

Sandoval County Desalination Pilot Project DRAFT- Pilot Testing Report



CDM

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Executive Summary

The Sandoval County desalination pilot project evaluated the potential to produce potable water from a brackish groundwater supply in the Rio Puerco valley west of Rio Rancho, NM. The aquifer is approximately 4000 feet deep and contains high concentrations of dissolved solids, hardness, arsenic, and radionuclides. Water discharges at artesian pressure, contains several dissolved gases, and is at a temperature of exceeding 125 degrees F. Individually, each of these water quality concerns present only a minor challenge, however when compounded together the primary objective of producing a potable and palatable water supply is formidable. A second objective of the pilot project was to determine if, once removed, these contaminants could be isolated in select waste streams in the treatment process to facilitate disposal of the hazardous waste streams and allow other process residuals be applied to beneficial reuse. Residual treatment was not specifically tested during piloting.

A pilot testing system using pretreatment with aeration, combined ferric chloride coagulation for arsenic reduction and caustic soda precipitation for softening, and granular filtration followed by ion exchange and reverse osmosis as final treatment was constructed at the EXP-6 Well site in Sandoval County. The pilot test design was based on historical raw water quality and bench-scale testing conducted in June of 2009. The pilot test operated for 66 days from September 21 to November 25, 2009.

The study demonstrated that it was possible to treat this challenging water to meet current Environmental Protection Agency drinking water standards. Residual waste streams can be separated as proposed, however additional filtration facilities may be required to further reduce contamination of downstream processes.

- Aeration at the pilot scale removed some dissolved gases and increased raw water pH as anticipated. The full scale facilities based on a packed tower or fine-bubble diffuser design should better meet process objectives because these processes have superior mass transfer capacity.
- Coagulation with ferric chloride prior to softening reduced arsenic concentration from 0.8 mg/L in the raw water to approximately 0.3 mg/L in the settled water. Improved arsenic removal down to 0.1 mg/L was realized if the settled water was then filtered to remove floc particles in the clarifier overflow
- Softening using caustic soda reduced hardness from over 1,500 mg/L as CaCO₃ in the raw water to approximately 200 mg/L as CaCO₃ which is acceptable for human consumption but for RO pretreatment a lower feed water hardness is preferred. Improved performance is expected in the full scale facilities from the use of lime and because the mixing and clarification basins will be designed with hydraulics better matched to the process flowrate.
- Ion exchange was an effective polishing step for reduction of remaining hardness in the RO feed water. Hardness was reduced to approximately 150 mg/L as CaCO₃

following the IX process. Ion exchange is a chemically intensive process requiring frequent regeneration with acid and its benefit must be evaluated during final design.

- Reverse osmosis reduced remaining target contaminants to very low or non-detect levels. Dissolved solids were removed to consistently below 150 mg/L from raw water concentrations exceeding 12,000 mg/L. Arsenic and radionuclides were also reduced to below detection limits.
- Residuals management goals were considered during piloting. RO Concentrate composition was regularly analyzed and should be suitable for brine separation and minimization processes.

Section 1

Pilot Testing Overview

1.1 Project Background

Southern Sandoval County is a rapidly growing region of central New Mexico. In effort to meet the increasing water demands of this area, Sandoval County has began exploration of alternative water supply sources including a currently undeveloped aquifer located west of Rio Rancho in the Rio Puerco basin. In 2007, Sandoval County drilled two wells, Well EXP-5 and Well EXP-6. Well 6 was tested in 2008 to determine its potential production capacity and has a reported production capacity of 600 gallons per minute (gpm, 0.86 mgd). Well 6 was used for this pilot testing evaluation.

The Sandoval County Desalination Pilot Project evaluated the feasibility and technology required to produce potable water from this 4000-ft deep brackish groundwater aquifer. Water from the wells is very high in total dissolved solids (12,000 milligrams per liter (mg/L)), hardness, and alkalinity, contains high levels of carbon dioxide and hydrogen sulfide(H₂S) gas as well as arsenic at 0.8 mg/L and the presence of some radionuclides. The water is under artesian pressure and discharges at approximately 160 psi at a temperature of approximately exceeding 125 degrees Fahrenheit.

Brackish water is usually treated using a reverse osmosis (RO) process. However, due to the complex chemistry of the water, the water requires significant pretreatment before the RO process. To determine the most effective treatment processes, the County will pilot tested recommended treatment processes to bring the water into compliance with drinking water standards. The goals of the pilot testing process were to determine the most effective treatment processes, the full scale plant design parameters, and the estimated cost of constructing and operations. Sandoval County intends to design and construct a water treatment plant with an initial production capacity of 5 million gallons per day (mgd) that is incrementally expandable to at least 20 mgd.

1.2 Pilot Testing Facilities

The pilot plant was operated for a 60 day period from September 21 to November 19, 2009. The facility was operated daily, seven days a week during this period. Process operation was 8-10 hours during startup and system testing and 24 hours per day for the full operation during the last 4-5 weeks of testing. An additional six day operation period was added at the conclusion of testing to evaluate the effectiveness of arsenic removal in the clarifier using ferric chloride independent of the lime softening process. The pilot system was then shut down and winterized on November 25th, 2009.



Sandoval County Desalination Pilot Facilities- September 2009

A 12-foot diameter pilot Claricone™ softening clarifier was rented from CB&I of Plainview, IL for this project for pilot testing the lime softening process and clarification with ferric chloride for arsenic reduction. Two, two-foot diameter granular filters were used for filtration of any carryover particles from the Claricone™ process. Aeration equipment was installed upstream of the clarifier to reduce dissolved gases present in the raw water. CDM provided its High-Efficiency Reverse Osmosis (RO) pilot trailer for this project which is a five stage RO process with two stages of brackish water RO membranes and three stages of high pressure seawater RO membranes with booster pumps. The pilot trailer also contains cartridge filters and ion exchange vessels for pretreatment, process monitoring equipment, benchtop analytical devices, and an electrical distribution skid. Process interconnection, chemical feed, and facility waste piping was assembled onsite to meet the requirements of the phases of pilot testing. The pilot

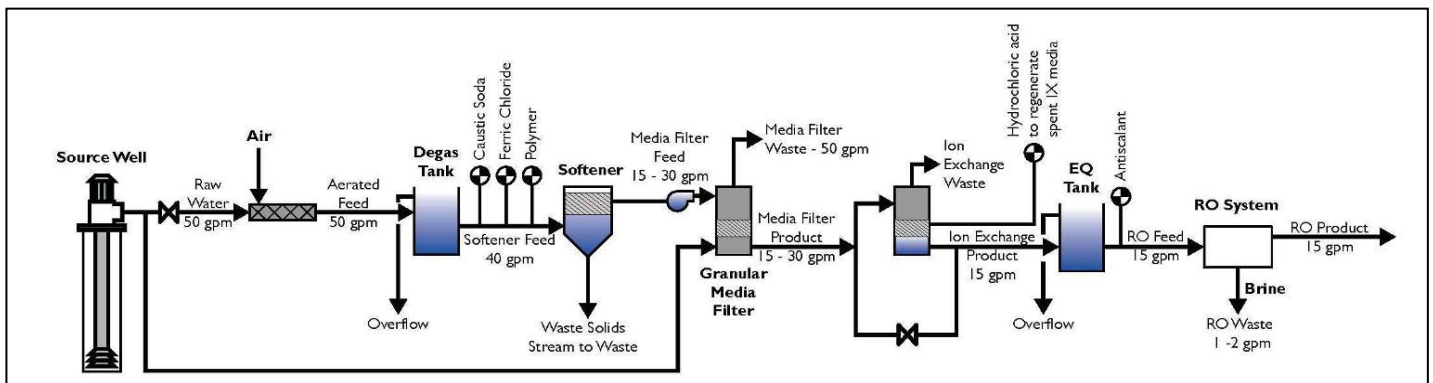


Figure 1-1 Pilot Test Plant Process Flow Diagram

test process flow diagram is shown in Figure 1-1

1.1.1 Pilot Plant Design Parameters

The RO pilot trailer was configured to process 15 gpm of feed water and produce 12-13 gpm finished water, depending on recovery. To meet this flow rate, the pretreatment processes were designed to produce between 15 to 20 gpm each to provide ample feed water for downstream treatment processes as well as backwashing and cleaning processes required for each treatment technology. The raw water flow from Well 6 typically ranged between 18 to 20 gpm but was occasionally as high as 50 to 100 gpm to flush the well column. The aeration process hydraulically limited plant feed flow to a maximum of 21 gpm. Flow into the claricone process matched the discharge of the aeration process and feed rates of process chemicals were based on flow through the Claricone. The softening clarifier required occasional purging of accumulated lime sludge and grit. Total flow through the media filters was 15-18 gpm to match the RO trailer feed flow and to provide water for backwashing the filters (conducted every 8 to 24 hours of filter bed operation). The ion exchange vessel operated at the same feed flow as the RO system, regeneration of the IX resin was conducted as a batch process while the RO system was off line. During operation of the pilot test, the RO trailer feed was between 10 and 15 gpm and produced between 8 and 13 gpm finished water.

1.3 Pilot Plant Objectives

The primary objective of the pilot test was to confirm that water could be produced from the proposed treatment process and that this water will meet EPA standards for drinking water. Additional objectives were to refine chemical dosage and energy requirements and individual process performance. The pilot plant was scheduled to operate for 60 days and an additional six day period was added at the conclusion for additional tests that, during the course of piloting, were determined would benefit the project. The following critical design and operational parameters were identified in the pilot protocol to be determined through pilot testing:

- Optimal softening pH
- Caustic dose required to achieve optimal pH
- Optimal coagulation dose
- IX regeneration rate
- Maximum RO recovery rate
- Maximum pressure (osmotic pressure and parasitic headloss)
- Fouling tendency of the water and membrane at high recoveries
- RO cleaning frequency
- Equipment reliability
- Operational stability, ease of operations, and process sensitivity
- Energy requirements
- Characterization of dissolved and suspended solids in each residual stream
- Permeate water quality

Table 1-1 below summarizes the pilot testing activities conducted during the 66 day operational period:

Table 1-1 Pilot Testing Objectives Summary

Week	Primary Objectives	Secondary Objectives	Comments
1-2	<ul style="list-style-type: none"> - System Startup - Pretreatment performance - Training 	<ul style="list-style-type: none"> - Softened water quality - Filter Performance - RO System troubleshooting 	RO at 75 percent recovery, 10 gfd flux, using old membranes. Evaluate limits of system operation.
3-4	<ul style="list-style-type: none"> - RO System proving - IX system commissioning 	<ul style="list-style-type: none"> - Improve softening performance with pH monitoring 	Increase RO recovery to 80 percent, achieve stable operation
5-6	<ul style="list-style-type: none"> - Continuous operation of pretreatment 	<ul style="list-style-type: none"> - IX regeneration performance 	Install New RO Membranes, operate at 80 percent recovery
7-8	<ul style="list-style-type: none"> - RO system challenge - Extended operation 	<ul style="list-style-type: none"> - Begin dosing polymer for flocculant aid 	Attempt increased RO recovery
9	<ul style="list-style-type: none"> - Evaluate Arsenic removal independent of softening 	<ul style="list-style-type: none"> - none 	Operate clarifier using only ferric chloride. No IX or RO since no softening

Section 2

Raw Water Quality and Treatment Challenges

2.1 Raw Water Quality

Extensive well water characterization was conducted during production tests of Well 6 in 2007 and in 2008. Complete raw water quality results are provided in Appendix A.

Water from the wells is very high in total dissolved solids (TDS), hardness, and alkalinity, and contains high levels of carbon dioxide gas, as well as arsenic and radionuclides. The water is under artesian pressure and discharges at approximately 160 pounds per square inch (psi) at a temperature of approximately 125 degrees Fahrenheit (F).

The quality of the raw water produced by the deep brackish supply wells in Sandoval County presents a formidable challenge for any water treatment process. Many of the contaminants are considered to be hazardous in large amounts (arsenic and radionuclides). Others, such as hardness and alkalinity, affect the efficiency and recovery of the treatment process. Brackish water is typically treated using reverse osmosis (RO) and this process is sensitive to constituents in the water. The constituents in the water from Well 6 along with the corresponding United States Environmental Protection Agency (EPA) primary and secondary drinking water standards are presented below in Table 2-1. Constituents that are **bold** exceed drinking water standards.

Table 2-1
Well 6 Water Chemistry¹

Parameter	Well 6 Water	Primary Drinking Water Standard	Secondary Drinking Water Standard
Alkalinity (mg/L) as CaCO ₃	1,800	N/A	N/A
Arsenic (mg/L)	0.634	0.01	N/A
Bicarbonate (mg/L)	1800	N/A	N/A
Boron (mg/L)	9.7	N/A	N/A
Calcium (mg/L)	450	N/A	N/A
Carbon Dioxide (mg CO ₂ /L)	1900	N/A	N/A
Chloride (mg/L)	3,100	N/A	250
Fluoride (mg/L)	4.8	4.0	2.0
Gross Alpha (pCi/L)	209	15	N/A
Hardness (mg/L as CaCO ₃)	1,500	N/A	N/A
Iron (mg/L)	3.3	N/A	0.3
Lead (mg/L)	ND	0.015	N/A
Magnesium (mg/L)	97	N/A	N/A
Phosphorus (mg/L)	0.29	N/A	N/A

**Table 2-1
Well 6 Water Chemistry¹**

Parameter	Well 6 Water	Primary Drinking Water Standard	Secondary Drinking Water Standard
pH	7.05	N/A	6.5-8.5
Radium 226+228 (pCi/L)	85	5	N/A
Salinity (unitless)	10.4	N/A	N/A
Silica (mg/L)	32	N/A	N/A
Sodium (mg/L)	3,600	N/A	N/A
Strontium (mg/L)	8.8	N/A	N/A
Sulfate (mg/L)	4,400	N/A	250
TDS (mg/L)	12,000	N/A	500
Temperature	120 F	N/A	N/A
Turbidity (NTU)	13	N/A	N/A
Thallium (mg/L)	0.007	0.002	N/A
Uranium (mg/L)	0.002	0.03	N/A

¹Based on testing dated 11/20/07
ND- Non-detect
N/A – Not applicable

2.2 Treatment Challenges

There are several constituents present in Well 6 water that provide competing treatment process challenges not typically found in a single water supply source. Hardness must be reduced to nearly zero before the TDS can be removed via high-recovery RO in order to prevent scaling and fouling of the membranes. In order to reduce the concentration of arsenic in the RO feed water, which would allow beneficial use of the RO concentrate, arsenic and radionuclides must be reduced in pretreatment. Arsenic can be removed using coagulation with ferric chloride and radionuclides are co-precipitated in this process, but the elevated levels present will most likely require that the residual sludge be handled as a hazardous material. Sulfate will also be present in the RO concentrate brine as an undesirable salt product. Boron is an unusual contaminant in a water supply well and is currently unregulated, but the elevated concentration suggests that this will be a contaminant of concern.

In addition to competing contaminants and elevated concentrations of certain constituents, pH control will be important to process design and chemical addition to control pH is a primary focus of the pilot testing. Arsenic removal is best achieved at lower pH water conditions between 6.5 and 8.0 pH units while hardness removal through lime softening is best achieved at pH in the range of 9.5 to 11.0. Ferric chloride depresses pH for arsenic removal which will then be increased using caustic soda for the softening process.

The elevated water temperature also has an influence on many of characteristics of the water and also its kinetics. The drawback to the elevated temperature of the raw water is that it can lead to increased biological activity in the processes and pipelines and increase the required dose to maintain chlorine residuals. Additionally, the water needs to be cooled approximately 20 degrees Celsius to meet aesthetic standards for the consumer.

The temperature of the water from Well 6 was within the recommended guidelines for all the process equipment but may have lead to increased permeability through the membranes in the Reverse Osmosis process.

2.2.1 Treatment Processes

Aeration, Arsenic Removal and Softening

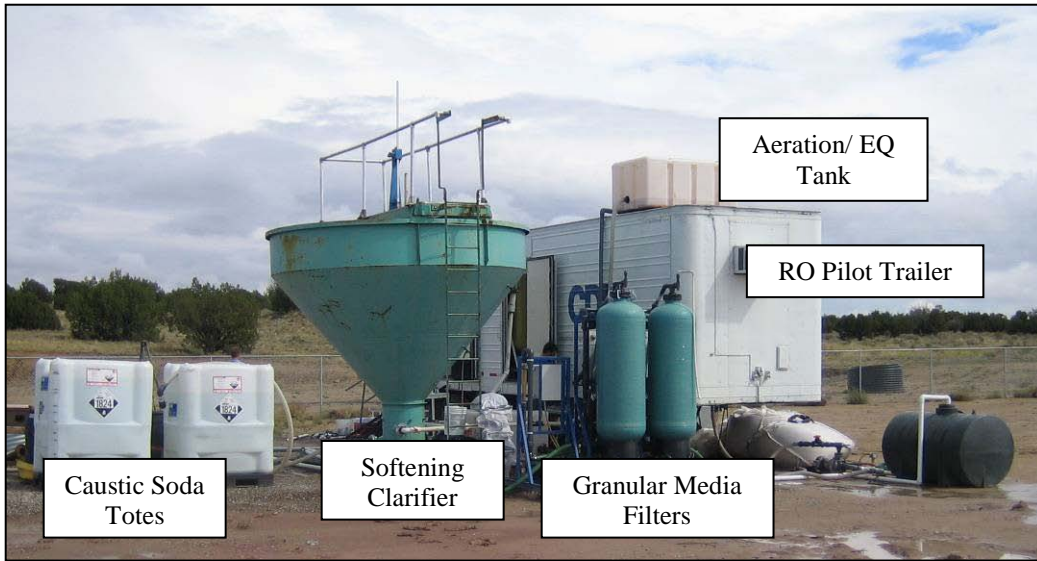
An eductor was used for aeration to remove the dissolved gasses from the well water and begin oxidation of iron and arsenic.. The educator created a vacuum in the process flow stream by drawing air from the atmosphere into the process flow pipeline. The air drawn in by the eductor is mixed using a static mixer the combined air/water stream was then sprayed into a holding tank for additional aeration and contact time. Artesian pressure from the well is lost in the aeration tank and flow through the remaining process is via gravity or pumping.



Eductor Assembly for Aeration

Arsenic removal, radionuclide removal, and softening took place in the same Claricone clarifier for the pilot test. Water flowed by gravity from the aeration tank into the bottom of the clarifier where ferric chloride, flocculant aid polymer, and caustic soda were added. Caustic soda softening floc and ferric chloride/ arsenic precipitates were formed and allowed to settle in the clarifier. Clarified water overflowed from the top of the Claricone into an equalization tank prior to two granular media filters, where carryover floc was removed.

Two 24-inch diameter granular media pressure filters were used to remove any remaining suspended particles passing through the Claricone clarifier. Filtered water was then sent to an equalization/ storage tank where to account for fluctuations in the filtration system and the RO process. The stored water was also used for backwashing the granular media filters.



Pilot Testing Facilities

Ion Exchange and Reverse Osmosis

Water from the granular filters was treated using ion exchange vessels located inside the RO pilot trailer. Cartridge filters installed at the inlet of the trailer removed sand sized particles remaining in the process water from the granular media processes. Feed pumps were required to pressurize water through the ion exchange and provide positive suction for the RO feed pumps.

The ion exchange vessel used in the pilot testing was a 30-inch diameter vessel containing approximately 7 cubic feet of weak acid cation (WAC) ion exchange resin. This resin was used to remove any calcium and magnesium ions remaining in the feed water following the softening process. IX softened water was also sent through intermediate cartridge filters to remove any particulates that passed through the ion exchange vessel. Anti-scalant was then added to the process flow stream prior to RO membrane treatment.

The RO treatment process used was a variable frequency driven five-stage, single pass configuration using four 12-foot long, four-inch diameter vessels and two nine-foot long 2.5-inch diameter pressure vessels. The first horizontal turbine feed pump delivered water to the first two stages which consist of a 2:1 cascading array with two of the four-inch vessels in parallel followed by one four-inch vessel and was pressurized to 350 to 400 psi. The second



Figure 2-x Ion Exchange Pressure Vessels



Reverse Osmosis Modules

horizontal turbine feed pump boosted pressure to stage 3 -one four-inch vessel followed by Stages 4 and 5 - two 2.5-inch vessels all in series. The elements used in all stages of the RO system were Dow Filmtec Seawater RO Membranes (SW30 and SW30HRLE). The RO process reduced the TDS sufficiently and any of the remaining constituents to well below the MCL.

Finished water was sent to a holding tank and eventually pumped into the receiving pond at Well 5. RO concentrate, backwash, and the IX regeneration solution (when used), and process overflow and drains were combined in an open tank and also pumped to the receiving pond at Well 5.

Process Monitoring

Throughout the test period, regular logs of the following operational parameters were recorded:

- Flow
- tank levels
- chemical dosing rates
- equipment status
- line pressure
- motor output
- valve control status
- pH
- conductivity
- hardness
- general observations

These routine notes document project progress including reactions to water quality upsets and aid in diagnosis of process disturbances such as membrane fouling, IX breakthrough, inadequate pH adjustment, or filter malfunction. Copies of these logs are included in Appendix B.

pH control was crucial to proper operation of the pilot process, specifically the softening clarifier which had a target pH range of 9.5 to 10.5. Routine pH measurement allowed the operators to adjust chemical and/or process water flows to maintain consistent process performance, or alternatively to efficiently determine the source of process failures. Handheld pH probes were used for routine pH analysis, since these instruments were easily calibrated and portable to allow consistency between measurements. Online instrumentation was also available in the RO system for visual confirmation of the pH and conductivity of the RO Feed, RO Permeate, and RO Concentrate streams.

Table 2-2 below summarizes the pilot plant operational equipment and the operating range of the process.

Table 2-2 Process Operation Parameters

Process Element	Type	Value	Unit	Purpose
Water Supply Well EXP-6	Exploratory Well	0-600	gpm	Provide water for well testing and pilot activities
Raw Water Flow Meter	4" Rotary	0-1000	gpm	Measure well discharge flow, provide totalizing measurement
Aerator Feed Flow Meter	1" Rotameter	0-35	gpm	Measure feed to aeration tank and pilot plant
Aerator	1" Mazzei Eductor	5- 25	gpm	Introduce air into process stream to remove CO ₂ and H ₂ S from liquid stream and oxidize soluble metals
Static Mixer	2" Koflo 6 Element	9-30	gpm	Mix air and water to enhance aeration
Aeration tank	Polyethylene	350	gal	Provide holding time for aeration
Ferric Chloride Dose	37% Solution	50-89	mg/L as FeCl ₃	Coagulant to adsorb arsenic and radium from solution
Ferric Chloride Feed Rate	Solenoid pump	0-1	gal/hour	
Polymer Dose	Magnafloc LT27	0-1	mg/L	Assist in settling and flocculation of particles. Only evaluated last 2 weeks of piloting
Caustic Soda Dose	25% Solution	1200-1500	mg/L	Dose to achieve target pH of 9.5 to 10.5 for excess lime softening. Calcium and magnesium reduction
Caustic Soda Feed Rate	Solenoid Pump	0-5	gal/hour	
Claricone Pilot Unit	12' diameter circular softening clarifier	0-200	gpm	Spiral motion of flow through conical clarifier encourages settling. Accumulated sludge is sluiced out of bottom of clarifier.
Softened Water Equalization Tank	Polyethylene	500	gal	Provides buffer for downstream process flows. Overflow allows for higher flow through clarifier.
Granular Media Filters	2-24' Diameter dual-media filters with backwash skid	3-7	gpm/sf	Filters out any carryover floc particles from clarifier. Can operate one filter or both. Feed water pumped through filters using onboard centrifugal pumps.
Filtered Water Holding Tank	Polyethylene	380	gal	Provides water for filter backwash and allows buffer for variable demand of IX/RO trailer
RO Inlet Feed Pump	5 hp Centrifugal pump with 5-5/8" impeller	0-50	gpm	Boosts pressure to 40-60 psi from holding tank through IX and to RO Feed pump.

Table 2-2 Process Operation Parameters

Process Element	Type	Value	Unit	Purpose
Inlet Bag Filters	5" diameter	20	micron	Particulate removal upstream of IX
IX Vessel	30" diameter	0-20	gpm	Complete with appurtenances for flow measurement, acid regeneration, vent, and flow bypass
IX Resin	Weak-acid cation			Purolite C104Plus resin. Removal of remaining calcium and magnesium.
Anti-Scalant Dose	5% Solution of King-Lee PretreatPlus100	0.5-2.5	mg/L	Reduces scaling potential of silica and other minerals in RO feed water
RO Feed Cartridge Filters	5" diameter inline	5	micron	Removes any suspended particulates following the IX process.
RO Feed Pump	10 hp multistage centrifugal with VFD	0-15	gpm	Boosts pressure through first two stages of RO process to 300-500 psi
RO Booster Pump	10 hp multistage centrifugal with VFD	0-12	gpm	Boosts concentrate pressure from first two RO stages to 700-1000 psi for feed to third and fourth stages
RO Pressure Vessels	2000 psi rated vessels	0-15	gpm	4" vessels each hold four, 36" membrane units. 2.5" vessels each hold three, 36" membrane units.
RO Control System	PLC and logging system plus manual valves and pump controls, with direct read flow devices			Through both manual and automatic controls, RO feed flows and pressure are adjusted and certain process parameters are monitored and recorded. Includes pH probes and conductivity meters.
RO Permeate holding tank	Polyethylene	40	gal	Provide secondary storage prior to discharge for process water
RO Permeate discharge pump	1 hp sprinkler pump	10	gpm	Transfers RO permeate to reserve pit at EXP-5 site
Waste Receiving Tank	Polyethylene	350	gal	Combine wastes from RO Concentrate, clarifier overflow and process drains to one common stream
Waste Discharge Pump	1.5 hp centrifugal pump	10	gpm	Transfers combined wastes to reserve pit at EXP-5 site

Section 3

Pilot Testing Results

3.1 Treatment Goals

Basic treatment goals, as measured by water quality, were established for pilot testing and are presented in Table 3-1.

Table 3-1 Water Quality Comparison

Parameter		Well 6 Water	Softened Water	RO Feed	RO Waste	RO Product
pH		5.97	10.2	10.2	9.5	10.3
Total Hardness (mg/L)	CaCO ₃	1,510	165	0.7	3.0	0
Total Alkalinity (mg/L)	CaCO ₃	1,800	2,480	2,480	11,900	130
Calcium (mg/L)	Ca	450	25	0.1	0.46	0
Magnesium (mg/L)	Mg	94	25	0.1	0.46	0
Silica (mg/L)	SiO ₂	30	20	20	88	0.8
Sodium (mg/L)	Na	3,828	4,177	4900	21,000	110
Chloride (mg/L)	Cl	3,100	3,100	3,100	15,115	97
Sulfate (mg/L)	SO ₄	4,400	4,400	4,400	21,903	26
Boron (mg/L)	B	9.7	9.7	9.7	40	1.1
Iron (mg/L)	Fe	3.6	0.01	0.01	0.1	0
TDS (mg/L)		12,000	12,280	12,300	60,200	309
Turbidity (NTU)		13	0.5	0.1	0.5	0.02
Arsenic (mg/L)	As	0.83	0.3	0.3	2.5	0.008
Radium 226+228 (pCi/L)	Ra	84	0.02	0.02	0.2	0
Process Flow Rate (gpm)		20	18	15	3	12

3.2 Contaminant Removal Performance

Water Quality Sampling

In addition to daily water quality monitoring, extensive water quality samples were collected for laboratory analysis. Complete water quality sampling events occurred on the following seven dates: 10/6/09, 10/19/09, 10/27/09, 11/1/09, 11/12/09, 11/17/09, and 11/19/09.

Additionally, limited sampling for metals and radionuclides only were collected during evaluation of arsenic removal with coagulation aided by ferric chloride. These samples were collected on 11/22/09, 11/24/09, and 11/25/09. Parameters analyzed and the location of sampling is described in the table below:

Table 3-2 Water Quality Parameters Monitored During Pilot Testing (Softening)

	Raw Water	Clarifier Overflow	Filtered/ IX Feed	RO Feed	RO Permeate	RO Concentrate
Boron	X		X	X	X	X
Calcium	X		X	X	X	X
Magnesium	X		X	X	X	X
Silica	X		X	X	X	X
Sodium	X		X	X	X	X
Vanadium	X		X	X	X	X
Arsenic	X		X	X	X	X
Chloride	X		X	X	X	X
Sulfate	x		x	X	X	X
Alkalinity	X		X	X	X	X
Total Dissolved Solids	X		X	X	X	X
Total Organic Carbon	X	X				
Ammonia	X			X	X	X
Ra-226/ Ra-228				X	X	
Gross Alpha Particles	X			X	X	

Table 3-3 Water Quality Parameters Monitored During Pilot Testing (Coagulation with Ferric Chloride)

	Clarifier Overflow
Barium	X
Beryllium	X
Boron	X
Cadmium	X
Calcium	X
Cobalt	X
Copper	X
Iron	X
Lead	X
Magnesium	X
Nickel	X
Silver	X
Antimony	X
Mercury	X
Vanadium	X
Arsenic	X
Thallium	X
Ra-226/ Ra-228	X

3.2.1 TDS

Total dissolved solids were reduced only in the RO Process. The use of caustic soda for chemical softening increased TDS slightly by adding 1,100 mg/L of sodium to the process, however the TDS was reduced to very low levels of less than 200 mg/L following RO treatment. Since RO recovery was limited by osmotic pressure, it should be anticipated that slightly higher recoveries could be achieved using calcium oxide (lime) for pH adjustment rather than caustic soda, since lime will not increase the sodium concentrations in the water. Occasional breakthrough of TDS was observed in the RO permeate stream, but this occurrence was due to individual parts failure and should not be seen in a full scale facility, where higher levels of automation and process controls will prevent significant passage of TDS.

3.2.2 Dissolved Gases

Dissolved hydrogen sulfide (H_2S) and carbon dioxide (CO_2) were reduced during aeration and the gases were allowed to vent to the atmosphere. During some experiments and the first couple days of operation, when no pH adjustment was used, it appeared that the sulfur had oxidized to elemental sulfur and turned the clarifier water black in color (see Figure 3-X). This behavior was not observed throughout testing and black water was not observed during later stages of testing. Hydrogen sulfide and carbon dioxide are most easily removed through aeration, as both can contribute indirectly to fouling of RO in different forms.



Figure 3-7 Unusual Black Water in Clarifier from Sulfur Oxidation

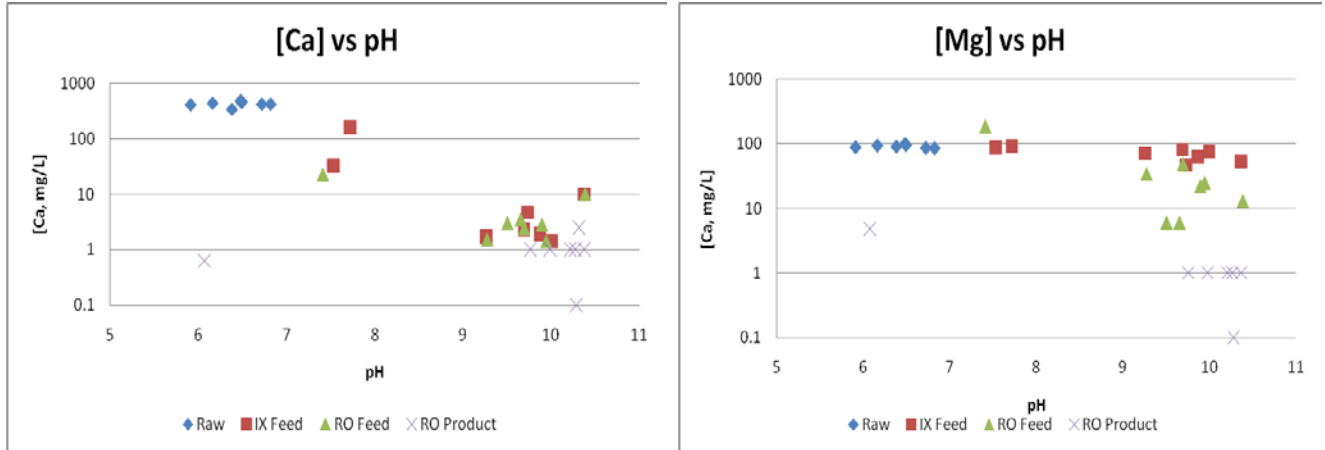
Hydrogen sulfide, when oxidized to elemental sulfur can be a significant

foulant on RO, and when oxidized further to sulfate, will contribute to the osmotic pressure of the RO feed water, limiting plant recovery and increasing the waste stream volume. Similarly, carbon dioxide, when converted to bicarbonate or carbonate through pH adjustment, increases the fouling potential of the RO and adds to the osmotic pressure.

3.2.3 Hardness

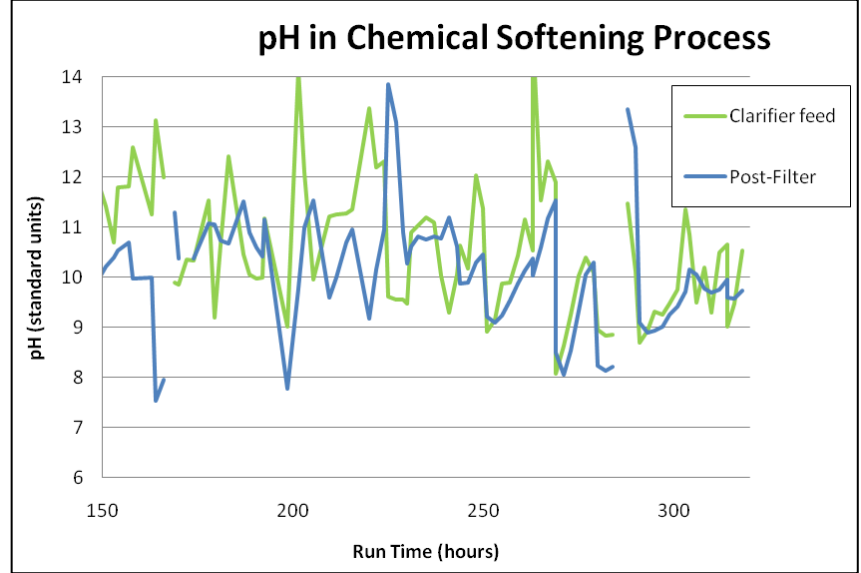
Hardness was monitored on a daily basis using disposable test strips (Hach) which had readings in steps of 0, 25, 50, 120, 250, and 425 mg/L as $CaCO_3$. These strips were an adequate relative indicator of process performance, but did not provide the accuracy of lab analysis. Calcium and magnesium concentrations were measured in the laboratory at several locations in the process train during each water quality sampling event.

As is shown in the following figures, calcium was removed to less than 10 mg/L in the chemical softening process while the pH of filtered water was greater than 9.2. Calcium concentrations as low as 2 mg/L were observed in the filtered, chemically softened water at pH 9.2. Increasing the pH above 9.2 by adding more sodium hydroxide did not result in higher calcium reduction. Operating the contact clarifiers at pH less than 8 was not effective at reducing hardness to the levels needed to feed the RO system. Overall the chemical softening process provided calcium reductions of 95 to 99 percent, when pH in the filtered water was at or above 9.2.



It should be noted that the pH drop from the feed side of the clarifier to the filtered product averaged 0.6 standard units, indicating that pH adjustment to 9.8 standard units will be required upstream of the contact clarifiers to produce pH 9.2 downstream of the filters. The figure below shows the pH immediately upstream of the contact clarifier after chemical addition and the pH downstream of the media filters, where most water quality samples were taken. While the data shows variability due to a time delay in flow through the clarifier, there is a consistent trend where post-filter water averages 0.6 standard units lower in pH than the pre-clarifier water. This should be expected, as the precipitation of calcium carbonate reduces alkalinity in the water. It will therefore be necessary to adjust pH to 9.8 or higher in order to achieve the calcium removal seen in this piloting.

Magnesium removal in the chemical softening was less pronounced than calcium. Conventional softening facilities often use soda ash to increase pH to 11 when magnesium removal is required. During pilot testing, softened water magnesium concentration was reduced only 10 to 30 percent from raw water concentrations of 90 to 100 mg/L to between 50 and 80 mg/L. As a result, magnesium passed through to the downstream processes, producing some risk of long term fouling potential on the RO. It should be noted, however, that this fouling potential is far less than fouling potential from the much higher calcium concentrations in the raw water.

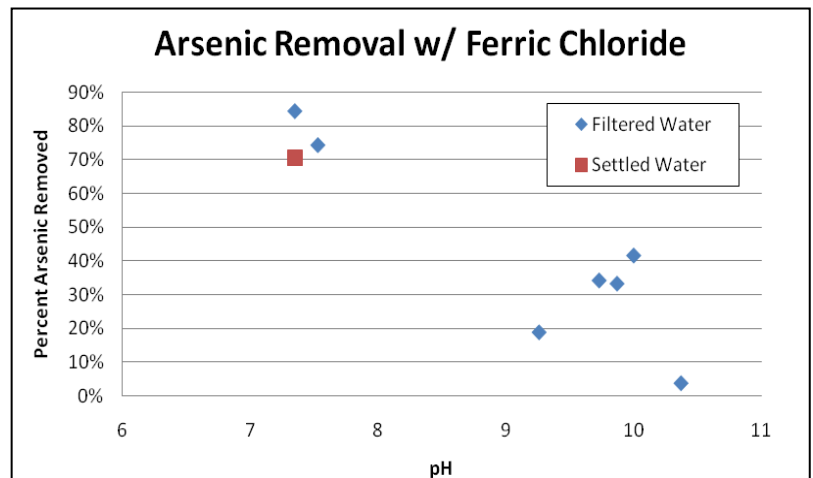


pH Trends in Softener

3.2.4 Arsenic

Arsenic concentration in the raw water supply is extremely high at 0.8 mg/L, which is nearly 80 times the MCL of 0.01 mg/L. Although arsenic can be readily removed by the RO process, the presence of arsenic in the RO waste stream will make beneficial reuse of this RO waste stream more difficult. One of the treatment goals is to remove the arsenic in a coagulation/ sedimentation step upstream of the chemical softening process. During pilot testing, a separate clarifier was not used for arsenic removal, however, operation of the clarifier over a range of pH levels, representing softening and non-softening conditions, was conducted to evaluate the effectiveness of arsenic reduction using ferric coagulation.

This figure shows that arsenic removal through the contact clarifiers and media filters was poor when ferric chloride was added to water at a dose of 15-50 mg/L and the was pH above 9. Arsenic removal was seen when the pH remained below 8 standard units. The majority of the arsenic removal was achieved within the contact clarifier, with approximately 12% removed by the media filters. Due to the poor arsenic removal at high pH, and good removal when pH adjustment was not used, it is expected that arsenic can be effectively removed by a coagulation/ sedimentation step ahead of the softening process without seeing a significant quantity of arsenic in the softener waste stream. The ability to remove arsenic separately from calcium chloride will be critical if the softener waste is to be reused as recalcinated lime.



Arsenic Removal vs pH (High pH Condition)

3.2.5 Boron

Boron was removed through the RO process from raw water concentrations between 7.5 and 9.5 to finished water concentrations between 0.5 and 3 mg/L. Boron concentrations were unchanged through the pretreatment processes. Boron removal with RO was greatest at high pH, with rejections above 93 percent, when the RO feed water pH exceeded 10. In contrast, boron removal of only 55 percent was seen at RO feed pH of 7.4.

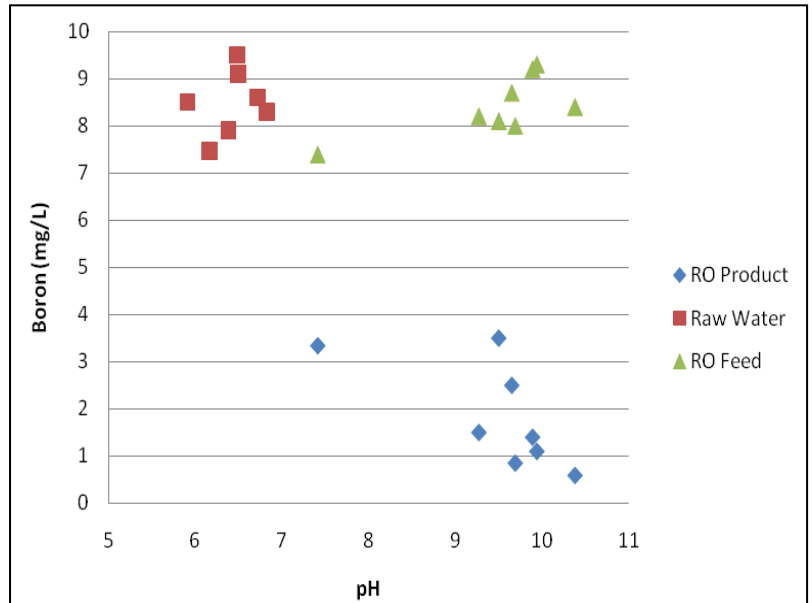


Figure 3-8

3.2.6 Radionuclides

Gross alpha particles and radium isotopes were monitored in the RO feed and RO product to confirm the removal effectiveness of the RO and the upstream treatment processes. The results show greater than 99 percent removal of gross alpha and radium with the treatment processes, resulting in concentrations below 0.5 pCi/L for both categories.

Radionuclide removal with the chemical softening process, upstream of RO, ranged from 50 to 99 percent, with greater removal seen at softening pH above 9.8. Partial removal of radium isotopes was seen when chemical coagulation was used without pH

adjustment, with 38 percent reduction in radium seen within the clarifier and an additional 38 percent reduction in the post-clarifier filters. This resulted in a concentration of 10.97 pCi/L in the filtered product (upstream of RO) for the sum of Radium 226 and 228. These results indicate that a majority of the radionuclides should be expected to be removed within the softening and filtration step of the proposed treatment process rather than in the

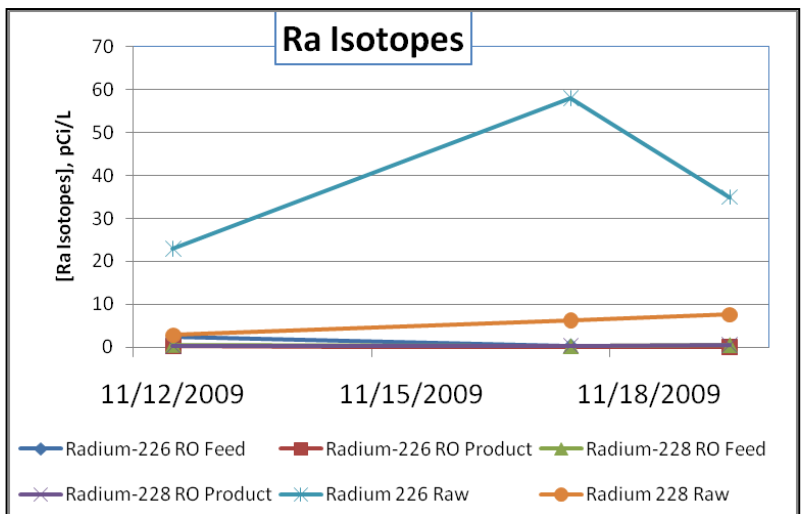


Figure 3-9

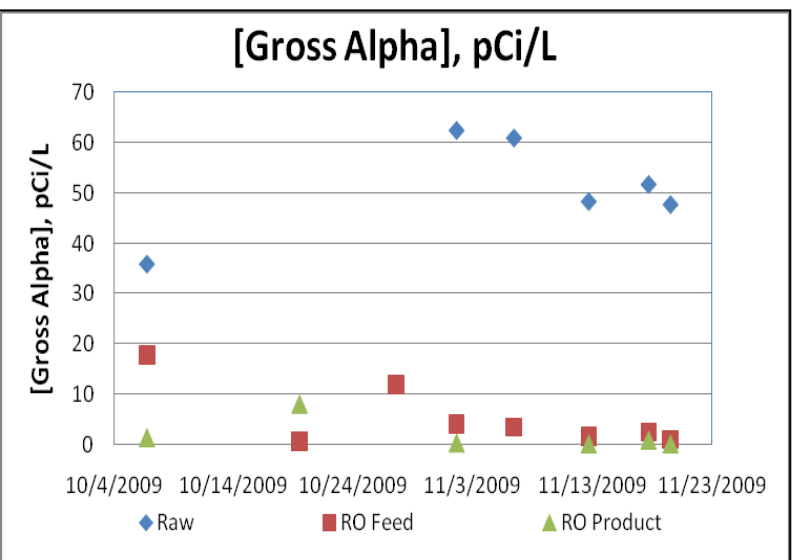


Figure 3-10

coagulation/clarification upstream of the softeners. The combined treatment process are effective at reducing radionuclides to well below the regulated limits, however, the presence of these radionuclides in the chemical softening waste could present complication to the beneficial reuse of the softening solids for recalcinated lime.

3.3 Process Analysis

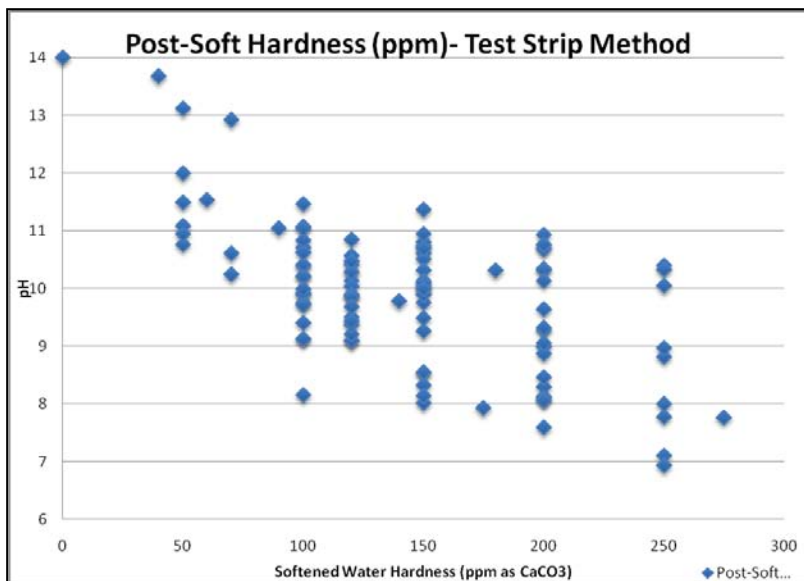
3.3.1 Aeration Process Performance

The aeration process used in the pilot testing was different from that proposed in the full-scale treatment process. The 1-inch Mazzei eductor operated at the flow rates encountered during piloting but would not be practical at a 5 mgd scale. Adding additional air, using an electric blower, did not significantly improve aeration performance, as a pH increase would have indicated.

A 1.5 inch Mazzei eductor was initially used during start-up testing but it was oversized for the flow rate and did not create an adequate vacuum at 15-20 gpm. The 1.5 inch eductor was replaced with a 1 inch eductor and aeration improved.

3.3.2 Softening and Filtration Process Performance

The softening process reduced calcium and magnesium hardness in the raw water as discussed above in section 3.2.3. The high alkalinity, low pH, and elevated TDS in the water necessitated high doses of caustic soda to force precipitation.



3.3.3 Clarification Process Performance

During pilot testing, arsenic was reduced through the addition of ferric chloride along with caustic soda to form iron hydroxide flocs that bond with arsenic and settle out of solution in the softening clarifier. This process was operated at the same pH as the softening process since only one clarification basin was used for pilot testing. Elevated pH is not optimal for arsenic reduction, but with the addition of ferric chloride, 25 to 35 percent arsenic reduction was observed.

Arsenic removal was specifically evaluated the last few days of pilot plant operation. In contrast to arsenic removal in the softening process, pH in the clarifier was maintained to between 6.9 and 7.5. This pH range and a ferric chloride dose of 50 to 87 mg/L reduced the arsenic from 0.7 mg/L to 0.11 to 0.3 mg/L, an 85 percent reduction. By comparison, at the elevated pH of the softening process the concentration of arsenic in the softened water was only 0.4 to 0.6 mg/L which is significantly above the 0.01 mg/L drinking water standard.



Clarification Using Ferric Chloride for Arsenic Removal 11/23/2009

3.3.4 Ion Exchange Process Performance

The ion exchange process reduced calcium and magnesium in the softened water prior to RO treatment to allow for higher recovery and reduce scaling potential. The IX resin used was Purolite C104plus and is a weak-acid cation IX resin. Lab data shows that this resin was much more effective in reducing magnesium than calcium throughout the test period. Calcium was maintained below 10 mg/L throughout testing but did not lower the concentration of calcium in the softened water any further. Magnesium was reduced from 60-80 mg/L in the softened water to about 5 mg/L initially and then the capacity for Mg reduced over the duration of pilot testing.

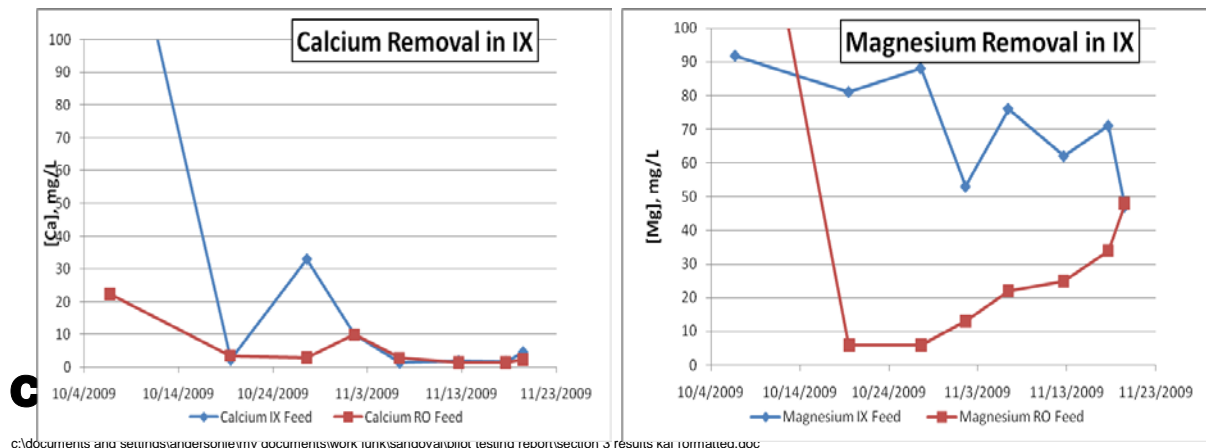


Figure 3-12

The ion exchange resin was regenerated with a hydrochloric acid in RO permeate water to make up a 7 percent acid solution and fed at a rate of 0.25 gallons acid per cubic foot of IX resin. After feeding the regenerant solution for approximately 90 minutes, the IX bed is rinsed with permeate to flush the acid solution and reduce the acidity of the IX product water when the system is brought back online. The acid displaced the Ca and Mg ions collected on the resin thus the regenerant flushed out of the IX vessel is very high in calcium and magnesium. Regeneration was conducted approximately weekly during pilot testing, breakthrough was monitored using the hardness test strips

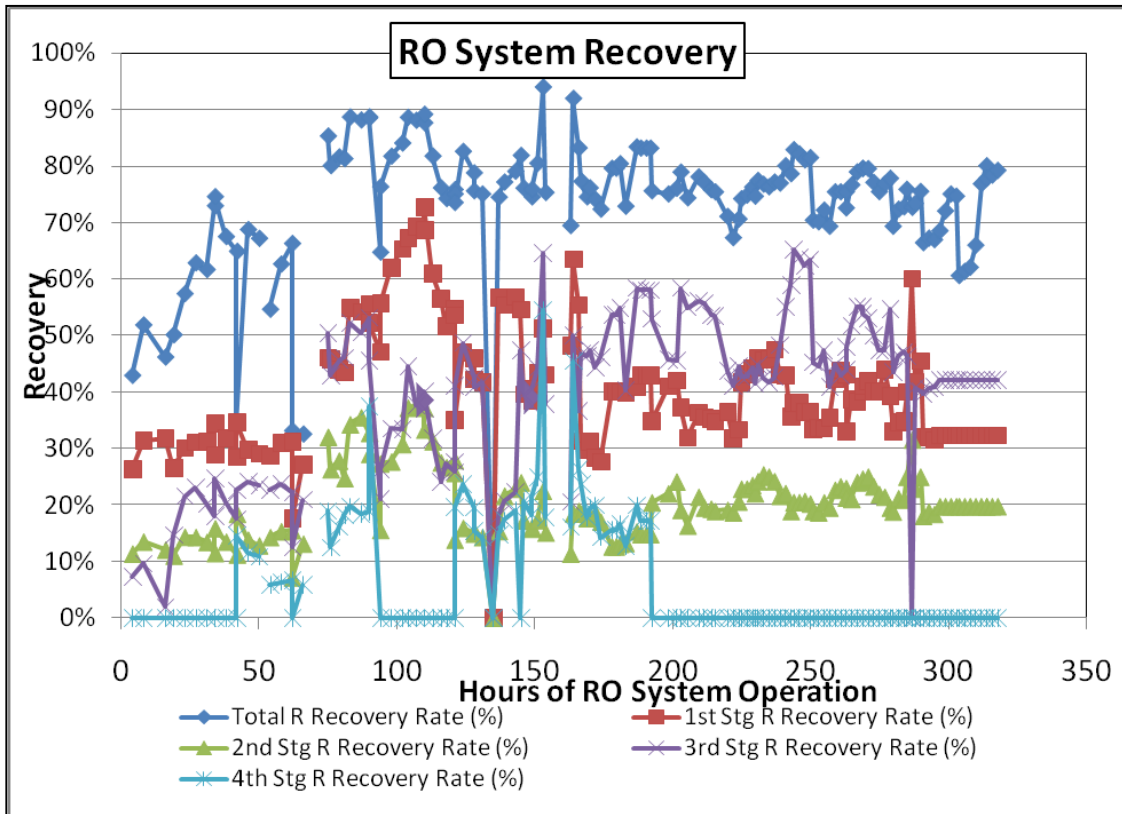


Figure 3-13

3.3.5 RO Process Performance

The RO operation parameters were based on RO projection software used in conjunction with the selected membranes to establish baseline operating conditions. Projections were developed for operation at 80, 82 and 90 percent recovery to evaluate different operational goals. Feed water quality to the RO system varied based on operation of pretreatment processes and did affect production performance of the RO system.

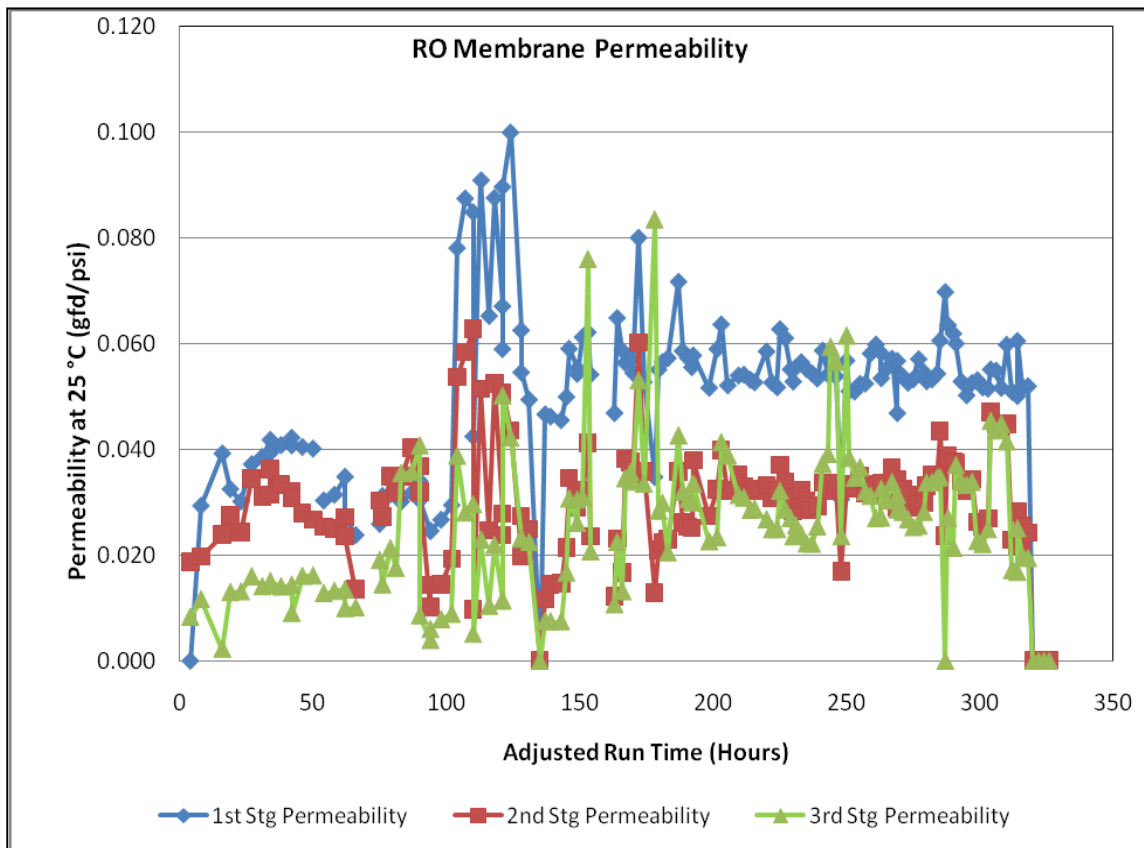
Recovery

The overall recovery of the RO system was between 65 and 90 percent, with the most stable operation between 80 and 82 percent. The first stage recovery was operated at 40 percent recovery of total flow and the second stage operated at approximately 20 percent recovery. Third stage stabilized at 50 percent recovery in the later, most representative phases of pilot plant operation. The fourth stage operated only infrequently as this final stage was not productive, however when in operation, this stage performed at 10-20 percent recovery.

Permeability

Permeability is a calculated value that accounts for feed pressure, transmembrane pressure, temperature, and flow across the membrane. Permeability achieved during pilot testing for stage 1 leveled off at 0.55 gfd/psi. For stage 2, the permeability equilibrated at about 0.3 gfd/psi and for stage 3 there was a downward slope that balanced off at 0.3 gfd/psi.

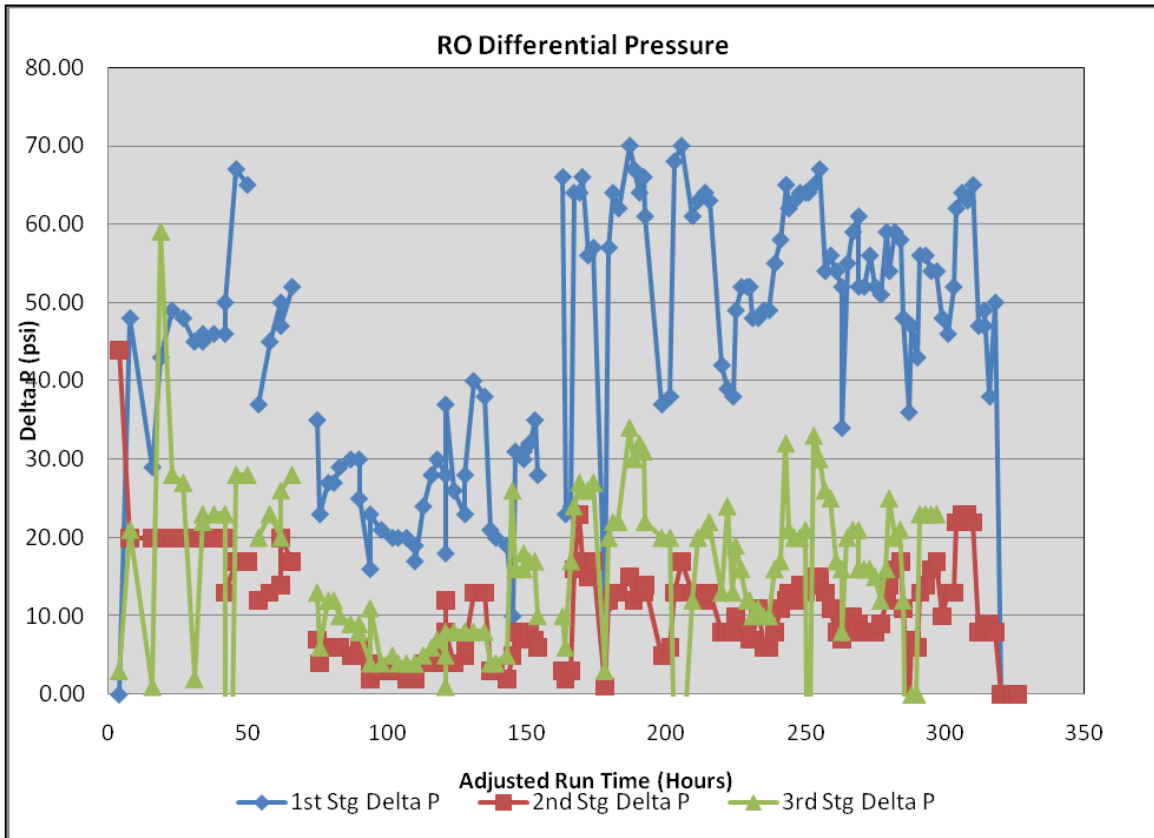
Increased temperature will result in a higher permeability and a greater salt passage. The raw water cooled to approximately 30 degrees C from the pre-treatment processes and cooling experienced in the distance from the artesian source up through the well casing. RO units are typically limited to operating at temperature below 40 degrees C to limit hydrolysis to the polyester chains of the membrane and weakening of the fabric (Hydranautics).



RO System Permeability

Pressure Differential

Feed pressure, individual stage discharge pressure, interstage pressure and final concentrate pressures were monitored throughout operation. While pressure differential at each stage followed a general trend and appears stable, some scatter is evident in the data. Stages 2 and 3 displayed more consistent pressure differential and much of the scatter can be attributed to the frequent start and stop of the RO process train.



RO System Pressure Differential

3.3.6 Comparison to Computerized Projections

The pilot scale RO system generally followed the computerized projections, when the projections are adjusted to actual operating temperatures. The computerized projections are included as Appendix C. Salt passage increases with temperature increase and the pilot plant operated at a temperature that is about 10 degrees Celsius lower than is expected for the full scale facility. Full scale design may need to compensate for this increased salt passage depending on the pre-treatment approach.

The combined permeate TDS was typically in the range of 150 mg/L while the model predicted 330 mg/L, as shown with the other anionic and cationic constituents in the Reverse Osmosis System Analysis (ROSA) projection presented in Appendix C. This projection is based upon 15

gpm of flow and an 80% overall recovery. The pilot permeate quality exceeded the removal performance of the projections of the ROSA file for every constituent.

Fouling projections were also performed by the anti-scalant manufacturer for the product used on the pilot, King Lee Y2K Plus. Table 3-3 below lists the general saturation indices for the common minerals associated with inorganic fouling.

Table 3-3 Estimated Solubility Levels Controlled by Antiscalant¹ and Typically Conservative Alarm Points Used in Hydranautics RO Design

Mineral of Concern	~ Solubility (mg/L) @ 18-32°C	King Lee Antiscalant Guidelines	Hydranautics Alarm ²
Calcium Sulfate - CaSO ₄	2000 mg/L	30 times K _{SP}	2.3 times SL
Strontium Sulfate -SrSO ₄	114 mg/L	11 times K _{SP}	8 times SL
Fe (dissolved):		X < 10 mg/L	Not alarmed
Barium Sulfate BaSO ₄	2.85 mg/L	51 times K _{SP}	60 times SL
Calcium Fluoride	17 mg/L	16,570 times K _{SP}	Not alarmed
Silica (reactive):	120 mg/L	2.3 times K _{SP}	At SL

¹ For CaCO₃: LSI = 3.4; SDSI = >3.7

² The Hydranautics Alarm values are based on the concentrate stream, with normal saturation limit (SL) of 100 percent without use of an antiscalant.

Typically silica levels in the concentrate limit potential recoveries on a RO system. Silica levels in the RO concentrate during the pilot testing remained below 100 mg/L when operated at 80% recovery, which indicate that silica may not be the limiting factor in the process recovery for this raw water source.

3.3.7 Ion Mass and Charge Balance Study

An evaluation of the balance of ions in the source water was conducted as a method to determine if the water quality analyses were adequately accounting for all major ions. Both ionic charge and mass were determined and balanced for all ions. During the pilot study, questions arose whether the sulfate analyses were correct as the cations (primarily metals) did not appear to balance the anions (including alkalinity, chloride and sulfate).

This ion mass and charge balance study confirmed that the analytical lab data for the water is charge balanced, within reasonable limits of 10 percent, for the source water and the samples of process streams. The following table provides the charge analysis and also a summary of the water quality data from pilot operation. Highlighted values are suspect and are being confirmed.

Table 3-4 Ion Charge Balance Analysis

Sample	Date	Ion Concentration (mg/L)										TDS (Calc)	TDS (Meas)	Cations (millimol)	Anions (millimol)	AB Diff	CB% Diff	MB% Diff	Conclusion ¹
		Ca ⁺²	Mg ²⁺	Na ⁺	K ⁺	Fe ⁺²	SiO ₂	SO ₄ ⁻²	Cl ⁻	CO ₃	HCO ₃ ⁻								
Raw (oct memo)	Historical	450	94	3828		3.6	30	4400	3100		1800	12788	12000	196.9	208.6	-11.7	-2.9	6.6	Too many anions
Raw adjusted (oct memo)	Historical	441	94	4171	140	3	34.7	4400	3100		1800	13266	12000	214.9	208.6	6.3	1.5	10.5	Too many cations
Raw	10/6/2009	437	94.2	3670	0	0	39.4	4300	3300	0	2318	12976	12500	189.2	220.6	-31.4	-7.7	3.8	Too many anions
Raw	10/19/2009	410	89	0.5	0	0	32	4300	3300	0	1220	8729	12300	27.8	202.6	-174.8	-75.8	-29.0	Missing cations
Raw	10/27/2009	337	91		0	0	24.1	4700	3400	0	2318	9688	12500	24.3	231.8	-207.4	-81.0	-22.5	Missing cations
Raw	11/1/2009	450	97	3600	0	0	32	4300	3100	0	2074	12595	12400	187.1	211.0	-23.9	-6.0	1.6	Too many anions
Raw	11/6/2009	470	96	3500	0	0	32	4400	3200	0	2196	12774	12400	183.6	217.9	-34.2	-8.5	3.0	Too many anions
Raw	11/12/2009	490	100	3600	0	0	33	4500	3000	0	2074	12739	12400	189.3	212.3	-23.0	-5.7	2.7	Too many anions
Raw	11/17/2009	420	86	3400	0	0	29	4400	3200	0	2196	12611	12400	176.0	217.9	-41.9	-10.6	1.7	Too many anions
Raw	11/19/2009	420	87	3400	0	0	29	4300	3200	0	2196	12512	12400	176.1	215.8	-39.7	-10.1	0.9	Too many anions
IX Feed	10/6/2009	164	91.7	4140	0	0	36	4500	3400	0	2562	13587	12900	195.8	231.6	-35.8	-8.4	5.3	Too many anions
IX Feed	10/19/2009	2.3	81	0.25	0	0	15	4300	3300	780	1952	9045	13500	6.8	240.6	-233.8	-94.5	-33.0	Missing cations
IX Feed	10/27/2009	33	88	0	0	0	24.8	5000	3600	57	2074	9791	12400	8.9	241.5	-232.7	-92.9	-21.0	Missing cations
IX Feed	11/1/2009	10	53	4900	0	0	9.6	4100	3000	1500	1037	13331	14200	218.0	236.9	-18.9	-4.2	-6.1	Missing cations
IX Feed	11/6/2009	1.4	76	4500	0	0	8.9	4300	3300	600	1952	13443	13400	202.1	234.6	-32.5	-7.4	0.3	Too many anions
IX Feed	11/12/2009	1.9	62	4600	0	0	15	4300	3000	0	3416	13653	13400	205.3	230.1	-24.8	-5.7	1.9	Too many anions
IX Feed	11/17/2009	1.7	71	4400	0	0	16	4400	3200	840	1586	13286	13500	197.3	235.8	-38.5	-8.9	-1.6	Missing cations
IX Feed	11/19/2009	4.7	47	4500	0	0	9.1	4200	3200	960	1342	13098	13800	199.9	231.7	-31.8	-7.4	-5.1	Missing cations
RO Feed	10/6/2009	22.5	184	4060	0	0	35.3	4500	3400	0	2562	13457	12900	192.9	231.6	-38.7	-9.1	4.3	Too many anions
RO Feed	10/19/2009	3.5	6	0.5	0	0	16	4200	3200	600	1952	8682	13500	0.7	229.7	-229.0	-99.4	-35.7	Missing cations
RO Feed	10/27/2009	3.0	6.0		0	0	20.9	4500	3300	312	1830	8883	12900	0.6	227.2	-226.5	-99.4	-31.1	Missing cations
RO Feed	11/1/2009	10	13	5000	0	0	8.7	4100	2900	1200	1159	13200	14100	219.1	226.1	-7.1	-1.6	-6.4	Missing cations
RO Feed	11/6/2009	2.8	22	4600	0	0	9	4200	3100	660	1830	13161	13500	202.0	226.9	-24.8	-5.8	-2.5	Missing

Table 3-4 Ion Charge Balance Analysis

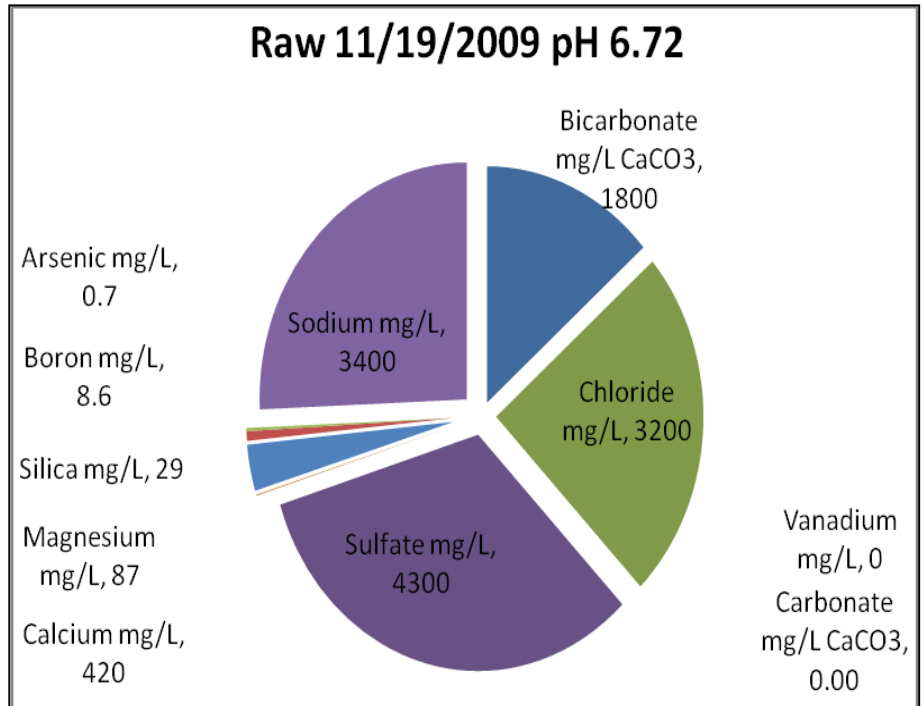
Sample	Date	Ion Concentration (mg/L)										TDS (Calc)	TDS (Meas)	Cations (millimol)	Anions (millimol)	AB Diff	CB% Diff	MB% Diff	Conclusion ¹	
		Ca ⁺²	Mg ⁺ ₂	Na ⁺	K ⁺	Fe ⁺²	SiO ₂	SO ₄ ⁻²	Cl ⁻	CO ₃	HCO ₃ ⁻									
RO Feed	11/12/2009	1.4	25	4600	0	0	14	4400	3000	0	3294	13654	13400	202.2	230.2	-28.0	-6.5	1.9	Too many anions	
RO Feed	11/17/2009	2.4	48	4500	0	0	8.5	4300	3200	780	1708	13286	13500	199.8	233.8	-33.9	-7.8	-1.6	Missing cations	
RO Feed	11/19/2009	1.5	34	4500	0	0	16	4200	3100	1020	1207.8	12953	13600	198.6	228.7	-30.0	-7.0	-4.8	Missing cations	
RO Product	10/6/2009	0.62 6	4.82	232	0	0	5.78	130	200	0	183	663	650	10.5	11.3	-0.8	-3.8	2.0	Too many anions	
RO Product	10/19/2009	0	0	69	0	0	0	12	0	12.6	96.38	135	170	3.0	2.2	0.8	14.3	-20.9	Missing anions	
RO Product	10/27/2009	0	0	105	0	0	0	21	110	3	87.84	281	272	4.6	5.1	-0.5	-5.3	3.1	Too many anions	
RO Product	11/1/2009	0	0	37	0	0	0	8.6	39	21	91.5	140	101	1.6	3.5	-1.9	-36.7	38.5	Too many anions	
RO Product	11/6/2009	0	0	33	0	0	0	6.5	35	0	85.4	116	124	1.4	2.5	-1.1	-27.5	-6.2	Missing cations	
RO Product	11/12/2009	0	0	56	0	0	0	18	59	18	0	142	152	2.4	2.6	-0.2	-4.0	-6.6	Missing cations	
RO Product	11/17/2009	0	0	41	0	0	0	7.8	50	2.76	29.28	115	114	1.8	2.1	-0.4	-9.2	0.5	Too many anions	
RO Product	11/19/2009	0	0	38	0	0	0	7.8	44	0	30.5	105	122	1.7	1.9	-0.3	-7.0	-14.1	Missing cations	
RO Concentrate	10/6/2009	113	934	16400	0	0	184	20000	14000	0	11590	57310	54200	795.9	1001.3	-205.4	-11.4	5.7	Too many anions	
RO Concentrate	10/19/2009	21	38	31000	0	0	100	27000	18000	3480	14640	85073	81400	1352.7	1425.8	-73.1	-2.6	4.5	Too many anions	
RO Concentrate	10/27/2009	24	40	0	0	0	75.3	32000	23000	2280	11712	62018	83600	4.5	1583.0	-1578.5	-99.4	-25.8	Missing cations	
RO Concentrate	11/1/2009	23	61	22000	0	0	39	20000	14000	6600	5124	61934	63200	963.2	1115.1	-151.9	-7.3	-2.0	Missing cations	
RO Concentrate	11/6/2009	13	100	21000	0	0	44	21000	16000	3420	8418	63992	63600	922.4	1140.4	-218.1	-10.6	0.6	Too many anions	
RO Concentrate	11/12/2009	5.6	110	19000	0	0	57	18000	13000	4560	5368	55083	56400	835.8	981.3	-145.5	-8.0	-2.3	Missing cations	
RO Concentrate	11/17/2009	6.9	150	20000	0	0	73	19000	13000	0	0	52230	41000	882.7	762.3	120.4	7.3	27.4	Too many cations	
RO Concentrate	11/19/2009	0	260	21000	0	0	44	23000	16000	5580	5734	65904	73100	934.9	1210.0	-275.1	-12.8	-9.8	Missing cations	

1. within 10% percent is acceptable

3.4 Chemical Constituents in Process Streams

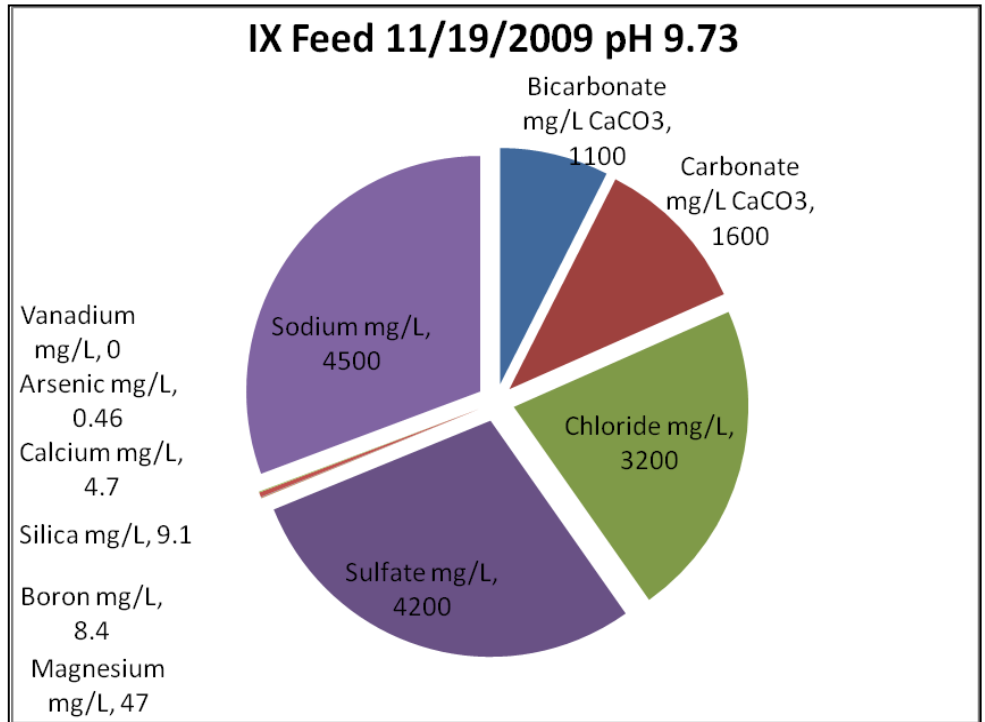
The following pie charts present the concentration of common present in the process streams through the pilot plant on one particular day of operation. At the time of sample collection, the softener was operating at 14 gpm, the RO feed at 12 gpm and RO concentrate at 2.3 gpm for a recovery of approximately 80 percent. The data provides a snapshot of typical water quality conditions in the process streams; however, variability was seen in each of the various process streams from day to day.

The primary constituents in the raw water were sodium cations and sulfate, chloride, and bicarbonate anions. High concentrations of calcium, magnesium, silica, and boron were also present; however, all of these concentrations were much lower than the four primary constituents.



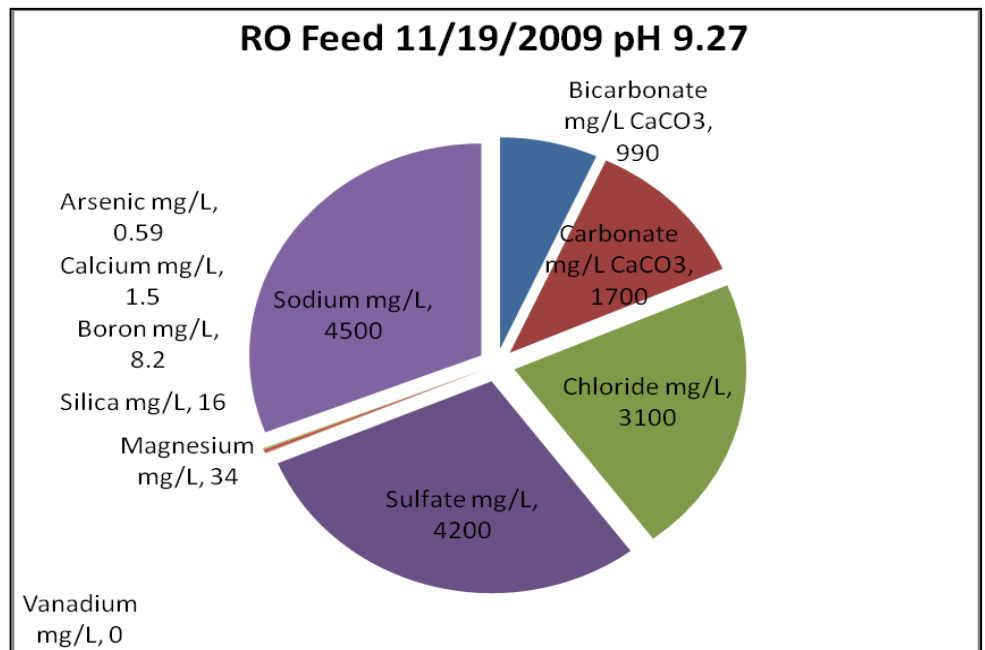
Raw Water Composition 11/19/09

Nearly all of the calcium and almost half of the magnesium was removed in the chemical softening, clarification, and granular filtration steps, as is shown in the IX Feed chart below. In addition, more than half of the bicarbonate had been converted to carbonate, through pH adjustment and the arsenic and silica concentrations had been reduced significantly. The primary cation remaining was sodium, with a higher concentration than had been seen in the raw water, due to the use of sodium hydroxide for pH adjustment in the clarification/ softening process. Sulfate and chloride were the two largest remaining anion constituents in the IX Feed water. Based on the observed change in water quality between the raw water and the IX feed, it should be anticipated that the major constituent of the chemical softening waste product will be calcium carbonate, with smaller quantities of magnesium hydroxide, silica, iron, and arsenic.



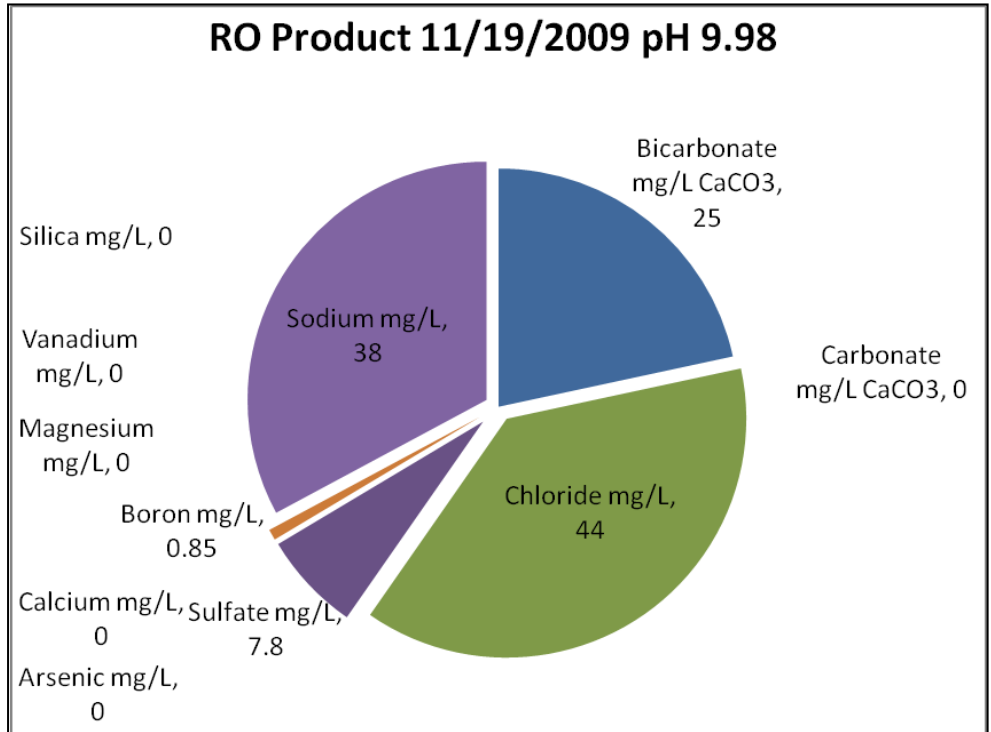
IX Feed Composition 11/19/09

The RO Feed water received additional treatment through ion exchange. Calcium levels here were further reduced to 1.5 mg/L, a 68 percent reduction from the softened water prior to IX. Magnesium was reduced 28 percent in the IX process. This type of ion exchange had no effect on TDS, boron or arsenic concentrations.



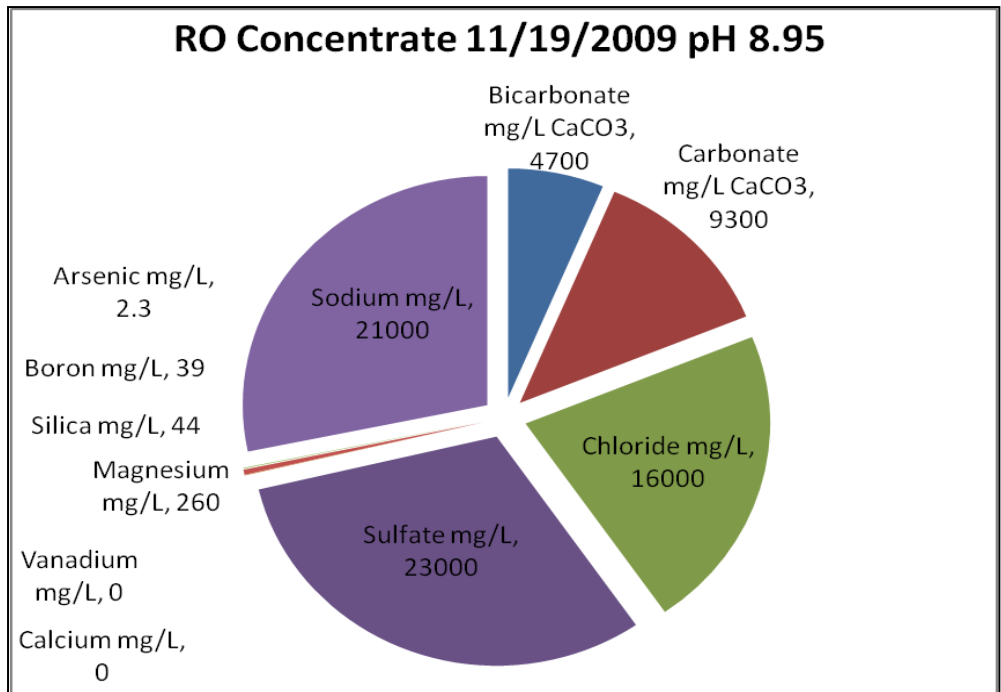
RO Feed Water Composition 11/19/09

The composition of the RO product water shows that the remaining ions were either significantly reduced or removed altogether. Arsenic was removed to below detection limits, as was magnesium, and calcium. It is important to note that silica was completely removed in this sample. TDS in the RO product is very low, with a sodium concentration of 38 mg/L. At a pH approaching 10.0, the alkalinity was all in the bicarbonate form, rather than the carbonate seen in the RO feed water. The major constituents of the RO product water were sodium chloride and bicarbonate, with a small concentration of sulfate (7.8 mg/L) remaining in the product water.



RO Product Water Composition 11/19/09

Constituent concentration in the RO Concentrate is provided as a reference and confirms the recovery rate of approximately 80 percent. As expected, ions were significantly concentrated in this process stream. Similar to the RO feed water, the major constituents of the RO concentrate were sodium sulfate, chloride, carbonate, and bicarbonate.



RO Concentrate Composition 11/19/09

Section 4

Recommendations

4.1 Process Performance

Outlined below are observations generated from pilot testing:

- Injecting air into the raw water and discharging the water into a tank at atmosphere pressure was not effective in significantly increasing the pH of the water. Computer projections indicate the pH could be increased to > 8 if all the CO₂ was removed. A packed tower cascading aeration system or fine bubble diffusers are recommended for a larger scale facility.
- The pilot plant operated at process water temperatures between 86 and 105 degrees F, about 30 degrees less than the temperatures anticipated in the full scale facility. This temperature difference is attributed to lower flow rates in the pilot scale which allowed the raw water to cool in the well column prior to discharge. During piloting, the well column was occasionally purged to increase the temperature and flush the well. Implications of higher temperature water in the RO process include higher salt passage through the membranes since the solubility of the common salts increases with temperature. This could account for a slightly higher TDS concentration in the finished water if the full scale RO process operated at temperatures greater than 105 degrees C as anticipated.
- Relatively high concentrations of total suspended solids (TSS) in the raw water and the RO concentrate suggests that the water was above the saturation limit for some minerals and precipitation was occurring.
- Combining the arsenic coagulation and settling process with the softening process resulted in reduced arsenic removal compared to a separate coagulation and settling process.
- Arsenic removal via coagulation with ferric chloride independent of softening reduced arsenic to levels between 0.25 and 0.35 mg/L As in comparison to 0.4 to 0.6 in softened water. The arsenic removal experiments were conducted at a pH range of 6.9 to 7.3. Arsenic removal upstream of the softening process is necessary in order for the precipitated calcium product from softening is to be regenerated into recalcinated lime.
- The pilot clarifier carried over significant iron floc in the clarifier discharge with iron content of 15 to 25 mg/L, which may have increased the arsenic concentration in those samples since the arsenic is adsorbed to the iron. One filtered sample was collected following coagulation, this sample contained 0.1 mg/L arsenic and corresponding lower iron content of 2.1 mg/L.
- The high pH (10-11) caustic soda softening process was effective in reducing silica concentration from greater than 30 mg/L to approximately 10 mg/L. This will allow the

drinking water RO system and the brine minimization RO systems to operate at higher recoveries before reaching the silica saturation limit.

- The weak acid cation (WAC) exchange system was generally effective in reducing calcium hardness to less than 5 mg/L from 10-40 mg/L in the feedwater. Magnesium concentration in the WAC feedwater were generally 50-80 mg/L, and the WAC IX process was only able to reduce the magnesium concentration to 10-20 mg/L, allowing this water to go onto the RO membranes increasing the chance of fouling. Most importantly, the WAC ion exchange process provides redundant softening capacity in the event that a process upset is encountered in the lime softening process.
- The regeneration frequency of the WAC was approximately 2000 bed volumes. The predicted regeneration frequency was 275 bed volumes. More frequent bed regeneration should have been conducted to prevent carryover of hardness onto the RO membranes.
- When treating softened feedwater the seawater RO system was able to operate at a reasonable flux rate (average 11-13 gfd) and recovery rate (75-80%) that would be economical for a full scale production unit. The stage 1 feed water pressure was between 350-450 psi, and the Stage 3 feedwater pressure was between 700-800 psi. Both were reasonable for the TDS, flux and temperature of the feedwater
- The normalized specific flux for Stage 1 and 2 was relatively stable. There was a fouling or scaling trend observed in Stage 3, which would probably result in the need to perform a short chemical cleaning every 3-5 days. The source of the fouling or scaling was not readily apparent, so it is possible that the pre-treatment and RO process could be optimized during a longer pilot test or start-up of the full scale facility to minimize the Stage 3 fouling. There was insufficient data to determine if there was a correlation between feedwater hardness, silica, sulfate or fluoride and the fouling trend.
- The headloss between the pressure vessel inlet and outlet of each RO vessel was between 10-20 psi and consistent with computerized projections from the manufacturer.
- Silica was not reduced in the IX process. Silica remaining after softening was completely removed in the RO process. The RO Feed contained silica in a range of 8.5 to 21 mg/L while the RO Product water silica concentrations were non-detect. Silica fouling of the RO membranes has not been confirmed.
- The seawater RO system was able to produce a high quality permeate that had less than 300 mg/L TDS, and had an arsenic concentration of non-detect to 2 ppb. The gross alpha was reduced to less than 1 pCi/L through the combined lime softening and RO process. The water quality for the various dissolved ions was consistent with the computerized projections from the membrane manufacturer, when corrected for variations in temperature. This performance indicates that a seawater RO system is able to treat this water to meet the treated water quality goals established for this project and all primary drinking water standards.

- The concentrate from the drinking water RO process is predominantly sulfate, chloride and sodium. Increasing recovery is primarily limited by the osmotic pressure associated with increasing the TDS since all of the potential minerals associated with these ions have relatively high solubilities.

4.2 Use of the Data for Full Scale Facilities

Due to the modular nature of membrane processes, the RO pilot process provides operational data representative of a full scale system treating the brackish water in Well #6. This data set can be useful for extrapolating capital costs for full scale equipment required treating for brackish groundwater in the Rio Puerco basin, although slight departures in the concentration of numerous constituents in the feed water can have a significant impact on the pre-treatment requirements, equipment sizing, and ultimate capital costs.

Preliminary estimates of capital and operations costs and conceptual design information are presented in the Draft Preliminary Engineering Report prepared separately for this project.

Appendix A
Laboratory Sample Data

Bench Tests

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	RsIt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	C0906292-0	T1J1	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4300	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/24/2009	310.1_W	R34337		Alkalinity	3600	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/24/2009	310.1_W	R34337		Carbonate	3200	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/24/2009	310.1_W	R34337		Bicarbonate	360	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/16/2009	TDS_W	19378	TDS	Total Dissc	14000	20	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/30/2009	SW6010B			Calcium	58.3	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/30/2009	SW6010B			Magnesium	58.6	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/30/2009	SW6010B			Iron	0.17	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/30/2009	SW6010B			Silicon	14.3	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J1	6/25/2009	SW6020			Arsenic	0.467	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4100	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/24/2009	310.1_W	R34337		Alkalinity	3600	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/24/2009	310.1_W	R34337		Carbonate	3500	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/24/2009	310.1_W	R34337		Bicarbonate	98	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/16/2009	TDS_W	19378	TDS	Total Dissc	14000	20	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/30/2009	SW6010B			Calcium	25	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/30/2009	SW6010B			Magnesium	23.4	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/30/2009	SW6010B			Iron	0.18	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/30/2009	SW6010B			Silicon	9.1	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J2	6/25/2009	SW6020			Arsenic	0.27	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4200	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/24/2009	310.1_W	R34337		Alkalinity	4000	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/24/2009	310.1_W	R34337		Carbonate	3800	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/24/2009	310.1_W	R34337		Bicarbonate	< 20	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/24/2009	310.1_W	R34337		Hydroxide	290	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/16/2009	TDS_W	19378	TDS	Total Dissc	15000	20	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/30/2009	SW6010B			Calcium	6.1	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/30/2009	SW6010B			Magnesium	4.1	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/30/2009	SW6010B			Iron	ND	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/30/2009	SW6010B			Silicon	8.2	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J3	6/25/2009	SW6020			Arsenic	0.188	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4000	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/16/2009	310.1_W	R34112		Alkalinity	460	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/16/2009	310.1_W	R34112		Carbonate	450	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/16/2009	310.1_W	R34112		Bicarbonate	< 20	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/18/2009	TDS_W	19389	TDS	Total Dissc	11000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/30/2009	SW6010B			Calcium	15.9	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/30/2009	SW6010B			Magnesium	22.6	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/30/2009	SW6010B			Iron	0.06	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/30/2009	SW6010B			Silicon	13.4	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J4	6/25/2009	SW6020			Arsenic	0.319	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4000	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/16/2009	310.1_W	R34112		Alkalinity	410	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/16/2009	310.1_W	R34112		Carbonate	230	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/16/2009	310.1_W	R34112		Bicarbonate	< 20	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/16/2009	310.1_W	R34112		Hydroxide	180	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/18/2009	TDS_W	19389	TDS	Total Dissc	10000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/30/2009	SW6010B			Calcium	14.4	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/30/2009	SW6010B			Magnesium	1.9	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/30/2009	SW6010B			Iron	0.05	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/30/2009	SW6010B			Silicon	12.6	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T1J5	6/25/2009	SW6020			Arsenic	0.307	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4100	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/16/2009	310.1_W	R34112		Alkalinity	650	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/16/2009	310.1_W	R34112		Carbonate	430	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/16/2009	310.1_W	R34112		Bicarbonate	230	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/18/2009	TDS_W	19389	TDS	Total Dissc	11000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/30/2009	SW6010B			Calcium	22.1	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/30/2009	SW6010B			Magnesium	65.9	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/30/2009	SW6010B			Iron	0.1	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	6/30/2009	SW6010B			Silicon	17.8	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	7/1/2009	E1632			Arsenic, In	453	1	1	ug/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	7/1/2009	E1632			Arsenic-III	346	1	1	ug/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J1	7/1/2009	E1632			Arsenic-V	107	2	1	ug/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4200	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/16/2009	310.1_W	R34112		Alkalinity	530	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/16/2009	310.1_W	R34112		Carbonate	460	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/16/2009	310.1_W	R34112		Bicarbonate	70	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/18/2009	TDS_W	19389	TDS	Total Dissc	11000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/30/2009	SW6010B			Calcium	26	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/30/2009	SW6010B			Magnesium	39.3	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/30/2009	SW6010B			Iron	0.22	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/30/2009	SW6010B			Silicon	12.9	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J2	6/25/2009	SW6020			Arsenic	0.304	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4200	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/16/2009	310.1_W	R34112		Alkalinity	460	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/16/2009	310.1_W	R34112		Carbonate	420	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/16/2009	310.1_W	R34112		Bicarbonate	45	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/18/2009	TDS_W	19389	TDS	Total Dissc	11000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/30/2009	SW6010B			Calcium	27	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/30/2009	SW6010B			Magnesium	27.4	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	6/30/2009	SW6010B			Iron	0.06	0.03	1	mg/L		6/13/2009

Bench Tests

CDM	Sandoval	C0906292-0	T2J3	6/30/2009	SW6010B			Silicon	11.4	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	7/1/2009	E1632			Arsenic, In	274	1	1	ug/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	7/1/2009	E1632			Arsenic-III	241	1	1	ug/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J3	7/1/2009	E1632			Arsenic-V	32	2	1	ug/L	D	6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4300	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/16/2009	310.1_W	R34112		Alkalinity, T	410	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/16/2009	310.1_W	R34112		Carbonate	400	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/16/2009	310.1_W	R34112		Bicarbonate	< 20	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/18/2009	TDS_W	19389	TDS	Total Dissc	11000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/30/2009	SW6010B			Calcium	13.8	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/30/2009	SW6010B			Magnesium	12.6	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/30/2009	SW6010B			Iron	0.39	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/30/2009	SW6010B			Silicon	12.5	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-0	T2J4	6/25/2009	SW6020			Arsenic	0.229	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4000	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/16/2009	310.1_W	R34112		Alkalinity, T	390	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/16/2009	310.1_W	R34112		Carbonate	310	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/16/2009	310.1_W	R34112		Bicarbonate	< 20	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/16/2009	310.1_W	R34112		Hydroxide	82	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/18/2009	TDS_W	19389	TDS	Total Dissc	11000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/30/2009	SW6010B			Calcium	11	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/30/2009	SW6010B			Magnesium	2.7	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/30/2009	SW6010B			Iron	0.04	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/30/2009	SW6010B			Silicon	12.3	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T2J5	6/25/2009	SW6020			Arsenic	0.234	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4200	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/18/2009	310.1_W	R34157		Alkalinity, T	1800	50	2.5	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/18/2009	310.1_W	R34157		Carbonate	850	5	2.5	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/18/2009	310.1_W	R34157		Bicarbonate	950	50	2.5	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/18/2009	TDS_W	19389	TDS	Total Dissc	13000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/30/2009	SW6010B			Calcium	39.3	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/30/2009	SW6010B			Magnesium	88.2	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/30/2009	SW6010B			Iron	0.36	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/30/2009	SW6010B			Silicon	17.6	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J3	6/25/2009	SW6020			Arsenic	0.493	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4300	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/24/2009	310.1_W	R34337		Alkalinity, T	2000	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/24/2009	310.1_W	R34337		Carbonate	1500	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/24/2009	310.1_W	R34337		Bicarbonate	480	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/18/2009	TDS_W	19389	TDS	Total Dissc	13000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/30/2009	SW6010B			Calcium	39.2	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/30/2009	SW6010B			Magnesium	85.8	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/30/2009	SW6010B			Iron	0.92	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/30/2009	SW6010B			Silicon	17.9	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J4	6/25/2009	SW6020			Arsenic	0.529	0.002	1	mg/L	D	6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4300	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/24/2009	310.1_W	R34337		Alkalinity, T	2200	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/24/2009	310.1_W	R34337		Carbonate	2000	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/24/2009	310.1_W	R34337		Bicarbonate	190	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/18/2009	TDS_W	19389	TDS	Total Dissc	12000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/30/2009	SW6010B			Calcium	21	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/30/2009	SW6010B			Magnesium	69.7	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/30/2009	SW6010B			Iron	0.05	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	6/30/2009	SW6010B			Silicon	16.5	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	7/1/2009	E1632			Arsenic, In	465	1	1	ug/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	7/1/2009	E1632			Arsenic-III	329	1	1	ug/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J5	7/1/2009	E1632			Arsenic-V	135	2	1	ug/L	D	6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/17/2009	300_W	R34130	14808-79-8	Sulfate	4200	100	200	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/24/2009	310.1_W	R34337		Alkalinity, T	2400	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/24/2009	310.1_W	R34337		Carbonate	2400	2	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/24/2009	310.1_W	R34337		Bicarbonate	60	20	1	mg/L CaCO3		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/18/2009	TDS_W	19389	TDS	Total Dissc	14000	200	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/30/2009	SW6010B			Calcium	32.1	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/30/2009	SW6010B			Magnesium	26.4	0.5	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/30/2009	SW6010B			Iron	0.06	0.03	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/30/2009	SW6010B			Silicon	10.4	0.1	1	mg/L		6/13/2009
CDM	Sandoval	C0906292-1	T3J6	6/25/2009	SW6020			Arsenic	0.264	0.002	1	mg/L	D	6/13/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	RsIt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	0910155-01A	IX Feed	10/29/2009	300_W	R35951	16887-00-6	Chloride	3400	50	500	mg/L		10/6/2009
CDM	Sandoval	0910155-01A	IX Feed	10/29/2009	300_W	R35951	14808-79-8	Sulfate	4500	250	500	mg/L		10/6/2009
CDM	Sandoval	0910155-01A	IX Feed	10/9/2009	310.1_W	R35665		Alkalinity, Total (As Ca)	2100	50	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-01A	IX Feed	10/9/2009	310.1_W	R35665		Carbonate	< 5.0	5	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-01A	IX Feed	10/9/2009	310.1_W	R35665		Bicarbonate	2100	50	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-01A	IX Feed	10/14/2009	TDS_W	20322	TDS	Total Dissolved Solids	12900	20	1	mg/L		10/6/2009
CDM	Sandoval	0910155-01A	IX Feed	10/14/2009	TSS	20310		Suspended Solids	< 10	10	1	mg/L	J	10/6/2009
CDM	Sandoval	0910155-01B	IX Feed	10/30/2009	6020A			Boron	7.3	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-01B	IX Feed	10/30/2009	6020A			Calcium	164	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-01B	IX Feed	10/30/2009	6020A			Magnesium	91.7	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-01B	IX Feed	10/30/2009	200.8			Silica	36	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-01B	IX Feed	10/30/2009	200.8			Silicon	16.8	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-01B	IX Feed	10/30/2009	6020A			Sodium	4140	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-01B	IX Feed	10/30/2009	6020A			Vanadium	ND	0.01	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/10/2009	300_W	R35660	16887-00-6	Chloride	200	2	20	mg/L		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/10/2009	300_W	R35660	14808-79-8	Sulfate	130	10	20	mg/L		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/8/2009	310.1_W	R35639		Alkalinity, Total (As Ca)	150	20	1	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/8/2009	310.1_W	R35639		Carbonate	< 2.0	2	1	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/8/2009	310.1_W	R35639		Bicarbonate	150	20	1	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/9/2009	NH3_W	R35647	7664-41-7	Ammonia	< 0.50	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/14/2009	TDS_W	20322	TDS	Total Dissolved Solids	650	20	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02A	RO Produc	10/14/2009	TSS	20310		Suspended Solids	< 10	10	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02B	RO Produc	10/30/2009	6020A			Boron	3.34	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02B	RO Produc	10/30/2009	6020A			Calcium	0.626	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02B	RO Produc	10/30/2009	6020A			Magnesium	4.82	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02B	RO Produc	10/30/2009	200.8			Silica	5.78	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02B	RO Produc	10/30/2009	200.8			Silicon	2.7	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02B	RO Produc	10/30/2009	6020A			Sodium	232	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02B	RO Produc	10/30/2009	6020A			Vanadium	ND	0.01	1	mg/L		10/6/2009
CDM	Sandoval	0910155-02C	RO Produc	10/17/2009	900.0m		12587-46-1	Gross Alpha	1.51 +/- 1.1	1.77	1	pCi/L		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/29/2009	300_W	R35951	16887-00-6	Chloride	3400	50	500	mg/L		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/29/2009	300_W	R35951	14808-79-8	Sulfate	4500	250	500	mg/L		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/9/2009	310.1_W	R35665		Alkalinity, Total (As Ca)	2100	50	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/9/2009	310.1_W	R35665		Carbonate	< 5.0	5	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/9/2009	310.1_W	R35665		Bicarbonate	2100	50	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/9/2009	NH3_W	R35647	7664-41-7	Ammonia	1.1	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/14/2009	TDS_W	20322	TDS	Total Dissolved Solids	12900	20	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03A	RO Feed	10/14/2009	TSS	20310		Suspended Solids	< 10	10	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03B	RO Feed	10/30/2009	6020A			Boron	7.39	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03B	RO Feed	10/30/2009	6020A			Calcium	22.5	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03B	RO Feed	10/30/2009	6020A			Magnesium	184	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03B	RO Feed	10/30/2009	200.8			Silica	35.3	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03B	RO Feed	10/30/2009	200.8			Silicon	16.5	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03B	RO Feed	10/30/2009	6020A			Sodium	4060	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03B	RO Feed	10/30/2009	6020A			Vanadium	ND	0.01	1	mg/L		10/6/2009
CDM	Sandoval	0910155-03C	RO Feed	10/13/2009	900.0m		12587-46-1	Gross Alpha	17.9 +/- 20	32.7	1	pCi/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/29/2009	300_W	R35951	16887-00-6	Chloride	14000	200	2000	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/29/2009	300_W	R35951	14808-79-8	Sulfate	20000	1000	2000	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/16/2009	310.1_W	R35786		Alkalinity, Total (As Ca)	9500	40	2	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/16/2009	310.1_W	R35786		Carbonate	< 4.0	4	2	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/16/2009	310.1_W	R35786		Bicarbonate	9500	40	2	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/9/2009	NH3_W	R35647	7664-41-7	Ammonia	4.5	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/14/2009	TDS_W	20322	TDS	Total Dissolved Solids	54200	20	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/14/2009	TSS	20310		Suspended Solids	< 10	10	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/30/2009	6020A			Boron	20.4	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/30/2009	6020A			Calcium	113	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/30/2009	6020A			Magnesium	934	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/30/2009	200.8			Silica	184	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/30/2009	200.8			Silicon	85.9	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/30/2009	6020A			Sodium	16400	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-04A	RO CONC	10/30/2009	6020A			Vanadium	ND	0.01	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/29/2009	300_W	R35951	16887-00-6	Chloride	3300	50	500	mg/L		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/29/2009	300_W	R35951	14808-79-8	Sulfate	4300	250	500	mg/L		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/9/2009	310.1_W	R35665		Alkalinity, Total (As Ca)	1900	50	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/9/2009	310.1_W	R35665		Carbonate	< 5.0	5	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/9/2009	310.1_W	R35665		Bicarbonate	1900	50	2.5	mg/L CaCO3		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/9/2009	NH3_W	R35647	7664-41-7	Ammonia	1.1	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/14/2009	TDS_W	20322	TDS	Total Dissolved Solids	12500	20	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05A	RAW WAT	10/14/2009	TSS	20310		Suspended Solids	41	10	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05B	RAW WAT	10/30/2009	6020A			Boron	7.47	0.5	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05B	RAW WAT	10/30/2009	6020A			Calcium	437	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05B	RAW WAT	10/30/2009	6020A			Magnesium	94.2	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05B	RAW WAT	10/30/2009	200.8			Silica	39.4	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05B	RAW WAT	10/30/2009	200.8			Silicon	18.4	1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05B	RAW WAT	10/30/2009	6020A			Sodium	3670	0.1	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05B	RAW WAT	10/30/2009	6020A			Vanadium	ND	0.01	1	mg/L		10/6/2009
CDM	Sandoval	0910155-05C	RAW WAT	10/16/2009	9060_W	R35754	7440-44-0	Total Organic Carbon	2.0	2	2	mg/L		10/6/2009
CDM	Sandoval	0910155-05D	RAW WAT	10/16/2009	900.0m		12587-46-1	Gross Alpha	36.0 +/- 25	38.9	1	pCi/L		10/6/2009
CDM	Sandoval	0910155-06A	Softened P	10/16/2009	9060_W	R35754	7440-44-0	Total Organic Carbon	2.5	2	2	mg/L		10/6/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	RsIt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	0910355-01A	Raw	11/9/2009	300_W	R36091	16887-00-6	Chloride	3300	20	200	mg/L		10/19/2009
CDM	Sandoval	0910355-01A	Raw	11/9/2009	300_W	R36091	14808-79-8	Sulfate	4300	100	200	mg/L		10/19/2009
CDM	Sandoval	0910355-01A	Raw	10/29/2009	310.1_W	R35943		Alkalinity	1000	50	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-01A	Raw	10/29/2009	310.1_W	R35943		Carbonate	< 5.0	5	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-01A	Raw	10/29/2009	310.1_W	R35943		Bicarbonate	1000	50	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-01A	Raw	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	1.1	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-01A	Raw	10/23/2009	TDS_W	20399	TDS	Total Dissc	12300	20	1	mg/L		10/19/2009
CDM	Sandoval	0910355-01A	Raw	10/21/2009	TSS	20385		Suspended	< 10	10	1	mg/L	J	10/19/2009
CDM	Sandoval	0910355-01B	Raw	11/4/2009	METALS_	20452	7440-42-8	Boron	8.5	0.4	10	mg/L		10/19/2009
CDM	Sandoval	0910355-01B	Raw	11/4/2009	METALS_	20452	7440-70-2	Calcium	410	5	10	mg/L		10/19/2009
CDM	Sandoval	0910355-01B	Raw	11/4/2009	METALS_	20452	7439-95-4	Magnesium	89	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-01B	Raw	11/4/2009	METALS_	20452	7440-23-5	Sodium	< 0.50	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-01B	Raw	11/4/2009	METALS_	20452	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	10/19/2009
CDM	Sandoval	0910355-01B	Raw	11/4/2009	METALS_	20452	7631-86-9	Silica	32	10.83	10	mg/L		10/19/2009
CDM	Sandoval	0910355-01C	Raw	10/21/2009	9060_W	R35830	7440-44-0	Total Orga	< 1.0	1	1	mg/L	J	10/19/2009
CDM	Sandoval	0910355-02A	Soft Prod	10/21/2009	9060_W	R35830	7440-44-0	Total Orga	1.1	1	1	mg/L	H	10/19/2009
CDM	Sandoval	0910355-03A	IX Feed	11/9/2009	300_W	R36091	16887-00-6	Chloride	3300	20	200	mg/L		10/19/2009
CDM	Sandoval	0910355-03A	IX Feed	11/9/2009	300_W	R36091	14808-79-8	Sulfate	4300	100	200	mg/L		10/19/2009
CDM	Sandoval	0910355-03A	IX Feed	10/29/2009	310.1_W	R35943		Alkalinity	12800	50	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-03A	IX Feed	10/29/2009	310.1_W	R35943		Carbonate	1300	5	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-03A	IX Feed	10/29/2009	310.1_W	R35943		Bicarbonate	1600	50	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-03A	IX Feed	10/23/2009	TDS_W	20399	TDS	Total Dissc	13500	20	1	mg/L		10/19/2009
CDM	Sandoval	0910355-03A	IX Feed	10/21/2009	TSS	20385		Suspended	< 10	10	1	mg/L	J	10/19/2009
CDM	Sandoval	0910355-03B	IX Feed	11/4/2009	METALS_	20452	7440-42-8	Boron	8.5	0.4	10	mg/L		10/19/2009
CDM	Sandoval	0910355-03B	IX Feed	11/4/2009	METALS_	20452	7440-70-2	Calcium	2.3	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-03B	IX Feed	11/4/2009	METALS_	20452	7439-95-4	Magnesium	81	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-03B	IX Feed	11/4/2009	METALS_	20452	7440-23-5	Sodium	< 0.50	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-03B	IX Feed	11/4/2009	METALS_	20452	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	10/19/2009
CDM	Sandoval	0910355-03B	IX Feed	11/4/2009	METALS_	20452	7631-86-9	Silica	15	10.83	10	mg/L		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	11/9/2009	300_W	R36091	16887-00-6	Chloride	3200	20	200	mg/L		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	11/9/2009	300_W	R36091	14808-79-8	Sulfate	4200	100	200	mg/L		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	10/29/2009	310.1_W	R35943		Alkalinity	12700	50	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	10/29/2009	310.1_W	R35943		Carbonate	1000	5	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	10/29/2009	310.1_W	R35943		Bicarbonate	1600	50	2.5	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	1.3	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	10/23/2009	TDS_W	20399	TDS	Total Dissc	13500	20	1	mg/L		10/19/2009
CDM	Sandoval	0910355-04A	RO Feed	10/21/2009	TSS	20385		Suspended	< 10	10	1	mg/L	J	10/19/2009
CDM	Sandoval	0910355-04B	RO Feed	11/4/2009	METALS_	20452	7440-42-8	Boron	8.7	0.4	10	mg/L		10/19/2009
CDM	Sandoval	0910355-04B	RO Feed	11/4/2009	METALS_	20452	7440-70-2	Calcium	3.5	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-04B	RO Feed	11/4/2009	METALS_	20452	7439-95-4	Magnesium	6.0	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-04B	RO Feed	11/4/2009	METALS_	20452	7440-23-5	Sodium	< 0.50	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-04B	RO Feed	11/4/2009	METALS_	20452	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	10/19/2009
CDM	Sandoval	0910355-04B	RO Feed	11/4/2009	METALS_	20452	7631-86-9	Silica	16	10.83	10	mg/L		10/19/2009
CDM	Sandoval	0910355-04C	RO Feed	11/3/2009	900.0m		12587-46-1	Gross Alph	0.553 +/- 0	1.42	1	pCi/L		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	11/9/2009	300_W	R36091	16887-00-6	Chloride	75	1	10	mg/L		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	11/9/2009	300_W	R36091	14808-79-8	Sulfate	12	5	10	mg/L		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	10/23/2009	310.1_W	R35858		Alkalinity	179	20	1	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	10/23/2009	310.1_W	R35858		Carbonate	21	2	1	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	10/23/2009	310.1_W	R35858		Bicarbonate	59	20	1	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	0.70	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	10/23/2009	TDS_W	20399	TDS	Total Dissc	170	20	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05A	RO Produc	10/21/2009	TSS	20385		Suspended	< 10	10	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05B	RO Produc	11/9/2009	METALS_	20542	7440-42-8	Boron	2.5	0.2	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05B	RO Produc	11/9/2009	METALS_	20542	7440-70-2	Calcium	< 2.5	2.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05B	RO Produc	11/9/2009	METALS_	20542	7439-95-4	Magnesium	< 2.5	2.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05B	RO Produc	11/10/2009	METALS_	20542	7440-23-5	Sodium	69	2.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05B	RO Produc	11/9/2009	METALS_	20542	7440-62-2	Vanadium	< 0.25	0.25	1	mg/L		10/19/2009
CDM	Sandoval	0910355-05B	RO Produc	11/9/2009	METALS_	20542	7631-86-9	Silica	< 5.4	5.415	1	mg/L	J	10/19/2009
	Sandoval	0910355-05C	RO Produc	10/28/2009	900.0m		12587-46-1	Gross Alph	8.15 +/- 22	38.5	1	pCi/L		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	11/10/2009	300_W	R36114	16887-00-6	Chloride	18000	200	2000	mg/L		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	11/9/2009	300_W	R36091	14808-79-8	Sulfate	27000	500	1000	mg/L		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	11/2/2009	310.1_W	R36004		Alkalinity	18000	20	1	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	11/2/2009	310.1_W	R36004		Carbonate	5800	2	1	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	11/2/2009	310.1_W	R36004		Bicarbonate	12000	20	1	mg/L CaCO3		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	3.9	0.5	1	mg/L		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	10/23/2009	TDS_W	20399	TDS	Total Dissc	81400	2000	1	mg/L		10/19/2009
CDM	Sandoval	0910355-06A	RO Conc	10/21/2009	TSS	20385		Suspended	24	10	1	mg/L		10/19/2009
CDM	Sandoval	0910355-06B	RO Conc	11/9/2009	METALS_	20542	7440-42-8	Boron	44	2	10	mg/L		10/19/2009
CDM	Sandoval	0910355-06B	RO Conc	11/9/2009	METALS_	20542	7440-70-2	Calcium	21	12.5	5	mg/L		10/19/2009
CDM	Sandoval	0910355-06B	RO Conc	11/9/2009	METALS_	20542	7439-95-4	Magnesium	38	12.5	5	mg/L		10/19/2009
CDM	Sandoval	0910355-06B	RO Conc	11/10/2009	METALS_	20542	7440-23-5	Sodium	31000	250	100	mg/L		10/19/2009
CDM	Sandoval	0910355-06B	RO Conc	11/9/2009	METALS_	20542	7440-62-2	Vanadium	< 1.3	1.25	5	mg/L		10/19/2009
CDM	Sandoval	0910355-06B	RO Conc	11/9/2009	METALS_	20542	7440-66-6	Zinc	< 0.50	0.5	5	mg/L		10/19/2009
CDM	Sandoval	0910355-06B	RO Conc	11/9/2009	METALS_	20542	7631-86-9	Silica	100	27.075	5	mg/L		10/19/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	Rslt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	0910495-01A	Raw	10/29/2009	300_W	R35951	16887-00-6	Chloride	3400	50	500	mg/L		10/27/2009
CDM	Sandoval	0910495-01A	Raw	10/29/2009	300_W	R35951	14808-79-8	Sulfate	4700	250	500	mg/L		10/27/2009
CDM	Sandoval	0910495-01A	Raw	11/2/2009	310.1_W	R35984		Alkalinity, T	1900	50	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-01A	Raw	11/2/2009	310.1_W	R35984		Carbonate	< 5.0	5	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-01A	Raw	11/2/2009	310.1_W	R35984		Bicarbonate	1900	50	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-01A	Raw	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	0.84	0.5	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01A	Raw	10/30/2009	TDS_W	20459	TDS	Total Dissc	12500	20	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01A	Raw	11/3/2009	TSS	20488		Suspended	13	10	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01B	Raw	11/3/2009	SW6020			Arsenic	0.781	0.001	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01B	Raw	11/3/2009	SW6010B			Boron	7.9	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01B	Raw	11/3/2009	SW6010B			Calcium	337	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01B	Raw	11/3/2009	SW6010B			Magnesium	91	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01B	Raw	11/3/2009	SW6010B			Vanadium	ND	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-01C	Raw	10/29/2009	9060_W	R35946	7440-44-0	Total Orga	1.3	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-02A	Soft Prod	10/29/2009	9060_W	R35946	7440-44-0	Total Orga	1.7	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-03A	IX Feed	10/29/2009	300_W	R35951	16887-00-6	Chloride	3600	50	500	mg/L		10/27/2009
CDM	Sandoval	0910495-03A	IX Feed	10/29/2009	300_W	R35951	14808-79-8	Sulfate	5000	250	500	mg/L		10/27/2009
CDM	Sandoval	0910495-03A	IX Feed	11/2/2009	310.1_W	R35984		Alkalinity, T	1800	50	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-03A	IX Feed	11/2/2009	310.1_W	R35984		Carbonate	95	5	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-03A	IX Feed	11/2/2009	310.1_W	R35984		Bicarbonate	1700	50	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-03A	IX Feed	10/30/2009	TDS_W	20459	TDS	Total Dissc	12400	20	1	mg/L		10/27/2009
CDM	Sandoval	0910495-03A	IX Feed	11/3/2009	TSS	20488		Suspended	< 10	10	1	mg/L	J	10/27/2009
CDM	Sandoval	0910495-03B	IX Feed	11/3/2009	SW6020			Arsenic	0.2	0.001	1	mg/L		10/27/2009
CDM	Sandoval	0910495-03B	IX Feed	11/3/2009	SW6010B			Boron	8.3	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-03B	IX Feed	11/3/2009	SW6010B			Calcium	33	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-03B	IX Feed	11/3/2009	SW6010B			Magnesium	88	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-03B	IX Feed	11/3/2009	SW6010B			Vanadium	ND	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	10/29/2009	300_W	R35951	16887-00-6	Chloride	3300	50	500	mg/L		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	10/29/2009	300_W	R35951	14808-79-8	Sulfate	4500	250	500	mg/L		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	11/2/2009	310.1_W	R35984		Alkalinity, T	2000	50	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	11/2/2009	310.1_W	R35984		Carbonate	520	5	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	11/2/2009	310.1_W	R35984		Bicarbonate	1500	50	2.5	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	< 0.50	0.5	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	10/30/2009	TDS_W	20459	TDS	Total Dissc	12900	20	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04A	RO Feed	11/3/2009	TSS	20488		Suspended	< 10	10	1	mg/L	J	10/27/2009
CDM	Sandoval	0910495-04B	RO Feed	11/3/2009	SW6020			Arsenic	0.288	0.001	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04B	RO Feed	11/3/2009	SW6010B			Boron	8.1	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04B	RO Feed	11/3/2009	SW6010B			Calcium	3.0	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04B	RO Feed	11/3/2009	SW6010B			Magnesium	6.0	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04B	RO Feed	11/3/2009	SW6010B			Vanadium	ND	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-04C	RO Feed	11/2/2009	EPA 900.0m		12587-46-1	Gross Alph	11.9 +/- 16.9	28.5	1	pCi-L		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	10/28/2009	300_W	R35925	16887-00-6	Chloride	110	2	20	mg/L		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	10/28/2009	300_W	R35925	14808-79-8	Sulfate	21	0.5	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	10/30/2009	310.1_W	R35959		Alkalinity, T	72	20	1	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	10/30/2009	310.1_W	R35959		Carbonate	5.0	2	1	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	10/30/2009	310.1_W	R35959		Bicarbonate	67	20	1	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	< 0.50	0.5	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	10/30/2009	TDS_W	20459	TDS	Total Dissc	272	20	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05A	RO Produc	11/3/2009	TSS	20488		Suspended	< 10	10	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05B	RO Produc	11/3/2009	SW6020			Arsenic	0.002	0.001	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05B	RO Produc	11/3/2009	SW6010B			Boron	3.5	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05B	RO Produc	11/3/2009	SW6010B			Calcium	ND	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05B	RO Produc	11/3/2009	SW6010B			Magnesium	ND	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05B	RO Produc	11/3/2009	SW6010B			Sodium	105	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05B	RO Produc	11/3/2009	SW6010B			Vanadium	ND	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-05C	RO Produc	11/3/2009	EPA 900.0m		12587-46-1	Gross Alph	-0.870 +/- 0.799	2.83	1	pCi-L		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	10/29/2009	300_W	R35951	16887-00-6	Chloride	23000	200	2000	mg/L		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	10/29/2009	300_W	R35951	14808-79-8	Sulfate	32000	1000	2000	mg/L		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	11/6/2009	310.1_W	R36112		Alkalinity, T	13000	20	1	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	11/6/2009	310.1_W	R36112		Carbonate	3800	2	1	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	11/6/2009	310.1_W	R36112		Bicarbonate	9600	20	1	mg/L CaCO3		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	10/28/2009	NH3_W	R35917	7664-41-7	Ammonia	2.0	0.5	1	mg/L		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	10/30/2009	TDS_W	20459	TDS	Total Dissc	83600	20	1	mg/L		10/27/2009
CDM	Sandoval	0910495-06A	RO Conc	11/3/2009	TSS	20488		Suspended	34	10	1	mg/L		10/27/2009
CDM	Sandoval	0910495-06B	RO Conc	11/3/2009	SW6020			Arsenic	1.86	0.001	1	mg/L		10/27/2009
CDM	Sandoval	0910495-06B	RO Conc	11/3/2009	SW6010B			Boron	31.6	0.1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-06B	RO Conc	11/3/2009	SW6010B			Calcium	24	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-06B	RO Conc	11/3/2009	SW6010B			Magnesium	40	1	1	mg/L		10/27/2009
CDM	Sandoval	0910495-06B	RO Conc	11/3/2009	SW6010B			Vanadium	ND	0.1	1	mg/L		10/27/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	RsIt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	0911028-01A	Raw Water	11/5/2009	300_W	R36052	16887-00-6	Chloride	3100	50	500	mg/L		11/1/2009
CDM	Sandoval	0911028-01A	Raw Water	11/2/2009	300_W	R35992	7727-37-9	Nitrogen, N	< 0.10	0.1	1	mg/L	J	11/1/2009
CDM	Sandoval	0911028-01A	Raw Water	11/5/2009	300_W	R36052	14808-79-8	Sulfate	4300	250	500	mg/L		11/1/2009
CDM	Sandoval	0911028-01A	Raw Water	11/6/2009	310.1_W	R36066		Alkalinity, T	1700	50	2.5	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-01A	Raw Water	11/6/2009	310.1_W	R36066		Carbonate	< 5.0	5	2.5	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-01A	Raw Water	11/6/2009	310.1_W	R36066		Bicarbonate	1700	50	2.5	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-01A	Raw Water	11/6/2009	TDS_W	20545	TDS	Total Dissc	12400	20	1	mg/L		11/1/2009
CDM	Sandoval	0911028-01A	Raw Water	11/5/2009	TSS	20536		Suspended	32	10	1	mg/L		11/1/2009
CDM	Sandoval	0911028-01B	Raw Water	11/8/2009	200.7	R36077	7440-42-8	Boron	9.1	0.4	10	mg/L		11/1/2009
CDM	Sandoval	0911028-01B	Raw Water	11/8/2009	200.7	R36077	7440-70-2	Calcium	450	10	10	mg/L		11/1/2009
CDM	Sandoval	0911028-01B	Raw Water	11/8/2009	200.7	R36077	7439-95-4	Magnesium	97	10	10	mg/L		11/1/2009
CDM	Sandoval	0911028-01B	Raw Water	11/8/2009	200.7	R36077	7631-86-9	Silica	32	1.6	10	mg/L		11/1/2009
CDM	Sandoval	0911028-01B	Raw Water	11/9/2009	200.7	R36082	7440-23-5	Sodium	3600	50	50	mg/L		11/1/2009
CDM	Sandoval	0911028-01B	Raw Water	11/8/2009	200.7	R36077	7440-62-2	Vanadium	< 0.50	0.5	10	mg/L		11/1/2009
CDM	Sandoval	0911028-01B	Raw Water	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	0.52	0.05	50	mg/L		11/1/2009
CDM	Sandoval	0911028-01C	Raw Water	11/4/2009	9060_W	R36041	7440-44-0	Total Orga	1.2	1	1	mg/L		11/1/2009
CDM	Sandoval	0911028-01D	Raw Water	11/14/2009	Sm 7110C		12587-46-1	Gross Alph	62.5 +/- 12	2.02	1	pCi/L		11/1/2009
CDM	Sandoval	0911028-02A	Soft Prod	11/4/2009	9060_W	R36041	7440-44-0	Total Orga	150	2	2	mg/L		11/1/2009
CDM	Sandoval	0911028-03A	1X Feed	11/5/2009	300_W	R36052	16887-00-6	Chloride	3000	50	500	mg/L		11/1/2009
CDM	Sandoval	0911028-03A	1X Feed	11/5/2009	300_W	R36052	14808-79-8	Sulfate	4100	250	500	mg/L		11/1/2009
CDM	Sandoval	0911028-03A	1X Feed	11/12/2009	310.1_W	R36149		Alkalinity, T	3300	20	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-03A	1X Feed	11/12/2009	310.1_W	R36149		Carbonate	2500	2	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-03A	1X Feed	11/12/2009	310.1_W	R36149		Bicarbonate	850	20	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-03A	1X Feed	11/6/2009	TDS_W	20545	TDS	Total Dissc	14200	20	1	mg/L		11/1/2009
CDM	Sandoval	0911028-03A	1X Feed	11/5/2009	TSS	20536		Suspended	56	10	1	mg/L		11/1/2009
CDM	Sandoval	0911028-03B	1X Feed	11/8/2009	200.7	R36077	7440-42-8	Boron	9.2	0.4	10	mg/L		11/1/2009
CDM	Sandoval	0911028-03B	1X Feed	11/8/2009	200.7	R36077	7440-70-2	Calcium	10	10	10	mg/L		11/1/2009
CDM	Sandoval	0911028-03B	1X Feed	11/8/2009	200.7	R36077	7439-95-4	Magnesium	53	10	10	mg/L		11/1/2009
CDM	Sandoval	0911028-03B	1X Feed	11/8/2009	200.7	R36077	7631-86-9	Silica	9.6	1.6	10	mg/L		11/1/2009
CDM	Sandoval	0911028-03B	1X Feed	11/9/2009	200.7	R36082	7440-23-5	Sodium	4900	100	100	mg/L		11/1/2009
CDM	Sandoval	0911028-03B	1X Feed	11/8/2009	200.7	R36077	7440-62-2	Vanadium	< 0.50	0.5	10	mg/L	J	11/1/2009
CDM	Sandoval	0911028-03B	1X Feed	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	0.50	0.05	50	mg/L		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/5/2009	300_W	R36052	16887-00-6	Chloride	2900	50	500	mg/L		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/2/2009	300_W	R35992	7727-37-9	Nitrogen, N	< 0.10	0.1	1	mg/L		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/5/2009	300_W	R36052	14808-79-8	Sulfate	4100	250	500	mg/L		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/6/2009	310.1_W	R36066		Alkalinity, T	3000	50	2.5	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/6/2009	310.1_W	R36066		Carbonate	2000	5	2.5	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/6/2009	310.1_W	R36066		Bicarbonate	950	50	2.5	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/6/2009	TDS_W	20545	TDS	Total Dissc	14100	20	1	mg/L		11/1/2009
CDM	Sandoval	0911028-04A	RO Feed	11/5/2009	TSS	20536		Suspended	< 10	10	1	mg/L	J	11/1/2009
CDM	Sandoval	0911028-04B	RO Feed	11/6/2009	200.7	R36070	7440-42-8	Boron	8.4	0.4	10	mg/L		11/1/2009
CDM	Sandoval	0911028-04B	RO Feed	11/8/2009	200.7	R36077	7440-70-2	Calcium	< 10	10	10	mg/L	J	11/1/2009
CDM	Sandoval	0911028-04B	RO Feed	11/6/2009	200.7	R36070	7439-95-4	Magnesium	13	10	10	mg/L		11/1/2009
CDM	Sandoval	0911028-04B	RO Feed	11/6/2009	200.7	R36070	7631-86-9	Silica	8.7	1.6	10	mg/L		11/1/2009
CDM	Sandoval	0911028-04B	RO Feed	11/9/2009	200.7	R36082	7440-23-5	Sodium	5000	100	100	mg/L		11/1/2009
CDM	Sandoval	0911028-04B	RO Feed	11/6/2009	200.7	R36070	7440-62-2	Vanadium	< 0.50	0.5	10	mg/L		11/1/2009
CDM	Sandoval	0911028-04B	RO Feed	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	0.47	0.05	50	mg/L		11/1/2009
	Sandoval	0911028-04C	RO Feed	11/14/2009	Sm 7110C		12587-46-1	Gross Alph	4.02 +/- 1.9	2.62	1	pCi/L		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/2/2009	300_W	R35992	16887-00-6	Chloride	39	2	20	mg/L		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/2/2009	300_W	R35992	7727-37-9	Nitrogen, N	0.11	0.1	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/2/2009	300_W	R35992	14808-79-8	Sulfate	8.6	0.5	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/4/2009	310.1_W	R36031		Alkalinity, T	75	20	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/4/2009	310.1_W	R36031		Carbonate	35	2	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/4/2009	310.1_W	R36031		Bicarbonate	40	20	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/6/2009	TDS_W	20545	TDS	Total Dissc	101	20	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05A	RO Prod	11/5/2009	TSS	20536		Suspended	< 10	10	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05B	RO Prod	11/6/2009	200.7	R36070	7440-42-8	Boron	0.59	0.04	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05B	RO Prod	11/8/2009	200.7	R36077	7440-70-2	Calcium	< 1.0	1	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05B	RO Prod	11/6/2009	200.7	R36070	7439-95-4	Magnesium	< 1.0	1	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05B	RO Prod	11/6/2009	200.7	R36070	7631-86-9	Silica	< 0.16	0.16	1	mg/L	J	11/1/2009
CDM	Sandoval	0911028-05B	RO Prod	11/6/2009	200.7	R36070	7440-23-5	Sodium	37	1	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05B	RO Prod	11/6/2009	200.7	R36070	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05B	RO Prod	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	0.0020	0.001	1	mg/L		11/1/2009
CDM	Sandoval	0911028-05C	RO Prod	11/13/2009	Sm 7110C		12587-46-1	Gross Alph	0.478 +/- 0	1.47	1	pCi/L		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/5/2009	300_W	R36052	16887-00-6	Chloride	14000	200	2000	mg/L		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/2/2009	300_W	R35992	7727-37-9	Nitrogen, N	< 2.0	2	20	mg/L		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/5/2009	300_W	R36052	14808-79-8	Sulfate	20000	1000	2000	mg/L		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/12/2009	310.1_W	R36149		Alkalinity, T	15000	20	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/12/2009	310.1_W	R36149		Carbonate	11000	2	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/12/2009	310.1_W	R36149		Bicarbonate	4200	20	1	mg/L CaCO3		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/6/2009	TDS_W	20545	TDS	Total Dissc	63200	20	1	mg/L		11/1/2009
CDM	Sandoval	0911028-06A	RO Conc	11/5/2009	TSS	20536		Suspended	76	10	1	mg/L		11/1/2009
CDM	Sandoval	0911028-06B	RO Conc	11/8/2009	200.7	R36077	7440-42-8	Boron	41	4	100	mg/L		11/1/2009
CDM	Sandoval	0911028-06B	RO Conc	11/8/2009	200.7	R36077	7440-70-2	Calcium	23	10	10	mg/L		11/1/2009
CDM	Sandoval	0911028-06B	RO Conc	11/6/2009	200.7	R36070	7439-95-4	Magnesium	61	10	10	mg/L		11/1/2009
CDM	Sandoval	0911028-06B	RO Conc	11/6/2009	200.7	R36070	7631-86-9	Silica	39	1.6	10	mg/L		11/1/2009
CDM	Sandoval	0911028-06B	RO Conc	11/9/2009	200.7	R36082	7440-23-5	Sodium	22000	500	500	mg/L		11/1/2009
CDM	Sandoval	0911028-06B	RO Conc	11/6/2009	200.7	R36070	7440-62-2	Vanadium	< 0.50	0.5	10	mg/L		11/1/2009
CDM	Sandoval	0911028-06B	RO Conc	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	2.3	0.5	500	mg/L		11/1/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	Rslt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	C0911166-01A	Raw	11/9/2009	300_W	R36091	16887-00-6	Chloride	3200	20	200	mg/L		11/6/2009
CDM	Sandoval	C0911166-01A	Raw	11/9/2009	300_W	R36091	14808-79-8	Sulfate	4400	100	200	mg/L		11/6/2009
CDM	Sandoval	C0911166-01A	Raw	11/10/2009	310.1_W	R36111		Alkalinity, T	1800	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-01A	Raw	11/10/2009	310.1_W	R36111		Carbonate	< 5.0	5	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-01A	Raw	11/10/2009	310.1_W	R36111		Bicarbonate	1800	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-01A	Raw	11/10/2009	NH3_W	R36110	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-01A	Raw	11/13/2009	TDS_W	20605	TDS	Total Dissol	12400	20	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-01A	Raw	11/10/2009	TSS	20562		Suspended	19	10	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-01B	Raw	11/16/2009	200.7	20555	7440-42-8	Boron	9.1	0.4	10	mg/L		11/6/2009
CDM	Sandoval	C0911166-01B	Raw	11/13/2009	200.7	R36165	7440-70-2	Calcium	470	10	10	mg/L		11/6/2009
CDM	Sandoval	C0911166-01B	Raw	11/13/2009	200.7	R36165	7439-95-4	Magnesium	96	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-01B	Raw	11/13/2009	200.7	R36165	7631-86-9	Silica	32	1.6	10	mg/L		11/6/2009
CDM	Sandoval	C0911166-01B	Raw	11/16/2009	200.7	20555	7440-23-5	Sodium	3500	100	100	mg/L		11/6/2009
CDM	Sandoval	C0911166-01B	Raw	11/13/2009	200.7	R36165	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-01B	Raw	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	0.72	0.05	50	mg/L		11/6/2009
CDM	Sandoval	C0911166-01C	Raw	11/11/2009	9060_W	R36146	7440-44-0	Total Orga	2.5	2	2	mg/L		11/6/2009
CDM	Sandoval	C0911166-01D	Raw	11/14/2009	Sm 7110C		12587-46-1	Gross Alph	61.0 +/- 12	2.97	1	pCi/L		11/6/2009
CDM	Sandoval	C0911166-02A	Soft Prod	11/11/2009	9060_W	R36146	7440-44-0	Total Orga	2.1	2	2	mg/L		11/6/2009
CDM	Sandoval	C0911166-03A	1x Feed	11/9/2009	300_W	R36091	16887-00-6	Chloride	3300	20	200	mg/L		11/6/2009
CDM	Sandoval	C0911166-03A	1x Feed	11/9/2009	300_W	R36091	14808-79-8	Sulfate	4300	100	200	mg/L		11/6/2009
CDM	Sandoval	C0911166-03A	1x Feed	11/10/2009	310.1_W	R36111		Alkalinity, T	2600	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-03A	1x Feed	11/10/2009	310.1_W	R36111		Carbonate	1000	5	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-03A	1x Feed	11/10/2009	310.1_W	R36111		Bicarbonate	1600	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-03A	1x Feed	11/13/2009	TDS_W	20605	TDS	Total Dissol	13400	20	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-03A	1x Feed	11/10/2009	TSS	20562		Suspended	< 10	10	1	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-03B	1x Feed	11/16/2009	200.7	20555	7440-42-8	Boron	9.1	0.4	10	mg/L		11/6/2009
CDM	Sandoval	C0911166-03B	1x Feed	11/13/2009	200.7	R36165	7440-70-2	Calcium	1.4	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-03B	1x Feed	11/13/2009	200.7	R36165	7439-95-4	Magnesium	76	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-03B	1x Feed	11/13/2009	200.7	R36165	7631-86-9	Silica	8.9	0.16	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-03B	1x Feed	11/16/2009	200.7	20555	7440-23-5	Sodium	4500	100	100	mg/L		11/6/2009
CDM	Sandoval	C0911166-03B	1x Feed	11/13/2009	200.7	R36165	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-03B	1x Feed	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	0.42	0.05	50	mg/L		11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/9/2009	300_W	R36091	16887-00-6	Chloride	3100	20	200	mg/L		11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/9/2009	300_W	R36091	14808-79-8	Sulfate	4200	100	200	mg/L		11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/10/2009	310.1_W	R36111		Alkalinity, T	2600	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/10/2009	310.1_W	R36111		Carbonate	1100	5	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/10/2009	310.1_W	R36111		Bicarbonate	1500	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/10/2009	NH3_W	R36110	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/13/2009	TDS_W	20605	TDS	Total Dissol	13500	20	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-04A	RO Feed	11/10/2009	TSS	20562		Suspended	12	10	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-04B	RO Feed	11/16/2009	200.7	20555	7440-42-8	Boron	9.2	0.4	10	mg/L		11/6/2009
CDM	Sandoval	C0911166-04B	RO Feed	11/13/2009	200.7	R36165	7440-70-2	Calcium	2.8	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-04B	RO Feed	11/13/2009	200.7	R36165	7439-95-4	Magnesium	22	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-04B	RO Feed	11/13/2009	200.7	R36165	7631-86-9	Silica	9.0	0.16	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-04B	RO Feed	11/16/2009	200.7	20555	7440-23-5	Sodium	4600	100	100	mg/L		11/6/2009
CDM	Sandoval	C0911166-04B	RO Feed	11/13/2009	200.7	R36165	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-04B	RO Feed	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	0.45	0.05	50	mg/L		11/6/2009
CDM	Sandoval	C0911166-04C	RO Feed	11/14/2009	Sm 7110C		12587-46-1	Gross Alph	3.49 +/- 1.7	2.46	1	pCi/L		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/9/2009	300_W	R36091	16887-00-6	Chloride	35	1	10	mg/L		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/9/2009	300_W	R36091	14808-79-8	Sulfate	6.5	5	10	mg/L		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/10/2009	310.1_W	R36111		Alkalinity, T	70	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/10/2009	310.1_W	R36111		Carbonate	< 5.0	5	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/10/2009	310.1_W	R36111		Bicarbonate	70	50	2.5	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/10/2009	NH3_W	R36110	7664-41-7	Ammonia	< 1.0	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/13/2009	TDS_W	20605	TDS	Total Dissol	124	20	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05A	RO Produc	11/10/2009	TSS	20562		Suspended	< 10	10	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05B	RO Produc	11/16/2009	200.7	20555	7440-42-8	Boron	1.4	0.2	5	mg/L		11/6/2009
CDM	Sandoval	C0911166-05B	RO Produc	11/13/2009	200.7	R36165	7440-70-2	Calcium	< 1.0	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05B	RO Produc	11/13/2009	200.7	R36165	7439-95-4	Magnesium	< 1.0	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05B	RO Produc	11/13/2009	200.7	R36165	7631-86-9	Silica	< 0.16	0.16	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05B	RO Produc	11/16/2009	200.7	20555	7440-23-5	Sodium	33	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05B	RO Produc	11/13/2009	200.7	R36165	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-05B	RO Produc	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	< 0.0010	0.001	1	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-05C	RO Produc	11/14/2009	Sm 7110C		12587-46-1	Gross Alph	-0.131 +/- 0	1.34	1	pCi/L		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/9/2009	300_W	R36091	16887-00-6	Chloride	16000	100	1000	mg/L		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/9/2009	300_W	R36091	14808-79-8	Sulfate	21000	500	1000	mg/L		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/12/2009	310.1_W	R36149		Alkalinity, T	13000	20	1	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/12/2009	310.1_W	R36149		Carbonate	5700	2	1	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/12/2009	310.1_W	R36149		Bicarbonate	6900	20	1	mg/L CaCO3		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/10/2009	NH3_W	R36110	7664-41-7	Ammonia	2.0	1	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/13/2009	TDS_W	20605	TDS	Total Dissol	63600	20	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-06A	RO Conc	11/10/2009	TSS	20562		Suspended	19	10	1	mg/L		11/6/2009
CDM	Sandoval	C0911166-06B	RO Conc	11/16/2009	200.7	20555	7440-42-8	Boron	38	2	50	mg/L		11/6/2009
CDM	Sandoval	C0911166-06B	RO Conc	11/13/2009	200.7	R36165	7440-70-2	Calcium	13	5	5	mg/L		11/6/2009
CDM	Sandoval	C0911166-06B	RO Conc	11/13/2009	200.7	R36165	7439-95-4	Magnesium	100	5	5	mg/L		11/6/2009
CDM	Sandoval	C0911166-06B	RO Conc	11/13/2009	200.7	R36165	7631-86-9	Silica	44	0.8	5	mg/L		11/6/2009
CDM	Sandoval	C0911166-06B	RO Conc	11/16/2009	200.7	20555	7440-23-5	Sodium	21000	500	500	mg/L		11/6/2009
CDM	Sandoval	C0911166-06B	RO Conc	11/13/2009	200.7	R36165	7440-62-2	Vanadium	< 0.25	0.25	5	mg/L	J	11/6/2009
CDM	Sandoval	C0911166-06B	RO Conc	11/9/2009	200.8_HAL	R36104	7440-38-2	Arsenic	2.2	0.5	500	mg/L		11/6/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	RsIt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	200.7	R36212	7440-42-8	Boron	9.3	0.4	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	200.7	R36212	7440-70-2	Calcium	1.9	1	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	200.7	R36199	7439-95-4	Magnesium	62	1	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	200.7	R36212	7631-86-9	Silica	15	1.6	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	200.7	R36212	7440-23-5	Sodium	4600	100	100	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	200.7	R36199	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/18/2009	200.8_HAL	R36242	7440-38-2	Arsenic	0.52	0.05	50	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	300_W	R36217	16887-00-6	Chloride	3000	50	500	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	300_W	R36217	14808-79-8	Sulfate	4300	250	500	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	310.1_W	R36203		Alkalinity, T	2800	50	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	310.1_W	R36203		Carbonate	< 5.0	5	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	310.1_W	R36203		Bicarbonat	2800	50	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/19/2009	TDS_W	20663	TDS	Total Dissc	13400	20	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	IX Feed	11/17/2009	TSS	20645		Suspended	17	10	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	200.7	R36212	7440-42-8	Boron	9.5	0.4	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	200.7	R36212	7440-70-2	Calcium	490	10	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	200.7	R36212	7439-95-4	Magnesium	100	10	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	200.7	R36212	7631-86-9	Silica	33	1.6	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	200.7	R36212	7440-23-5	Sodium	3600	100	100	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	200.7	R36199	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/18/2009	200.8_HAL	R36242	7440-38-2	Arsenic	0.78	0.05	50	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	300_W	R36217	16887-00-6	Chloride	3000	50	500	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	300_W	R36217	14808-79-8	Sulfate	4500	250	500	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	310.1_W	R36203		Alkalinity, T	1700	50	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	310.1_W	R36203		Carbonate	< 5.0	5	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	310.1_W	R36203		Bicarbonat	1700	50	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/16/2009	9060_W	R36194	7440-44-0	Total Orga	1.7	1	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/18/2009	NH3_W	R36226	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/19/2009	TDS_W	20663	TDS	Total Dissc	12400	20	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/17/2009	TSS	20645		Suspended	20	10	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	Raw Water	11/20/2009	SM 7110C		12587-46-1	Gross Alph	48.4 +/- 9.6	1.79	1	pCi/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/18/2009	200.7	20651	7440-42-8	Boron	32	2	50	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	200.7	R36212	7440-70-2	Calcium	5.6	5	5	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	200.7	R36212	7439-95-4	Magnesium	110	5	5	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	200.7	R36212	7631-86-9	Silica	57	0.8	5	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	200.7	R36212	7440-23-5	Sodium	19000	500	500	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	200.7	R36212	7440-62-2	Vanadium	< 0.25	0.25	5	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/18/2009	200.8_HAL	R36242	7440-38-2	Arsenic	0.92	0.05	50	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	300_W	R36217	16887-00-6	Chloride	13000	100	1000	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	300_W	R36217	14808-79-8	Sulfate	18000	500	1000	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/24/2009	310.1_W	R36316		Alkalinity, T	12000	20	1	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/24/2009	310.1_W	R36316		Carbonate	7600	2	1	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/24/2009	310.1_W	R36316		Bicarbonat	4400	20	1	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/18/2009	NH3_W	R36226	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/19/2009	TDS_W	20663	TDS	Total Dissc	56400	20	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Conc	11/17/2009	TSS	20645		Suspended	26	10	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	200.7	R36212	7440-42-8	Boron	9.3	0.4	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	200.7	R36212	7440-70-2	Calcium	1.4	1	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	200.7	R36199	7439-95-4	Magnesium	25	1	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	200.7	R36212	7631-86-9	Silica	14	1.6	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	200.7	R36212	7440-23-5	Sodium	4600	100	100	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	200.7	R36199	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/18/2009	200.8_HAL	R36242	7440-38-2	Arsenic	0.52	0.05	50	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	300_W	R36217	16887-00-6	Chloride	3000	50	500	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	300_W	R36217	14808-79-8	Sulfate	4400	250	500	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	310.1_W	R36203		Alkalinity, T	2700	50	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	310.1_W	R36203		Carbonate	< 5.0	5	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	310.1_W	R36203		Bicarbonat	2700	50	2.5	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/18/2009	NH3_W	R36226	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/19/2009	TDS_W	20663	TDS	Total Dissc	13400	20	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Feed	11/17/2009	TSS	20645		Suspended	< 10	10	1	mg/L	J	11/12/2009
	Sandoval	C0911289-01	RO Feed	11/20/2009	SM 7110C		12587-46-1	Gross Alph	1.58 +/- 1.1	1.81	1	pCi/L		11/12/2009
	Sandoval	C0911289-01	RO Feed	11/24/2009	EPA 903.1		13982-63-3	Radium-22	2.48 +/- 1.0	0.652	1	pCi/L		11/12/2009
	Sandoval	C0911289-01	RO Feed	11/23/2009	EPA 904.0		15262-20-1	Radium-22	0.612 +/- 0	0.699	1	pCi/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	200.7	R36212	7440-42-8	Boron	1.1	0.2	5	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	200.7	R36212	7440-70-2	Calcium	< 1.0	1	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	200.7	R36199	7439-95-4	Magnesium	< 1.0	1	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	200.7	R36199	7631-86-9	Silica	< 0.16	0.16	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	200.7	R36212	7440-23-5	Sodium	56	1	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	200.7	R36199	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/18/2009	200.8_HAL	R36242	7440-38-2	Arsenic	0.0020	0.001	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/16/2009	300_W	R36193	16887-00-6	Chloride	59	1	10	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	300_W	R36217	14808-79-8	Sulfate	18	0.5	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/24/2009	310.1_W	R36324		Alkalinity, T	34	20	1	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/24/2009	310.1_W	R36324		Carbonate	30	2	1	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/24/2009	310.1_W	R36324		Bicarbonat	< 20	20	1	mg/L CaCO3		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/18/2009	NH3_W	R36226	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/19/2009	TDS_W	20663	TDS	Total Dissc	152	20	1	mg/L		11/12/2009
CDM	Sandoval	C0911289-01	RO Produc	11/17/2009	TSS	20645		Suspended	< 10	10	1	mg/L		11/12/2009
	Sandoval	C0911289-01	RO Produc	11/20/2009	SM 7110C		12587-46-1	Gross Alph	0.311 +/- 0	1.4	1	pCi/L		11/12/2009
	Sandoval	C0911289-01	RO Produc	11/24/2009	EPA 903.1		13982-63-3	Radium-22	0.252 +/- 0	0.903	1	pCi/L		11/12/2009
	Sandoval	C0911289-01	RO Produc	11/23/2009	EPA 904.0		15262-20-1	Radium-22	0.236 +/- 0	0.61	1	pCi/L		11/12/2009
CDM	Sandoval	C0911289-01	Soft Prod	11/16/2009	9060_W	R36194	7440-44-0	Total Orga	2.4	1	1	mg/L		11/12/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	Rslt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval Co	0911356-01A	RAW WAT	11/19/2009	300_W	R36254	16887-00-6	Chloride	3200	20	200	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01A	RAW WAT	11/19/2009	300_W	R36254	14808-79-8	Sulfate	4400	100	200	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01A	RAW WAT	11/25/2009	310.1_W	R36346		Alkalinity, T	1800	20	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-01A	RAW WAT	11/25/2009	310.1_W	R36346		Carbonate	< 2.0	2	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-01A	RAW WAT	11/25/2009	310.1_W	R36346		Bicarbonate	1800	20	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-01A	RAW WAT	11/19/2009	NH3_W	R36252	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/17/2009
CDM	Sandoval Co	0911356-01A	RAW WAT	11/24/2009	TDS_W	20681	TDS	Total Dissc	12400	20	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01A	RAW WAT	11/20/2009	TSS	20674		Suspended	21	10	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01B	RAW WAT	11/23/2009	9060_W	R36299	7440-44-0	Total Orga	< 2.0	2	2	mg/L	J	11/17/2009
CDM	Sandoval Co	0911356-01C	RAW WAT	11/24/2009	200.7	R36313	7440-42-8	Boron	8.3	0.4	10	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01C	RAW WAT	11/24/2009	200.7	R36313	7440-70-2	Calcium	420	10	10	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01C	RAW WAT	11/24/2009	200.7	R36313	7439-95-4	Magnesium	86	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01C	RAW WAT	11/24/2009	200.7	R36313	7631-86-9	Silica	29	1.6	10	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01C	RAW WAT	11/24/2009	200.7	R36313	7440-23-5	Sodium	3400	100	100	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01C	RAW WAT	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01C	RAW WAT	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	0.74	0.05	50	mg/L		11/17/2009
CDM	Sandoval Co	0911356-01D	RAW WAT	11/20/2009	SM 7110C		12587-46-1	Gross Alph	51.8 +/- 10	2.68	1	pCi/L		11/17/2009
CDM	Sandoval Co	0911356-02A	1 X Feed	11/19/2009	300_W	R36254	16887-00-6	Chloride	3200	20	200	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02A	1 X Feed	11/19/2009	300_W	R36254	14808-79-8	Sulfate	4400	100	200	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02A	1 X Feed	11/24/2009	310.1_W	R36324		Alkalinity, T	2700	50	2.5	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-02A	1 X Feed	11/24/2009	310.1_W	R36324		Carbonate	1400	5	2.5	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-02A	1 X Feed	11/24/2009	310.1_W	R36324		Bicarbonate	1300	50	2.5	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-02A	1 X Feed	11/24/2009	TDS_W	20681	TDS	Total Dissc	13500	20	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02A	1 X Feed	11/20/2009	TSS	20674		Suspended	< 10	10	1	mg/L	J	11/17/2009
CDM	Sandoval Co	0911356-02B	1 X Feed	11/24/2009	200.7	R36313	7440-42-8	Boron	8.2	0.4	10	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02B	1 X Feed	11/24/2009	200.7	R36313	7440-70-2	Calcium	1.7	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02B	1 X Feed	11/24/2009	200.7	R36313	7439-95-4	Magnesium	71	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02B	1 X Feed	11/24/2009	200.7	R36313	7631-86-9	Silica	16	1.6	10	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02B	1 X Feed	11/24/2009	200.7	R36313	7440-23-5	Sodium	4400	100	100	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02B	1 X Feed	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-02B	1 X Feed	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	0.60	0.05	50	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/19/2009	300_W	R36254	16887-00-6	Chloride	3200	20	200	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/19/2009	300_W	R36254	14808-79-8	Sulfate	4300	100	200	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/24/2009	310.1_W	R36324		Alkalinity, T	2600	50	2.5	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/24/2009	310.1_W	R36324		Carbonate	1300	5	2.5	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/24/2009	310.1_W	R36324		Bicarbonate	1400	50	2.5	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/19/2009	NH3_W	R36252	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/24/2009	TDS_W	20681	TDS	Total Dissc	13500	20	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03A	RO Feed	11/20/2009	TSS	20674		Suspended	< 10	10	1	mg/L	J	11/17/2009
CDM	Sandoval Co	0911356-03B	RO Feed	11/24/2009	200.7	R36313	7440-42-8	Boron	8.2	0.4	10	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03B	RO Feed	11/24/2009	200.7	R36313	7440-70-2	Calcium	1.5	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03B	RO Feed	11/24/2009	200.7	R36313	7439-95-4	Magnesium	34	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03B	RO Feed	11/24/2009	200.7	R36313	7631-86-9	Silica	16	1.6	10	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03B	RO Feed	11/24/2009	200.7	R36313	7440-23-5	Sodium	4500	100	100	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03B	RO Feed	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03B	RO Feed	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	0.59	0.05	50	mg/L		11/17/2009
CDM	Sandoval Co	0911356-03C	RO Feed	11/20/2009	SM 7110C		12587-46-1	Gross Alph	2.41 +/- 1.5	2.4	1	pCi/L		11/17/2009
CDM	Sandoval Co	0911356-03D	RO Feed	12/1/2009	903.1		13982-63-3	Radium-22	0.264 +/- 0	0.389	1	pCi/L		11/17/2009
CDM	Sandoval Co	0911356-03D	RO Feed	11/30/2009	904		15262-20-1	Radium-22	0.264 +/- 0	0.76	1	pCi/L		11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/19/2009	300_W	R36254	16887-00-6	Chloride	50	2	20	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/19/2009	300_W	R36254	14808-79-8	Sulfate	7.8	0.5	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/21/2009	310.1_W	R36290		Alkalinity, T	28	20	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/21/2009	310.1_W	R36290		Carbonate	4.6	2	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/21/2009	310.1_W	R36290		Bicarbonate	24	20	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/19/2009	NH3_W	R36252	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/24/2009	TDS_W	20681	TDS	Total Dissc	114	20	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04A	RO Produc	11/20/2009	TSS	20674		Suspended	< 10	10	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04B	RO Produc	11/24/2009	200.7	R36313	7440-42-8	Boron	1.5	0.2	5	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04B	RO Produc	11/24/2009	200.7	R36313	7440-70-2	Calcium	< 1.0	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04B	RO Produc	11/24/2009	200.7	R36313	7439-95-4	Magnesium	< 1.0	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04B	RO Produc	11/24/2009	200.7	R36313	7631-86-9	Silica	< 0.16	0.16	1	mg/L	J	11/17/2009
CDM	Sandoval Co	0911356-04B	RO Produc	11/24/2009	200.7	R36313	7440-23-5	Sodium	41	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04B	RO Produc	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04B	RO Produc	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	0.0020	0.001	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-04C	RO Produc	11/24/2009	SM 7110C		12587-46-1	Gross Alph	1.08 +/- 1.0	1.85	1	pCi/L		11/17/2009
CDM	Sandoval Co	0911356-04D	RO Produc	11/24/2009	903.1		13982-63-3	Radium-22	- 0.124 +/-	0.574	1	pCi/L		11/17/2009
CDM	Sandoval Co	0911356-04D	RO Produc	11/24/2009	904		15262-20-1	Radium-22	0.374 +/- 0	0.628	1	pCi/L		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/20/2009	300_W	R36293	16887-00-6	Chloride	13000	200	2000	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/20/2009	300_W	R36293	14808-79-8	Sulfate	19000	1000	2000	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/21/2009	310.1_W	R36290		Alkalinity, T	< 20	20	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/21/2009	310.1_W	R36290		Carbonate	< 2.0	2	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/21/2009	310.1_W	R36290		Bicarbonate	< 20	20	1	mg/L CaCO3		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/19/2009	NH3_W	R36252	7664-41-7	Ammonia	1.3	1	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/24/2009	TDS_W	20681	TDS	Total Dissc	41000	20	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05A	RO Conc	11/20/2009	TSS	20674		Suspended	20	10	1	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05B	RO Conc	11/24/2009	200.7	R36313	7440-42-8	Boron	33	4	100	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05B	RO Conc	11/24/2009	200.7	R36313	7440-70-2	Calcium	6.9	5	5	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05B	RO Conc	11/24/2009	200.7	R36313	7439-95-4	Magnesium	150	5	5	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05B	RO Conc	11/24/2009	200.7	R36313	7631-86-9	Silica	73	0.8	5	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05B	RO Conc	11/24/2009	200.7	R36313	7440-23-5	Sodium	20000	500	500	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05B	RO Conc	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.25	0.25	5	mg/L		11/17/2009
CDM	Sandoval Co	0911356-05B	RO Conc	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	2.6	0.5	500	mg/L		11/17/2009
CDM	Sandoval Co	0911356-06A	Soft Prod	11/23/2009	9060_W	R36299	7440-44-0	Total Orga	< 2.0	2	2	mg/L	J	11/17/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	Rslt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	0911427-02A	1 x FEED	11/23/2009	300_W	R36304	16887-00-6	Chloride	3200	20	200	mg/L		11/19/2009
CDM	Sandoval	0911427-02A	1 x FEED	11/23/2009	300_W	R36304	14808-79-8	Sulfate	4200	100	200	mg/L		11/19/2009
CDM	Sandoval	0911427-02A	1 x FEED	11/24/2009	310.1_W	R36324		Alkalinity, T	2700	50	2.5	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-02A	1 x FEED	11/24/2009	310.1_W	R36324		Carbonate	1600	5	2.5	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-02A	1 x FEED	11/24/2009	310.1_W	R36324		Bicarbonate	1100	50	2.5	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-02A	1 x FEED	11/30/2009	TDS_W	20733	TDS	Total Dissc	13800	20	1	mg/L		11/19/2009
CDM	Sandoval	0911427-02A	1 x FEED	11/25/2009	TSS	20724		Suspended	19	10	1	mg/L		11/19/2009
CDM	Sandoval	0911427-02B	1 x FEED	11/24/2009	200.7	R36313	7440-42-8	Boron	8.4	0.4	10	mg/L		11/19/2009
CDM	Sandoval	0911427-02B	1 x FEED	11/24/2009	200.7	R36313	7440-70-2	Calcium	4.7	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-02B	1 x FEED	11/24/2009	200.7	R36313	7439-95-4	Magnesium	47	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-02B	1 x FEED	11/24/2009	200.7	R36313	7631-86-9	Silica	9.1	0.16	1	mg/L		11/19/2009
CDM	Sandoval	0911427-02B	1 x FEED	11/24/2009	200.7	R36313	7440-23-5	Sodium	4500	100	100	mg/L		11/19/2009
CDM	Sandoval	0911427-02B	1 x FEED	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/19/2009
CDM	Sandoval	0911427-02B	1 x FEED	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	0.46	0.05	50	mg/L		11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/23/2009	300_W	R36304	16887-00-6	Chloride	3200	20	200	mg/L		11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/23/2009	300_W	R36304	14808-79-8	Sulfate	4300	100	200	mg/L		11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/24/2009	310.1_W	R36316		Alkalinity, T	1800	20	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/24/2009	310.1_W	R36316		Carbonate	< 2.0	2	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/24/2009	310.1_W	R36316		Bicarbonate	1800	20	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/25/2009	NH3_W	R36333	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/30/2009	TDS_W	20733	TDS	Total Dissc	12400	20	1	mg/L		11/19/2009
CDM	Sandoval	0911427-01A	RAW WAT	11/25/2009	TSS	20724		Suspended	27	10	1	mg/L		11/19/2009
CDM	Sandoval	0911427-01B	RAW WAT	11/23/2009	9060_W	R36299	7440-44-0	Total Orga	1.9	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-01C	RAW WAT	11/24/2009	200.7	R36313	7440-42-8	Boron	8.6	0.4	10	mg/L		11/19/2009
CDM	Sandoval	0911427-01C	RAW WAT	11/24/2009	200.7	R36313	7440-70-2	Calcium	420	10	10	mg/L		11/19/2009
CDM	Sandoval	0911427-01C	RAW WAT	11/24/2009	200.7	R36313	7439-95-4	Magnesium	87	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-01C	RAW WAT	11/24/2009	200.7	R36313	7631-86-9	Silica	29	1.6	10	mg/L		11/19/2009
CDM	Sandoval	0911427-01C	RAW WAT	11/24/2009	200.7	R36313	7440-23-5	Sodium	3400	100	100	mg/L		11/19/2009
CDM	Sandoval	0911427-01C	RAW WAT	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/19/2009
CDM	Sandoval	0911427-01C	RAW WAT	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	0.70	0.05	50	mg/L		11/19/2009
CDM	Sandoval	0911427-01D	RAW WAT	12/4/2009	SM7110C		12587-46-1	Gross Alph	47.8 +/- 9.9	2.32	1	pCi/L		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/23/2009	300_W	R36304	16887-00-6	Chloride	16000	200	2000	mg/L		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/23/2009	300_W	R36304	14808-79-8	Sulfate	23000	1000	2000	mg/L		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/24/2009	310.1_W	R36316		Alkalinity, T	14000	20	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/24/2009	310.1_W	R36316		Carbonate	9300	2	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/24/2009	310.1_W	R36316		Bicarbonate	4700	20	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/25/2009	NH3_W	R36333	7664-41-7	Ammonia	1.4	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/30/2009	TDS_W	20733	TDS	Total Dissc	73100	20	1	mg/L		11/19/2009
CDM	Sandoval	0911427-06A	RO Conc	11/25/2009	TSS	20724		Suspended	26	10	1	mg/L		11/19/2009
CDM	Sandoval	0911427-06B	RO Conc	11/24/2009	200.7	R36313	7440-42-8	Boron	39	2	50	mg/L		11/19/2009
CDM	Sandoval	0911427-06B	RO Conc	11/24/2009	200.7	R36313	7440-70-2	Calcium	< 50	50	50	mg/L	J	11/19/2009
CDM	Sandoval	0911427-06B	RO Conc	11/24/2009	200.7	R36313	7439-95-4	Magnesium	260	50	50	mg/L		11/19/2009
CDM	Sandoval	0911427-06B	RO Conc	11/24/2009	200.7	R36313	7631-86-9	Silica	44	8	50	mg/L		11/19/2009
CDM	Sandoval	0911427-06B	RO Conc	11/24/2009	200.7	R36313	7440-23-5	Sodium	21000	500	500	mg/L		11/19/2009
CDM	Sandoval	0911427-06B	RO Conc	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 2.5	2.5	50	mg/L		11/19/2009
CDM	Sandoval	0911427-06B	RO Conc	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	2.3	0.5	500	mg/L		11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/23/2009	300_W	R36304	16887-00-6	Chloride	3100	20	200	mg/L		11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/23/2009	300_W	R36304	14808-79-8	Sulfate	4200	100	200	mg/L		11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/24/2009	310.1_W	R36324		Alkalinity, T	2700	50	2.5	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/24/2009	310.1_W	R36324		Carbonate	1700	5	2.5	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/24/2009	310.1_W	R36324		Bicarbonate	990	50	2.5	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/25/2009	NH3_W	R36333	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/30/2009	TDS_W	20733	TDS	Total Dissc	13600	20	1	mg/L		11/19/2009
CDM	Sandoval	0911427-04A	RO FEED	11/25/2009	TSS	20724		Suspended	< 10	10	1	mg/L		11/19/2009
CDM	Sandoval	0911427-04B	RO FEED	12/1/2009	200.7	R36390	7440-42-8	Boron	8.0	0.4	10	mg/L		11/19/2009
CDM	Sandoval	0911427-04B	RO FEED	11/24/2009	200.7	R36313	7440-70-2	Calcium	2.4	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-04B	RO FEED	11/24/2009	200.7	R36313	7439-95-4	Magnesium	48	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-04B	RO FEED	11/24/2009	200.7	R36313	7631-86-9	Silica	8.5	0.16	1	mg/L		11/19/2009
CDM	Sandoval	0911427-04B	RO FEED	11/24/2009	200.7	R36313	7440-23-5	Sodium	4500	100	100	mg/L		11/19/2009
CDM	Sandoval	0911427-04B	RO FEED	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/19/2009
CDM	Sandoval	0911427-04B	RO FEED	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	0.45	0.05	50	mg/L		11/19/2009
CDM	Sandoval	0911427-04C	RO FEED	12/4/2009	SM7110C		12587-46-1	Gross Alph	1.01 +/- 1.3	2.63	1	pCi/L		11/19/2009
CDM	Sandoval	0911427-04D	RO FEED	12/8/2009	903.1		13982-63-3	Radium-22	0.252 +/- 0	0.779	1	pCi/L		11/19/2009
CDM	Sandoval	0911427-04D	RO FEED	12/9/2009	904		15262-20-1	Radium-22	0.538 +/- 0	0.785	1	pCi/L		11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/23/2009	300_W	R36304	16887-00-6	Chloride	44	2	20	mg/L		11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/23/2009	300_W	R36304	14808-79-8	Sulfate	7.8	0.5	1	mg/L		11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/24/2009	310.1_W	R36324		Alkalinity, T	25	20	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/24/2009	310.1_W	R36324		Carbonate	< 2.0	2	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/24/2009	310.1_W	R36324		Bicarbonate	25	20	1	mg/L CaCO3		11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/25/2009	NH3_W	R36333	7664-41-7	Ammonia	< 1.0	1	1	mg/L	J	11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/30/2009	TDS_W	20733	TDS	Total Dissc	122	20	1	mg/L		11/19/2009
CDM	Sandoval	0911427-05A	RO Produc	11/30/2009	TSS	20736		Suspended	< 20	20	1	mg/L		11/19/2009
CDM	Sandoval	0911427-05B	RO Produc	11/24/2009	200.7	R36313	7440-42-8	Boron	0.85	0.04	1	mg/L		11/19/2009
CDM	Sandoval	0911427-05B	RO Produc	11/24/2009	200.7	R36313	7440-70-2	Calcium	< 1.0	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-05B	RO Produc	11/24/2009	200.7	R36313	7439-95-4	Magnesium	< 1.0	1	1	mg/L	J	11/19/2009
CDM	Sandoval	0911427-05B	RO Produc	11/24/2009	200.7	R36313	7631-86-9	Silica	< 0.16	0.16	1	mg/L	J	11/19/2009
CDM	Sandoval	0911427-05B	RO Produc	11/24/2009	200.7	R36313	7440-23-5	Sodium	38	1	1	mg/L		11/19/2009
CDM	Sandoval	0911427-05B	RO Produc	11/24/2009	200.7	R36313	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L		11/19/2009
CDM	Sandoval	0911427-05B	RO Produc	11/24/2009	200.8_HAL	R36305	7440-38-2	Arsenic	< 0.0010	0.001	1	mg/L	J	11/19/2009
CDM	Sandoval	0911427-05C	RO Produc	12/2/2009	SM7110C		12587-46-1	Gross Alph	0.292 +/- 0	1.32	1	pCi/L		11/19/2009
CDM	Sandoval	0911427-05D	RO Produc	12/8/2009	903.1		13982-63-3	Radium-22	0.0845 +/-	0.622	1	pCi/L		11/19/2009
CDM	Sandoval	0911427-05D	RO Produc	12/7/2009	904		15262-20-1	Radium-22	0.583 +/- 0	0.921	1	pCi/L		11/19/2009
CDM	Sandoval	0911427-03A	SOFT PRC	11/23/2009	9060_W	R36299	7440-44-0	Total Orga	1.8	1	1	mg/L		11/19/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	Rslt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-39-3	Barium	0.037	0.01	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-41-7	Beryllium	< 0.010	0.01	5	mg/L	J	11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-42-8	Boron	8.4	0.4	10	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-43-9	Cadmium	< 0.010	0.01	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-70-2	Calcium	420	5	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/11/2009	200.7	R36526	7440-48-4	Cobalt	< 0.030	0.03	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-50-8	Copper	< 0.030	0.03	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7439-89-6	Iron	20	1	50	mg/L	*	11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7439-92-1	Lead	< 0.025	0.025	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7439-95-4	Magnesium	91	5	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-02-0	Nickel	< 0.050	0.05	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-22-4	Silver	< 0.025	0.025	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-62-2	Vanadium	< 0.25	0.25	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.7	R36418	7440-66-6	Zinc	< 0.050	0.05	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.8_HAL	R36417	7440-36-0	Antimony	< 0.0050	0.005	5	mg/L	J	11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.8_HAL	R36417	7440-38-2	Arsenic	0.37	0.05	50	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.8_HAL	R36417	7782-49-2	Selenium	0.035	0.005	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/3/2009	200.8_HAL	R36417	7440-28-0	Thallium	< 0.0050	0.005	5	mg/L		11/24/2009
CDM	Sandoval	C0911482-01A	Clarifer Prd	12/7/2009	245.1	20796	7439-97-6	Mercury	< 0.00020	0.0002	1	mg/L		11/24/2009
CDM	Sandoval	C0911482-01B	Clarifer Prd	12/8/2009	903.1		13982-63-3	Radium-22	24.1 +/- 5.2	0.798	1	pCi/L		11/24/2009
CDM	Sandoval	C0911482-01B	Clarifer Prd	12/7/2009	904		15262-20-1	Radium-22	4.31 +/- 1.1	0.989	1	pCi/L		11/24/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-39-3	Barium	0.031	0.01	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-41-7	Beryllium	< 0.010	0.01	5	mg/L	J	11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-42-8	Boron	8.6	0.4	10	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-43-9	Cadmium	< 0.010	0.01	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-70-2	Calcium	430	5	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/11/2009	200.7	R36526	7440-48-4	Cobalt	< 0.030	0.03	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-50-8	Copper	< 0.030	0.03	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7439-89-6	Iron	15	1	50	mg/L	*	11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7439-92-1	Lead	< 0.025	0.025	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7439-95-4	Magnesium	93	5	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-02-0	Nickel	< 0.050	0.05	5	mg/L	J	11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-22-4	Silver	< 0.025	0.025	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-62-2	Vanadium	< 0.25	0.25	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.7	R36418	7440-66-6	Zinc	< 0.050	0.05	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.8_HAL	R36417	7440-36-0	Antimony	< 0.0050	0.005	5	mg/L	J	11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.8_HAL	R36417	7440-38-2	Arsenic	0.18	0.005	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.8_HAL	R36417	7782-49-2	Selenium	0.038	0.005	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/3/2009	200.8_HAL	R36417	7440-28-0	Thallium	< 0.0050	0.005	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-02A	Settled	12/7/2009	245.1	20796	7439-97-6	Mercury	< 0.00020	0.0002	1	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-39-3	Barium	0.023	0.01	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-41-7	Beryllium	< 0.010	0.01	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-42-8	Boron	8.7	0.4	10	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-43-9	Cadmium	< 0.010	0.01	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-70-2	Calcium	330	5	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/11/2009	200.7	R36526	7440-48-4	Cobalt	< 0.030	0.03	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-50-8	Copper	< 0.030	0.03	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7439-89-6	Iron	2.1	0.1	5	mg/L	*	11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7439-92-1	Lead	< 0.025	0.025	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7439-95-4	Magnesium	120	5	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-02-0	Nickel	< 0.050	0.05	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-22-4	Silver	< 0.025	0.025	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-62-2	Vanadium	< 0.25	0.25	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.7	R36418	7440-66-6	Zinc	< 0.050	0.05	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.8_HAL	R36417	7440-36-0	Antimony	< 0.0050	0.005	5	mg/L	J	11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.8_HAL	R36417	7440-38-2	Arsenic	0.11	0.005	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.8_HAL	R36417	7782-49-2	Selenium	0.037	0.005	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/3/2009	200.8_HAL	R36417	7440-28-0	Thallium	< 0.0050	0.005	5	mg/L		11/22/2009
CDM	Sandoval	C0911482-03A	Filtered	12/7/2009	245.1	20796	7439-97-6	Mercury	< 0.00020	0.0002	1	mg/L		11/22/2009
	Sandoval	C0911482-03B	Filtered	12/8/2009	903.1		13982-63-3	Radium-22	8.41 +/- 2.4	1.05	1	pCi/L		11/22/2009
	Sandoval	C0911482-03B	Filtered	12/7/2009	904		15262-20-1	Radium-22	2.56 +/- 0.1	0.735	1	pCi/L		11/22/2009

ClientID	ProjectName	SampleID	ClientSample	AnalDate	TestCode	BatchID	CAS	Analyte	Rslt	PQL	DF	Units	Qual	CollectionDate
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-39-3	Barium	0.030	0.002	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-41-7	Beryllium	0.0033	0.002	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-42-8	Boron	9.1	0.4	10	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-43-9	Cadmium	< 0.0020	0.002	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-70-2	Calcium	440		5	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-48-4	Cobalt	< 0.0060	0.006	1	mg/L	J	11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-50-8	Copper	< 0.0060	0.006	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7439-89-6	Iron	25		1	50 mg/L	*	11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7439-92-1	Lead	< 0.0050	0.005	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7439-95-4	Magnesium	98		1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-02-0	Nickel	0.012	0.01	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-22-4	Silver	< 0.0050	0.005	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-62-2	Vanadium	< 0.050	0.05	1	mg/L	J	11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/12/2010	200.7	R36906	7440-66-6	Zinc	0.018	0.01	1	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/13/2010	200.8_HAL	R36927	7440-36-0	Antimony	< 0.0050	0.005	5	mg/L	J	11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/13/2010	200.8_HAL	R36927	7440-38-2	Arsenic	0.30	0.01	10	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/13/2010	200.8_HAL	R36927	7782-49-2	Selenium	0.033	0.005	5	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/13/2010	200.8_HAL	R36927	7440-28-0	Thallium	< 0.0050	0.005	5	mg/L		11/25/2009
CDM	Sandoval	1001009-01A	Clarifer Dis	1/14/2010	245.1	21125	7439-97-6	Mercury	< 0.00020	0.0002	1	mg/L	H	11/25/2009
CDM	Sandoval	1001009-01B	Clarifer Dis	1/12/2010	903.1		13982-63-3	Radium-22	24.3 ± 5.3	0.765	1	pCi/L		11/25/2009
CDM	Sandoval	1001009-01B	Clarifer Dis	1/12/2010	904.0		152262-20	Radium-22	0.513 ± 0.3	0.744	1	pCi/L		11/25/2009

Appendix B

Daily Data Log

*Note: Electronic daily data worksheet attached, which includes field logs transferred to electronic copy.
Handwritten data log sheets available upon request.*

Appendix C

RO System Manufacturer's Projections

Appendix C ROSA Projection Summary

Name	Feed	Adjusted Feed	Concentrate (mg/l as Ion)				Permeate (mg/l as Ion)				
			Stage 1	Stage 2	Stage 3	Stage 4	Stage 1	Stage 2	Stage 3	Stage 4	Total
NH4	0.7	0.7	1.41	1.76	2.71	3.21	0.05	0.06	0.07	0.37	0.07
K	130	130	265	333.0	519	621	5.53	3.8	4.03	43.92	7.12
Na	4900	5360	11088	13965	21807	26327	85.49	77.84	84.69	672.27	115.8
Mg	0.1	0.1	0.21	0.26	0.41	0.5	0	0	0	0	0
Ca	0.1	0.1	0.21	0.26	0.41	0.5	0	0	0	0	0
Sr	0.5	0.5	1.04	1.31	2.06	2.49	0	0	0	0.01	0
Ba	0.04	0.04	0.08	0.1	0.16	0.2	0	0	0	0	0
CO3	1200	1200	2529	3190	4988	5984	36.59	12.78	13.25	302.94	43.06
HCO3	1000	1000	1965	2466	3831	4588	47.33	37.54	42.87	326.25	61.11
NO3	0.05	0.05	0.09	0.11	0.16	0.18	0.01	0.02	0.02	0.06	0.02
Cl	3100	3100	6411	8069	12587	15189	50.44	65.95	71	424	76
F	4.8	4.8	9.9	12.46	19.41	23.39	0.1	0.13	0.14	0.81	0.15
SO4	4400	4400	9162	11552	18069	21910	13.73	16.15	18	110	20
SiO2	30	30	61.51	77.32	120.37	144.44	0.98	1.03	1.12	7.8	1.37
Boron	8.97	8.97	17.84	21.76	32.17	37.49	0.81	2.83	3.32	7.28	1.84
CO2	0.03	0.03	1.02	1.43	2.75	3.57	0.01	0.01	0.01	0.05	0.01
TDS	14821	15281	31599	39794	62132	75009	246.57	232.12	254.44	1930	336
pH	10.4	10.4	8.95	8.88	8.83	8.88	10.02	9.67	9.62	9.83	9.95

Reverse Osmosis System Analysis for FILMTEC™ Membranes
 Project: Sandoval County High TDS Deep Well
 Doug Brown, CDM, Inc.

ROSA v6.1.5 ConfigDB U238786_55
 Case: 1
 10/28/2009

Project Information: Raw water source is a deep high TDS well that is approximately 50C before cooling and has 13,000 mg/L TDS and 1500 mg/L of hardness before softening. The proposed pre-treatment process is lime softening followed by weak acid cation exchange to reduce hardness and polyvalent cations to non-detect levels. This will allow operation at silica concentrations of 2-3 times the theoretical saturation limits.

System Details

Feed Flow to Stage 1	15.00 gpm	Pass 1 Permeate Flow	12.00 gpm	Osmotic Pressure:	
Raw Water Flow to System	15.00 gpm	Pass 1 Recovery	79.99 %	Feed	128.94 psig
Feed Pressure	494.05 psig	Feed Temperature	30.0 C	Concentrate	653.23 psig
Fouling Factor	0.85	Feed TDS	15281.80 mg/l	Average	391.09 psig
Chem. Dose	None	Number of Elements	22	Average NDP	238.82 psig
Total Active Area	1488.00 ft²	Average Pass 1 Flux	11.61 gfd	Power	4.96 kW
Water Classification: RO Permeate SDI < 1				Specific Energy	6.89 kWh/kgal

Stage	Element	#PV	#Ele	Feed Flow (gpm)	Feed Press (psig)	Recirc Flow (gpm)	Conc Flow (gpm)	Conc Press (psig)	Perm Flow (gpm)	Avg Flux (gfd)	Perm Press (psig)	Boost Press (psig)	Perm TDS (mg/l)
1	SW30-4040	2	4	15.00	489.05	0.00	7.19	480.66	7.81	17.57	40.00	0.00	246.57
2	SW30HRLE-4040	1	4	7.19	475.66	0.00	5.70	463.93	1.49	6.31	40.00	0.00	232.12
3	SW30HRLE-4040	1	4	5.70	758.93	0.00	3.64	751.65	2.06	8.72	100.00	300.00	254.44
4	SW30-2540	1	6	3.64	746.65	0.00	3.00	718.52	0.64	5.50	40.00	0.00	1930.79

Pass Streams (mg/l as Ion)											
Name	Feed	Adjusted Feed	Concentrate				Permeate				
			Stage 1	Stage 2	Stage 3	Stage 4	Stage 1	Stage 2	Stage 3	Stage 4	Total
NH4	0.70	0.70	1.41	1.76	2.71	3.21	0.05	0.06	0.07	0.37	0.07
K	130.00	130.00	265.16	333.44	519.53	621.27	5.53	3.80	4.03	43.92	7.12
Na	4900.00	5360.55	11088.66	13965.39	21807.11	26327.85	85.49	77.84	84.69	672.27	115.80
Mg	0.10	0.10	0.21	0.26	0.41	0.50	0.00	0.00	0.00	0.00	0.00
Ca	0.10	0.10	0.21	0.26	0.41	0.50	0.00	0.00	0.00	0.00	0.00
Sr	0.50	0.50	1.04	1.31	2.06	2.49	0.00	0.00	0.00	0.01	0.00
Ba	0.04	0.04	0.08	0.10	0.16	0.20	0.00	0.00	0.00	0.00	0.00
CO3	1200.19	1200.19	2529.93	3190.69	4988.94	5984.00	36.59	12.78	13.25	302.94	43.06
HCO3	1000.00	1000.00	1965.82	2466.23	3831.32	4588.12	47.33	37.54	42.87	326.25	61.11
NO3	0.05	0.05	0.09	0.11	0.16	0.18	0.01	0.02	0.02	0.06	0.02
Cl	3100.00	3100.00	6411.47	8069.32	12587.88	15189.74	50.44	65.95	71.00	423.93	75.88
F	4.80	4.80	9.90	12.46	19.41	23.39	0.10	0.13	0.14	0.81	0.15
SO4	4400.00	4400.00	9162.99	11552.73	18069.27	21910.70	13.73	16.15	17.75	110.20	19.88
SiO2	30.00	30.00	61.51	77.32	120.37	144.44	0.98	1.03	1.12	7.80	1.37
Boron	8.97	8.97	17.84	21.76	32.17	37.49	0.81	2.83	3.32	7.28	1.84
CO2	0.03	0.03	1.02	1.43	2.75	3.57	0.01	0.01	0.01	0.05	0.01
TDS	14821.25	15281.80	31599.74	39794.91	62132.39	75009.39	246.57	232.12	254.44	1930.79	336.33
pH	10.40	10.40	8.95	8.88	8.83	8.88	10.02	9.67	9.62	9.83	9.95

Permeate Flux reported by ROSA is calculated based on ACTIVE membrane area. DISCLAIMER: NO WARRANTY, EXPRESSED OR IMPLIED, AND NO WARRANTY OF MERCHANTABILITY OR FITNESS, IS GIVEN. Neither FilmTec Corporation nor The Dow Chemical Company assume liability for results obtained or damages incurred from the application of this information. FilmTec Corporation and The Dow Chemical Company assume no liability, if, as a result of customer's use of the ROSA membrane design software, the customer should be sued for alleged infringement of any patent not owned or controlled by the FilmTec Corporation nor The Dow Chemical Company.

Reverse Osmosis System Analysis for FILMTEC™ Membranes
 Project: Sandoval County High TDS Deep Well
 Doug Brown, CDM, Inc.

ROSA v6.1.5 ConfigDB U238786_55
 Case: 1
 10/28/2009

Design Warnings

-None-

Solubility Warnings

Langelier Saturation Index > 0

BaSO4 (% Saturation) > 100%

Antiscalants may be required. Consult your antiscalant manufacturer for dosing and maximum allowable system recovery.

Stage Details

Stage 1 Element Recovery		Perm Flow (gpm)	Perm TDS (mg/l)	Feed Flow (gpm)	Feed TDS (mg/l)	Feed Press (psig)
1	0.17	1.24	149.21	7.50	15281.80	489.05
2	0.17	1.08	205.68	6.26	18281.00	486.08
3	0.17	0.89	290.84	5.18	22035.05	483.79
4	0.16	0.70	426.96	4.29	26543.26	482.02
Stage 2 Element Recovery		Perm Flow (gpm)	Perm TDS (mg/l)	Feed Flow (gpm)	Feed TDS (mg/l)	Feed Press (psig)
1	0.07	0.47	172.00	7.19	31599.74	475.66
2	0.06	0.40	211.54	6.72	33797.59	472.35
3	0.05	0.34	261.97	6.32	35929.92	469.32
4	0.05	0.28	326.23	5.98	37943.52	466.53
Stage 3 Element Recovery		Perm Flow (gpm)	Perm TDS (mg/l)	Feed Flow (gpm)	Feed TDS (mg/l)	Feed Press (psig)
1	0.13	0.74	155.23	5.70	39794.91	758.93
2	0.12	0.58	220.21	4.96	45740.51	756.63
3	0.10	0.43	318.85	4.38	51737.71	754.72
4	0.08	0.31	468.00	3.95	57323.64	753.09
Stage 4 Element Recovery		Perm Flow (gpm)	Perm TDS (mg/l)	Feed Flow (gpm)	Feed TDS (mg/l)	Feed Press (psig)
1	0.05	0.17	1193.85	3.64	62132.39	746.65
2	0.04	0.14	1494.20	3.47	65085.27	741.36
3	0.03	0.11	1864.36	3.34	67695.35	736.38
4	0.03	0.09	2280.28	3.23	69962.63	731.65
5	0.02	0.07	2848.21	3.14	71941.24	727.12
6	0.02	0.06	3452.22	3.06	73597.19	722.75

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Scaling Calculations

	Raw Water	Adjusted Feed	Concentrate
pH	10.40	10.40	8.88
Langelier Saturation Index	0.83	0.83	0.63
Stiff & Davis Stability Index	0.17	0.17	-0.61
Ionic Strength (Molal)	0.30	0.31	1.61
TDS (mg/l)	14821.25	15281.80	75009.39
HCO ₃	1000.00	1000.00	4588.12
CO ₂	0.03	0.03	3.57
CO ₃	1200.19	1200.19	5984.00
CaSO ₄ (% Saturation)	0.02	0.02	0.11
BaSO ₄ (% Saturation)	481.29	481.29	3031.35
SrSO ₄ (% Saturation)	3.19	3.19	25.92
CaF ₂ (% Saturation)	0.31	0.31	36.35
SiO ₂ (% Saturation)	4.77	4.77	57.64
Mg(OH) ₂ (% Saturation)	2.16	2.16	0.01

To balance: 460.55 mg/l Na added to feed.