. Pump is reset @ 400' DTW @ 378'
	- Install transducers in Rice #2
6:00	Start pump test.
	- continue to monitor water level in Rice #1 during test w/ a sounder. The drillers indicate that DTW in Rice #1 before the test was 264' bgs. This measurement is suspect.
	- Pump rate is set at constant 100 gpm.
00:25	Larry from Azca Arrives, I leave site.

Signed:

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Folsom, CA 95630
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DAILY FIELD REPORT

PROJECT NAME: Rice			
PROJECT NO.:			
DATE: 8/19/09		PAGE	OF
ARRIVE SITE: 7:00	DEPART SITE:		

WORLEYPARSONS PERSONNEL ON-SITE:	CONTRACTOR(S) ON-SITE:
R. Farrell	Azca
GENERAL WORK DESCRIPTION: Pump test	

TIME	ACTIVITY - WORK PROGRESS
4:00	Azca Arrives to install pump in Rice #1.
7:00	I arrive onsite. Pump test is going well. I continue to collect WQ indicator parameters & water levels. Pump for Rice #1 finished install @ 10:00
19:50	Leave site.

Signed:

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DAILY FIELD REPORT

PROJECT NAME: Rice			
PROJECT NO.:			
DATE: 8/20/09		PAGE	OF
ARRIVE SITE:	DEPART SITE:		

WORLEYPARSONS PERSONNEL ON-SITE:	CONTRACTOR(S) ON-SITE:
R. Farrell	Arcu
GENERAL WORK DESCRIPTION: Pump tests	

TIME	ACTIVITY - WORK PROGRESS
7:00	Arrive onsite. Continue to perform pump test on Rice #2
18:20	Start pump test for Rice #1. Transducer set @ 30' bwl. Took water sample @ beginning of test.
18:50	& Leave site

Signed:

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Folsom, CA 95630
Phone: 916-817-3920 Fax: 916-983-1935

DAILY FIELD REPORT

PROJECT NAME: Rice	
PROJECT NO.:	
DATE: 9/21/09	PAGE 1 OF 1
ARRIVE SITE: 03:00 DEPART SITE: 1900	

WORLEYPARSONS PERSONNEL ON-SITE:	CONTRACTOR(S) ON-SITE:
R. Farrell	Arca
GENERAL WORK DESCRIPTION: Pump tests.	

TIME	ACTIVITY - WORK PROGRESS
03:00	Arrive onsite. Both pump tests going well.
	- have to adjust valve on Rice #1 to make sure it stays
	within 5% of the 15 gpm pumping rate.
17:20	Take water sample from Rice #2
17:30	Arca Arrives. Take water sample from Rice #1
18:00	Stop test for Rice #2
18:20	Stop test for Rice #1. Clean up site.
19:00	Leave site.

Signed:

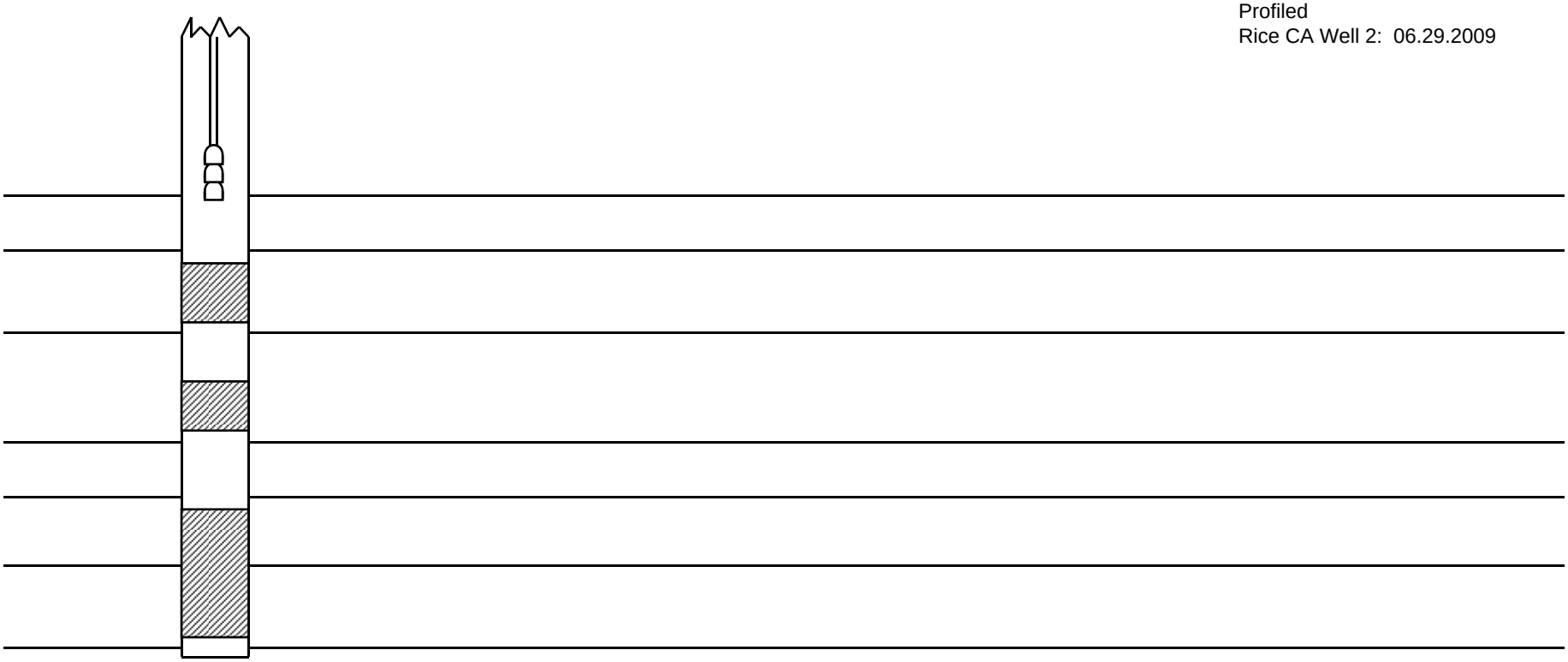
APPENDIX 4

HYDRODYNAMIC TESTING OF RICE #2

50 Tiburon Street Suite 7
San Rafael , CA 94901
Toll Free.866.298.8701
Phone.415.453.2501
Fax.415.453.2509

Preliminary Report: Dynamic Flow Profile For Rice, CA Well 2

Profiled
Rice CA Well 2: 06.29.2009



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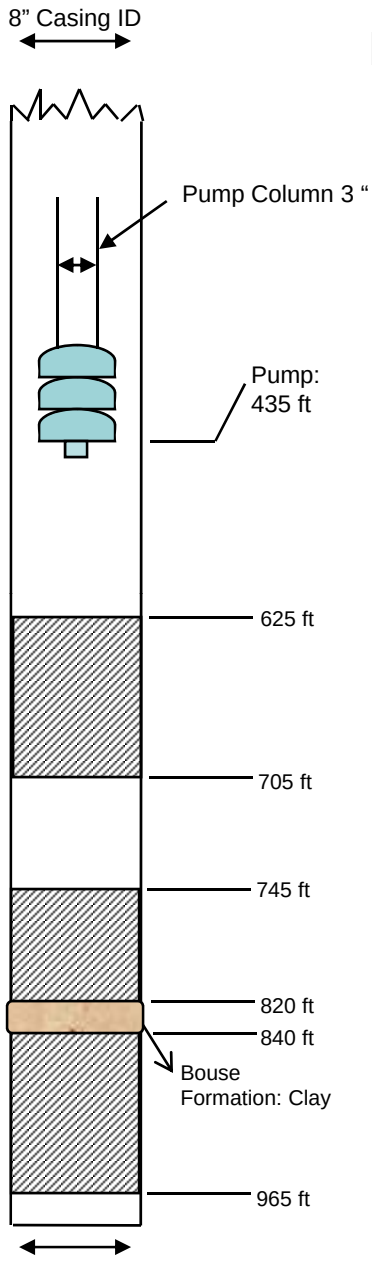
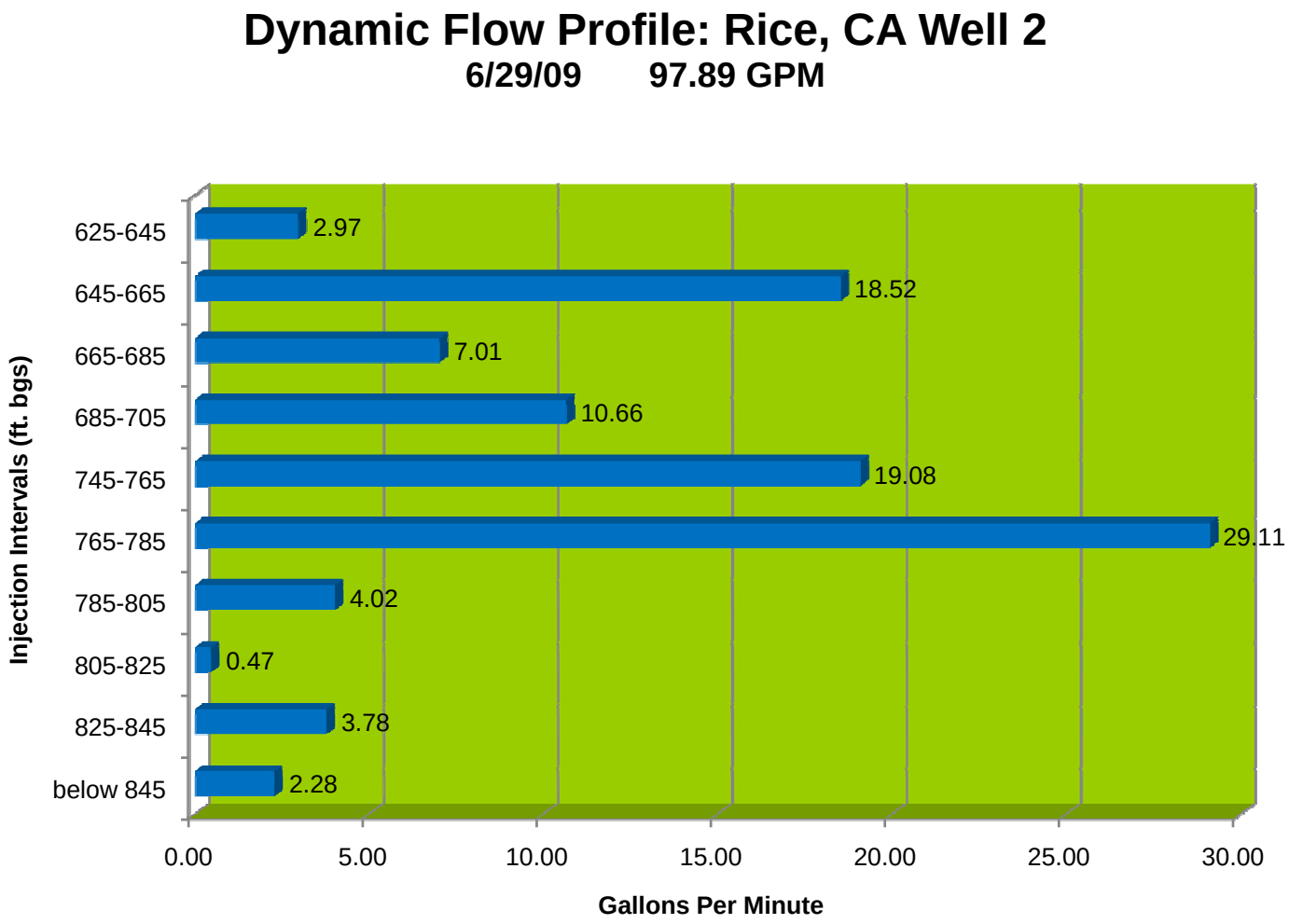
Dynamic Flow Contribution (GPM) By Depth and Screen Intervals





The graph shows dynamic flow contribution vs. the injection depth intervals (ft.,bgs.).

The upper screen interval between 625’ and 705’ produces approximately 39.16 gpm. This accounts 40% of water coming from the upper screen interval. The bottom screen produces 58.32 gpm or 60% of total production.

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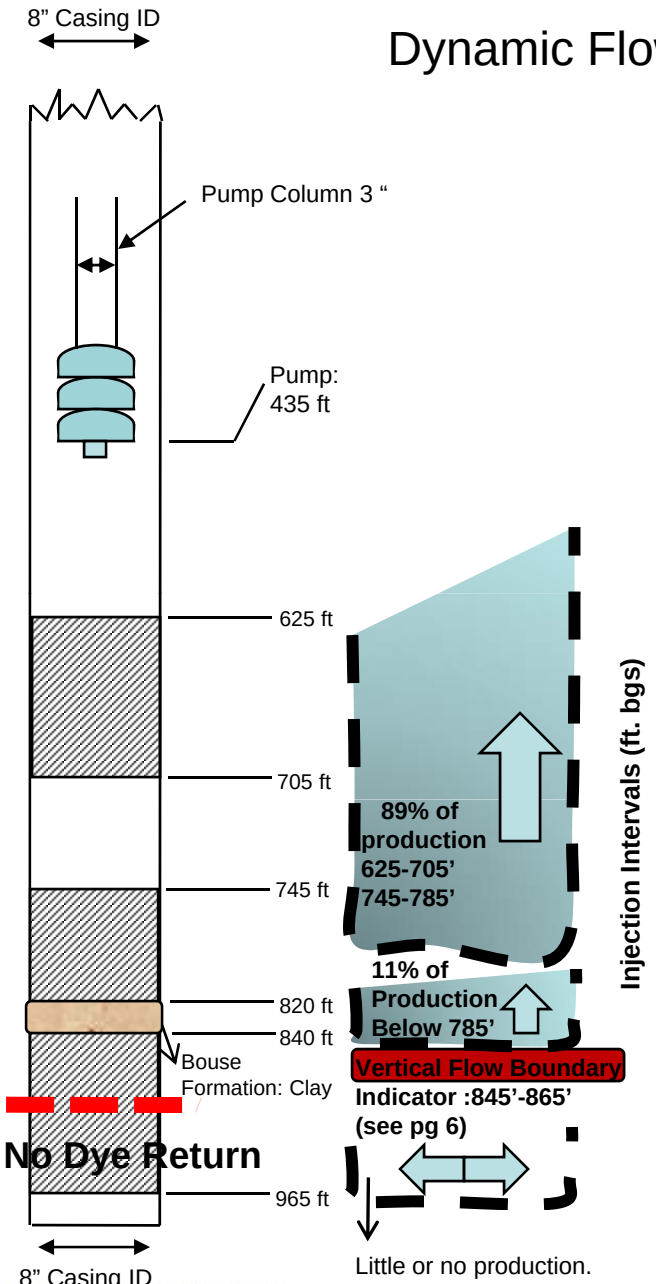
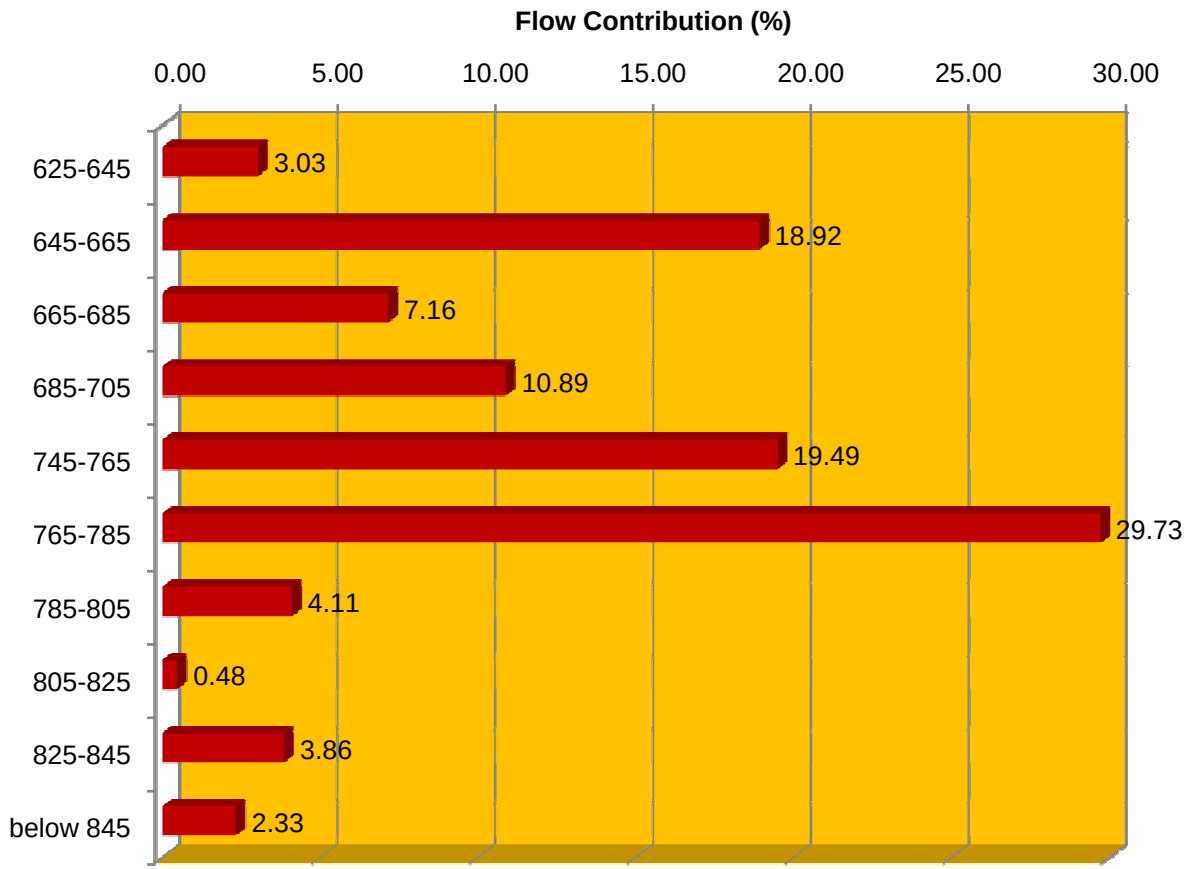
Dynamic Flow Contribution (%) By Depth and Screen Intervals





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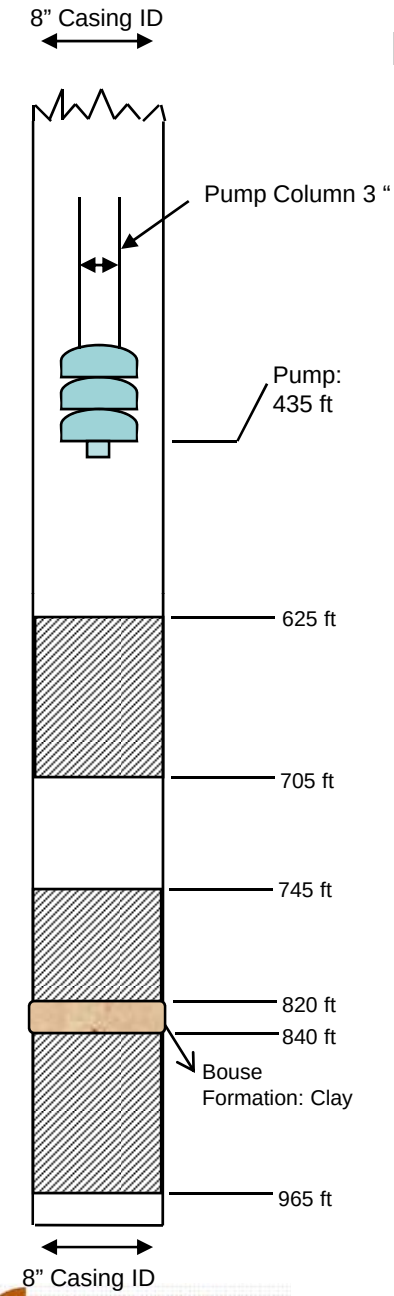
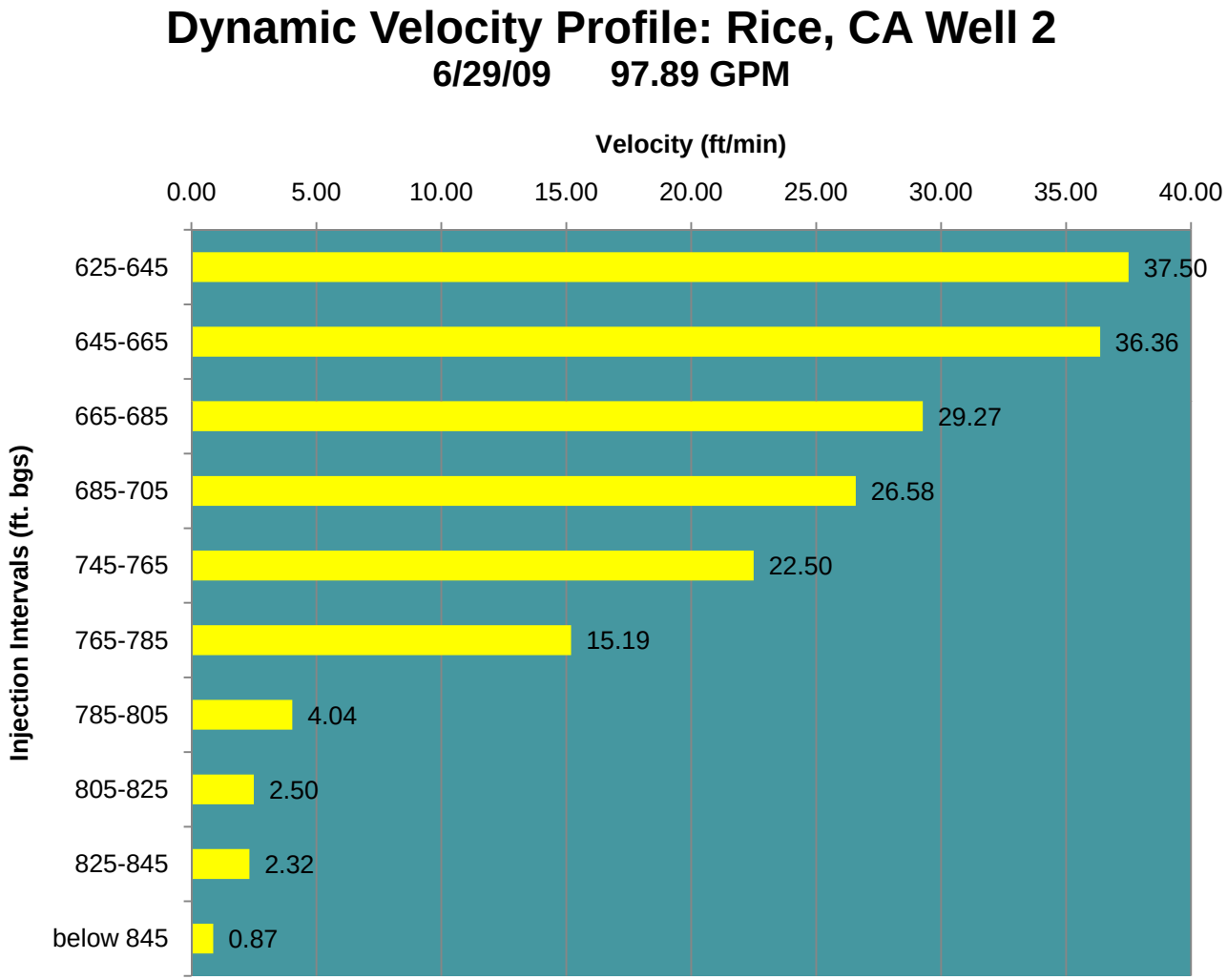
Dynamic Flow Velocity By Depth and Screen Intervals





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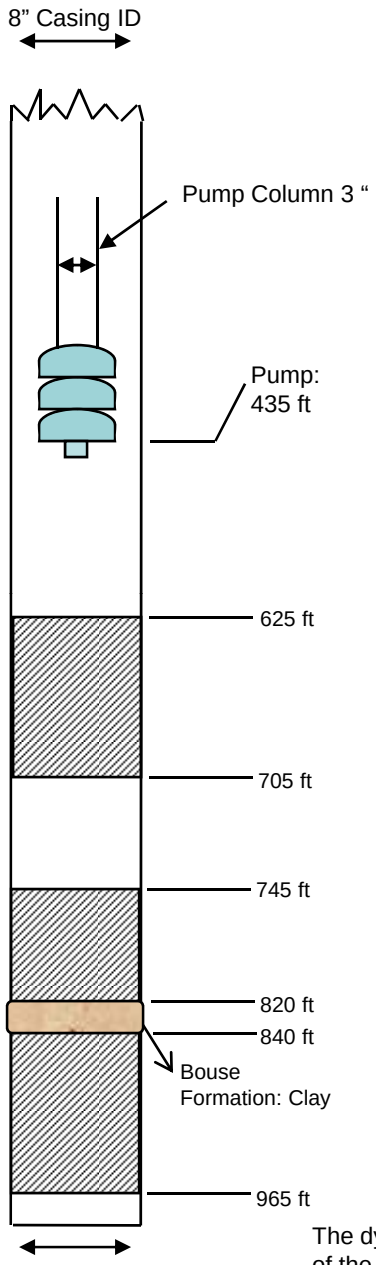
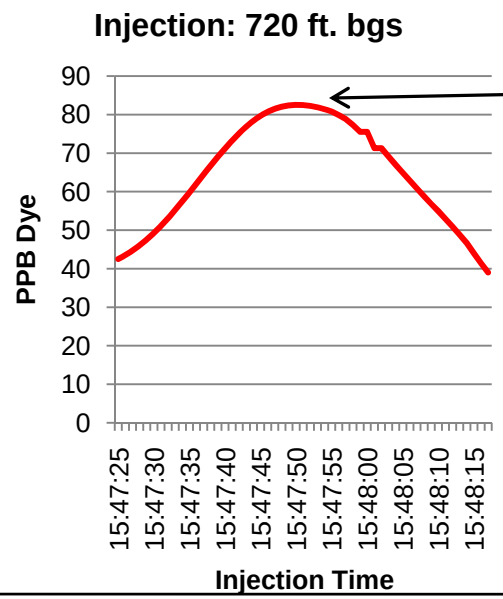
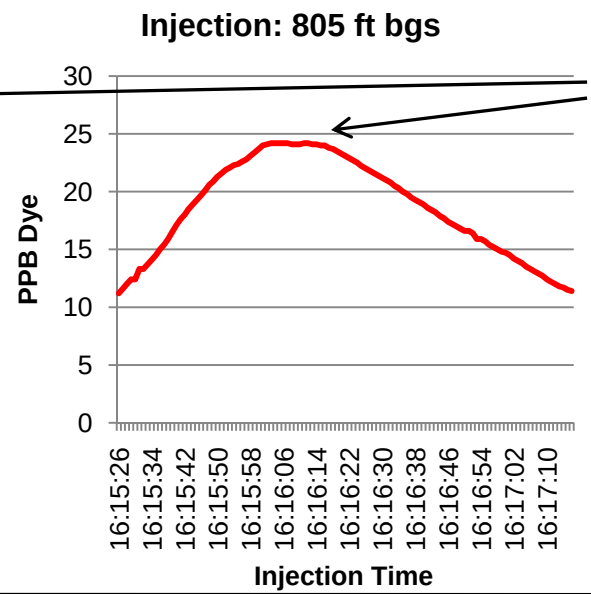
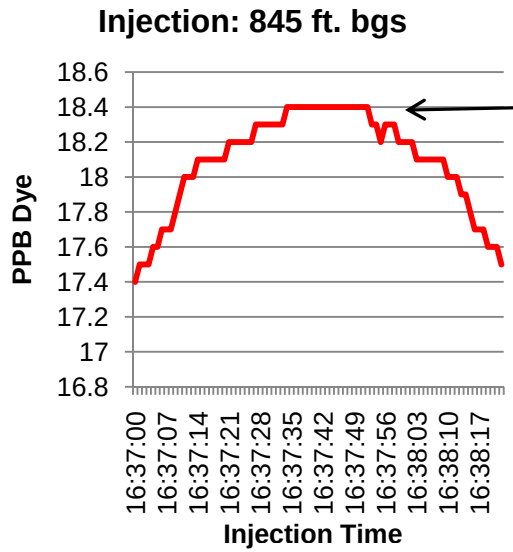
Injection Return Times Analysis: Peak Dye Returns

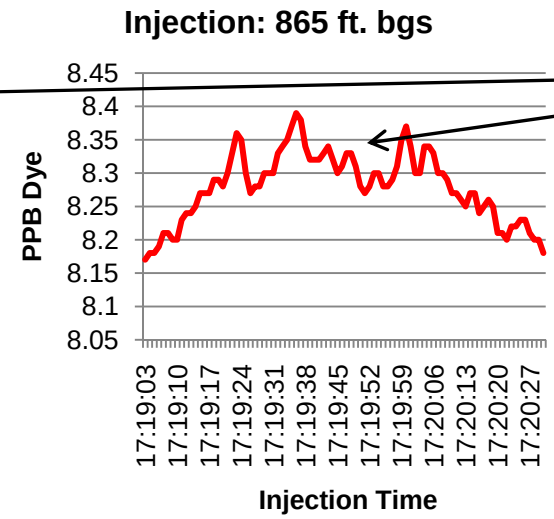






Peak Dye Returns Exhibit a *distinct* peak for injections above 805 ft bgs





Peak Dye Returns Exhibit a *rolling* peak for injections below 845 ft bgs

The dye tracer method of collecting dye peak returns provides flow velocities values that are used to generate a flow profile of the well in GPM. The (FBI) or *Flow Boundary Indicator is the lowest dye return peak below which there is typically no flow return to the pump*. As shown above, dye returns below 845 ft bgs show a tendency to *Roll* as they peak. These graphs qualitatively indicate the bottom boundary for vertical capture of flow by the suction of the pump and/or the boundary of production inside the well casing at this specific Pumping rate and pump location. Injections at 805 and above show distinct peaks which correlate to substantial flow contribution. *There was no sign of dye return observed at injection point 885 ft. bgs or 900 ft. bgs after waiting for 102 minutes.*

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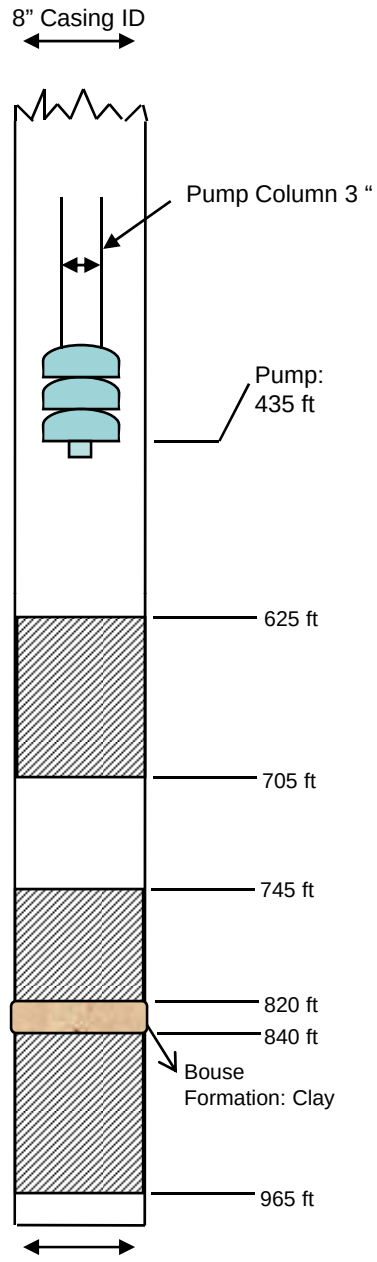
Well Information



Rice, CA Well 2

Pump Intake Depth (ft. bgs.)	435’
Well Diameter (in)	8”
Pump Column Diameter (in)	3”
Cross Sectional Area of well (ft^2)	.349
Measured Well Bottom (ft. bgs)	985
Measured Discharge (gpm)	97.89
Pumping Water Level (ft. bgs)	Unknown

Screen Intervals:

625-705’
745-965’

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