APPENDIX 4-S KSM PROJECT HDS PILOT PLANT



An Investigation into

KSM PROJECT HDS PILOT PLANT

prepared for

SEABRIDGE GOLD

Project 1298 – Final Report January 11, 2013

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Executive Summary

SGS was requested by Rescan Environmental to conduct a high density sludge process pilot plant study for lime neutralization of ARD solution. The pilot plant test work was initiated to allow the determination of optimum operating conditions for the high density sludge (HDS) process to produce acceptable quality effluent and minimize reagent consumption. In addition, it was essential to obtain high density sludge and determine the ultimate sludge density that can be achieved with an HDS process. Standard HDS design was adopted with neutralization using lime in two reactor tanks followed by solid/liquid separation in a conventional clarifier. During the pilot program, the sludge density was consistently increasing with a maximum sludge density of 19% solids. Typically, HDS pilot plants are operated for a minimum of three weeks so all the transitional sludge (combination of low density and high density) is converted to high density and the underflow density tends to level off; however, for the KSM pilot plant the density continued to increase as the pilot plant was terminated after the 9th day of operation due to lack of feed water. Based on experience of similar projects, the sludge density in large scale plants is expected to be above 25% solids in the clarifier underflow. In general, due to high compression zone in the industrial plant, the sludge density is higher than what is experienced during pilot plant trials. The pilot plant clarifier was operated with a sludge bed depth of less than 4 inches which did not allow sufficient retention time or compression for the sludge to release water.

Several operating parameters such as pH, sludge recycle rates and retention times were tested to optimize the operating conditions. Two operating pH values of 9.5 and 10.5 were tested. Most metals of concern were within the discharge limit with the exception of aluminum which was high at 11 mg/L when operated at a pH above 9.0. However, the clarifier overflow was acidified to pH 7.5 using 1N H_2SO_4 and the dissolved aluminum concentration after acidification was below 0.145 mg/L.

Three retention times were also tested and ranged from 40 to 90 minutes in both reactor tanks. Longer retention time did not significantly impact the metal concentrations in the effluent; however, a slight improvement in metal concentration was observed with longer retention time. The aluminum concentration after 90 minutes was still high at 2.3 mg/L and required pH adjustment to the clarifier overflow.

Observed lime consumption in the pilot study with a 90 minute retention time and pH 10.5 with an underflow recycle ratio of approximately 35:1 was 0.83 kg/m3. In a typical HDS plant with similar solids loading, polymer addition rate is usually between 1.0-1.5 mg/L and the expected TSS in the clarifier overflow could be below 10 mg/L with rise rate of 1.0 m/hr or lower in the clarifier. Measurements of TSS from the small clarified were in the 8 to 12 mg/l range.

Based on the results of the pilot plant trials a full scale HDS system using lime neutralization to treat ARD should provide effluent with low metal concentrations and produce a sludge density of 25% solids or higher. However, the clarifier overflow should go through a pH adjustment stage prior to discharge. Although an industrial plant retention time of 40 minutes is sufficient, safety should be included within the design and a longer retention time of 60 minutes is recommended which should improve lime utilization.

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Introduction

Seabridge Gold Inc's KSM project is a proposed gold/copper mine located near the town of Stewart, British Columbia. The project is currently undergoing an environmental assessment and as part of this phase is exploring options for treating acid rock drainage (ARD). SGS Canada Inc. (SGS) was tasked by Rescan Environmental Services Ltd. (Rescan) to conduct a pilot-scale program of the high density sludge (HDS) process for treatment of ARD.

The predicted water quality indicates the proposed ARD for the KSM project will contain elevated levels of iron, arsenic, copper, zinc, and various other metals. Due to the high predicted iron concentration, any neutralization using lime will result in very high volume of sludge. Therefore, based on past experience with similar feed types, an HDS circuit was recommended as the most suitable process to achieve acceptable effluent water quality and maximize sludge density.

The pilot plant testing was carried out to demonstrate the effectiveness of the HDS process for the removal of dissolved metals (specifically Fe, Cu, Zn, As, Se and Hg) and other constituents from the ARD solution and determine design parameters such as operating pH, retention time and sludge density for the treatment plant. Previous bench-scale testing, conducted by SGS for the KSM Project, had indicated that neutralization to pH 10.5 would be sufficient to precipitate iron and other metals of concern to below the target discharge level. As a result the operating pH was maintained at 10.5 for most of the pilot campaign; however, several retention times were tested in order to determine the impact of retention time on effluent quality.

The study was carried out at the SGS Burnaby, BC facility and operated continuously (24 hours per day) beginning October 20, 2012 and completing October 29, 2012. This report provides the fundamentals of the HDS process describing the experimental approach, equipment and provides the experimental results, interpretation and conclusions. The test data, graphs and analytical results from the experiments are provided in the appendices.

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Testwork Summary

1. Project Objective

A pilot plant study was undertaken to optimize conditions for operating a High Density Sludge Plant for the treatment of acid rock drainage and review the expected effect of the HDS process on selenium ions. The pilot plant study determined the impact of iron and acid concentration on the process, operating parameters, agitation, and reagent requirements. The effluent quality and sludge density characteristics are critical in order to determine settling/thickening rate and filtering to size the clarifier. Success of the project was based upon a predetermined set of performance guidelines regarding effluent quality and sludge density as discussed by SGS and Rescan,

- Produce an effluent which would meet discharge target levels in both suspended solids and dissolved metals (water quality)
- Determine the optimum pH and reaction time for oxidation of dissolved iron and metals removal
- Determine the maximum percent solids in the clarifier underflow with lime neutralization
- Determine the recycle ratio, which results in sufficient sludge density; minimize gypsum scale build up on equipment, and minimal reagent consumption
- Generation of data to establish Process Optimization and operating parameters

1.1. Background

The test program was designed for continuous (24 hours/day) pilot plant operation. Commercial grade hydrated lime was used for neutralization and determining the lime requirements. The main indicators that were used during the pilot scale testing to evaluate treatment efficiency were the effluent water quality and density (or specific gravity) of the clarifier underflow sludge. The primary focus was the reduction of iron, copper, aluminum, manganese, selenium, zinc, arsenic, mercury and TSS concentrations in the effluent as the clarifier overflow was further tested for toxicity.

Based on SGS experience with HDS systems and batch test results, conducted during October 2011, the pilot plant commissioning operating pH of 10.5 was selected. The recycle ratio was set very high (about 30:1 dry basis) during the commissioning phase (~96 hrs) while a circulating load of sludge inventory was built up in the system. The recycle ratio was varied during the pilot study from 15:1 to 35:1 in order to determine the impact of low recycle rate on reagent consumption and effluent quality. The retention time was also varied from 40 to 90 minutes during the pilot plant trial to develop an understanding for the influence of residence time on effluent quality.

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During commissioning, the target operating pH in Reactor #1 was maintained at 10.5 and was adjusted with a pH controller that pumped hydrated lime slurry prepared at 15% solids to maintain the set pH within +/- 0.1 pH units.

1.2. The HDS Process

The effective removal of base metals in a chemically stable form in the HDS process is achieved by co-precipitation with iron on the surfaces of the recycled sludge particles. The chemical stability of the precipitates is favourably influenced by a high iron to total metals ratio in the treatment plant feed. A simple recycle is sometimes not sufficient to change metal ratios and in extreme examples, iron may have to be added. Otherwise, the storage site for the sludge produced must allow for the possibility of long term instability. In all cases, the oxidation of ferrous iron to ferric iron is the principal oxygen-consuming reaction, and oxygen mass transfer into solution is the rate controlling reaction influencing reactor tank sizing. Oxygen transfer should be closely considered during agitator design.

Designed plant throughput is also influenced by the volume of water to be treated. For example, seasonal changes will determine variations in run-off, much of which may have to be treated. Increased flow may be accompanied by a dilution of contaminants, both acid and metal, and the resulting plant influent may require reduced oxidation and/or residence time, thus compensating for the increased flow.

The near-complete precipitation of the metals as hydroxides in the neutralization process proceeds according to the following reactions:

Equation 1: $M^{++} + SO_4^{=} + Ca^{++} + 2(OH)^{-} + 2H_2O \rightarrow M(OH)_2 + CaSO_4 \bullet 2H_2O$ Equation 2: $2M^{+++} + 3(SO_4)^{=} + 3Ca^{++} + 6(OH)^{-} + 6H_2O \rightarrow 2M(OH)_3 + 3CaSO_4 \bullet 2H_2O$

As implied by the equations above, the products of these reactions are metal hydroxide precipitates and calcium sulphate (gypsum). If the sulphate concentration of the wastewater is high enough, there will be sufficient gypsum produced to exceed its solubility and it will precipitate with the sludge.

The main features of the HDS process can be summarized as follows: hydrated lime and recycled sludge are added to the lime-sludge mix tank at the head of the process, providing the main neutralization agent. This mixture is discharged to the rapid mix tank where it is mixed with influent, thereby achieving neutralization. This mixture is fed to the main lime reactor where a combination of aggressive aeration and high shear agitation ensures optimum process chemistry and subsequent clarifier performance. The discharge from the lime reactor is treated with flocculent in the flocculation tank. In the final step, the clarifier separates the treated effluent from the sludge, a portion of which is recycled to the head of the process.

The HDS process is normally run at a pH greater than 9.5, as most metals encountered will precipitate at or below this concentration of hydroxide ions. Oxidation of ferrous to ferric iron takes place rapidly at this pH, with air being the most common oxidizing agent.

For efficiency, the process relies on sludge recycle from a treated effluent. In most plants this is achieved through a unit operation similar to a thickener/clarifier which provides sludge that has the ability to pump underflow as the separated solids product. Recycling sludge from a settling pond or from filters are alternatives but they may present handling problems.

2. Pilot Plant Trial

A pilot plant program was established to determine HDS water treatment effluent quality and to provide plant optimization criteria for the HDS treatment plant. The testwork was designed to confirm the effectiveness of an HDS process utilizing lime at operating pH of 10.5. Acid rock drainage solution was collected on site and shipped to the SGS facility located in Burnaby, BC for the pilot study. The solution was spiked according to the composition provided by Rescan to generate synthetic feed solution that would simulate the predicted ARD water quality. The quality control on the feed solution was provided by Rescan.

2.1. Synthetic Feed Preparation

Two 5,000L batches of the synthetic solution were prepared according to the composition provided by Rescan and indicated in Table 1. After the reagents were added and allowed to mix for a minimum of 6 hours, three profile samples (bottom, middle and top of the tank) of the 5,000L tank were obtained to ensure that the solution was homogenous and the water quality was similar to the predicted water quality outlined by Table 1.

Acid rock drainage water collection and delivery to SGS was the responsibility of Rescan. The ARD water was then split into two 5,000L batches and spiked using laboratory grade reagents as summarized in Table 1. Water for the testwork was collected from the upper Mitchell Creek below the toe of the Mitchell Glacier. An agitator was mounted on top of the 5,000L tank as well as a re-circulating loop was pumped at 8 gallons per minute to properly recycle the solution and provide a consistent feed to the plant. After 24 hours of mixing, three samples from top, middle and bottom of the tank were collected and submitted for analysis to assure homogeneity of each feed solution. The results are provided in Appendix H. After processing 3,500L of Batch #1, the remaining water was transferred into two 1m³ totes, and the second batch was prepared to avoid any interruption during piloting.

Table 1: Synthetic Feed Composition (mg/L)

	Mitchell Creek	Predicted Water			
	Water	Quality	Added As	Batch-1	Batch-2
рН	3.09	2.6		2.79	2.73
Aluminum	6.89	35	Al2SO4*18H2O	34.4	34.1
Antimony	<0.00010	0.005	AA Standard	0.0009	0.0018
Arsenic	0.00044	0.162	AA Standard	0.129	0.153
Barium	0.0368	0.015	•	0.091	0.0975
Beryllium	0.00206	0.02	-	0.00277	0.0187
Boron	<0.010	0.05	•	<0.020	<0.05
Cadmium	0.0207	0.0314	3CdSO4*8H2O	0.0446	0.0418
Calcium	30.4	150	•	54.3	165
Chromium	0.00039	0.02	Cr K(SO4)2*12H2O	0.0242	0.0224
Cobalt	0.0217	0.45	CoSO4*7H2O	0.487	0.518
Copper	2.45	25	CuSO4*5H2O	20.6	24.9
Iron	13.9	300	Fe2(SO4)3*XH2O	234	257
Lead	0.0247	0.04	Pb(NO3)2	0.038	0.034
Lithium	0.00840	0.038	ı	0.012	0.012
Magnesium	4.99	17.2	MgSO4	24	24.8
Manganese	2.29	15	MnSO4*H2O	13.8	16.6
Mercury	<0.000010	0.00005	AA Standard	2.5E-05	3.3E-05
Molybdenum	<0.000050	0.23	MoS2	0.151	0.0135
Nickel	0.00774	0.147	NiSO4*6H2O	0.188	0.196
Phosphorous	< 0.30	20	-	<0.3	<0.3
Potassium	0.526	1.8	K2SO4	1.76	1.94
Selenium	0.00054	0.120	Se(VI) Std. plus Se(IV)	0.128	0.13
Silver	0.000031	0.005	AgNO3	0.0044	0.00485
Sodium	<2.0	4.1	Na2SO4	5.8	4.17
Strontium	0.246	0.8	SrCl2*6H2O	0.737	0.804
Zinc	1.37	3.2	ZnSO4*7H2O	3.64	3.52
Sulphate	222	1850	CaSO4	1170	1540

3. Lime Preparation

The lime used for testing was commercial grade with specifications shown in Table 2.

Table 2: Lime Specifications

Product Specs	%Mg	%CaO	Ca(OH) ₂ Equivalent
Hydrated Lime	1	70.6	93.3

The lime slurry was prepared at 10% solids (w/v) using tap water. There are three different sources for tap water in Burnaby; the average water quality of those water sources is illustrated in Appendix A. To

prepare 10% lime solution, 1.5 kg of lime was mixed with water in a 20L pail to produce 15L batches and transferred to the lime stock tank.

4. Flocculent Preparation

Flocculent (Magnafloc-10) was prepared at 0.25 g/L, using tap water. In order to prepare flocculent solution, a vortex was initially generated using a variable speed mixer in a 20L batch of water to which 5 grams of flocculent was slowly introduced into the vortex. After the addition, the solution was stirred gently for 60 to 120 minutes to completely dissolve the flocculent in the water.

5. Pilot Plant Setup

The pilot plant was set up in a standard HDS configuration. The pilot plant consisted of:

- One 0.6L Lime/Recycled sludge mix tank;
- Two 24L reactor tanks equipped with a dual impeller;
- One 1.5L flocculent mix tank with a variable speed agitator;
- One 20L lime slurry feed tank;
- 16 inch diameter clarifier providing a 3-4 hour retention time for solid/liquid separation.

As shown in Figure 2, monitors and controls were mounted on a panel behind the equipment. The feed water was pumped from a 5,000L holding tank into Reactor #1 using a variable speed peristaltic pump; the influent flow rate was maintained at a set flow rate (~750 ml/min with a 60 min retention time) to achieve the desired residence time. Lime slurry and recycled sludge were mixed vigorously in the lime/sludge mix tank, and the mixture overflowed into Reactor #1. Lime addition was controlled to maintain a pH set point in Reactor #1. The reactors were positioned in a cascade which allowed Reactor #1 overflow to gravity feed Reactor #2 and subsequently overflowed to the flocculation tank. Each reactor was equipped with a variable speed agitator and dual A310 hydrofoil impellers.

A two-reactor system was used to minimize solution short-circuiting. Although based on analysis results, which are discussed in greater detail in the following section, overflow from Reactor #1 was almost completely oxidized and metals concentration was reaching the discharge limit. As a result, 30 minutes of retention time (controlled by feeds flow rate) was sufficient to meet the discharge limit.

Air (5 L/min) was sparged into the reactors below the impeller. The flocculent solution was added into the flocculent tank using a variable speed peristaltic pump. The slurry from the flocculation tank overflowed into the clarifier feed well located in the centre of the clarifier. The clarifier overflowed into an effluent collection weir and discharged through a hose for disposal. The precipitated solids settled to the bottom

of the clarifier, forming a sludge bed. The settled sludge was recycled to the lime/sludge mix tank using a variable speed peristaltic pump or discharged from the system using the sludge purge pump. Sludge purge rate was manually controlled to maintain a constant sludge bed level height in the clarifier.

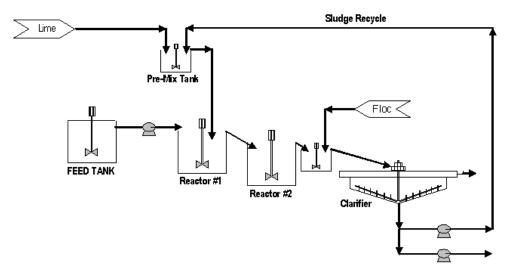


Figure 1: HDS Pilot Plant Flowsheet



Figure 2: HDS Pilot Plant

6. Process Control and Monitoring

To determine the process effectiveness and provide preliminary effluent quality information, operating parameters such as feed, flocculent and recycle flow rats as well as pH of each reactor and clarifier were measured regularly at 2 hour intervals and samples were collected for analysis at established 12 hour intervals. In addition, all pilot plant observations were recorded in a project logbook. The operator starting the shift reviewed the comments from the previous shift and made adjustments accordingly. The pilot plant project manager also reviewed the logbook and the data sheets on regular basis.

Measurements included: influent, sludge recycle, lime slurry, flocculent solution flow rates, and reactors, clarifier, and influent pH. Flowrate measurements were used to determine the residence time and lime and flocculent consumption during the testing program. The following paragraphs describe the measurement and test procedures.

6.1. Flowrate Measurement

The feed flowrate, sludge recycle and flocculent were controlled by changing the pumps speed. The influent feed, sludge recycle and flocculent addition flowrate measurements were made using a stopwatch and a graduated cylinder.

6.2. pH Measurement

The pH of each reactor vessel and the clarifier overflow were measured and recorded every two hours. The probes connected to the pH controllers were acid cleaned and calibrated with standardized pH buffers every 4 hours.

7. Process Samples

7.1. Effluent Water Samples

Reactor slurry samples and effluent water samples were collected once per shift (every 12 hours) for analysis. The solution samples were submitted to ALS Environmental (as requested by the Rescan) for dissolved and total ICP-MS, anions, nutrients, TDS and TSS analysis.

7.2. Sludge and Filter Cake Samples

A sample of underflow sludge were collected and dried once per day to determine the % solids. Towards the end of the pilot campaign, 5L of the High Density Sludge was shipped to Delkor for filtration testwork. The filtered cake was then submitted for TCLP, modified SWEP and total digestion. Two cake thicknesses of 20 mm and 40 mm were tested and as was expected, the results indicated that a filter

cake with 60% to 62% moisture can be produced after filtration. Detailed results of the filtration test are provided in Appendix G.

8. Auxiliary Bench Testing

8.1. Settling Tests

Several settling tests were conducted for each test run by collecting a 1.0L sample from Reactor #2 overflow. An appropriate amount of flocculent was added. The slurry was mixed by inverting a 1.0L graduated cylinder end to end five times, then allowed to settle. The interfacial height between the slurry and the overflow was recorded every minute for the first 10 minutes, and after regular intervals up to 180 minutes. Then the slurry was filtered to separate water from solid. The filter paper and solid were kept for 24 hours in a low temperature oven before measuring the weight of dry solid. Another purpose of settling tests was to observe the overflow clarity for sizing the clarifier.

8.2. Solids Generation Tests

Solids generation tests were performed at each new operating condition to determine the amount of solids generated per litre of feed. A 1.0L sample of feed solution was subjected to the optimum test conditions (pH=10.5, 60 minutes retention time and no recycle) to precipitate the dissolved metals. Flocculent was added and the solids were allowed to settle. The clear overflow was decanted and the settled sludge was filtered. The filter cake was dried for a minimum of 24 hours before weighing. The solids generated were used to set the sludge recycle rate as mentioned above.

8.3. Sulphide Precipitation Tests

Since many metal sulphides are insoluble, in some case converting heavy metals to sulphide salts would increase the overall efficiency of the treatment process. To review this option SGS conducted scoping level sulphide addition beaker tests (500mL sample) to treat ARD solution.

The pH of 500mL feed water in three different beakers; #1, #2 and #3 were adjusted using sulphuric acid to pH 4.0, 4.0, and 5.5. Following this 50 mL of 1g/L sulphide was added to each beaker and allowed the solutions to react for 30 minutes. Solution of beaker #1 (at pH 4.0) was sampled for dissolved analysis and pH of the solution in beakers #2 (pH 4.0) and #3 (pH 5.5) was adjusted to 10.5 using hydrated lime. Typically, to assist with the settling of the fine sulphide precipitate, iron should be added before pH adjustment by lime; however, due to the naturally high concentration of iron in the KSM feed no iron was added. After treatment, flocculent at 2 mg/L was added and solution was allowed to settle for 60 minutes before the clear overflow was decanted from the top for analysis. To compare the results of those tests with HDS process, the feed water was treated in another beaker (#4) at pH 10.5 with HDS procedure and treated water sample was sent for dissolve analysis.

Results and Discussion

The following will provide an overview of results from process measurements, tests, and sample analysis produced from the pilot plant study. The complete details are provided in Appendices. All process irregularities and observations were noted in the project data book.

1. Process Measurements and Tests

The results of measurements and tests performed are provided in Appendix A and summarized below in Table 7 and Table 9. Influent and effluent samples from each test were submitted for ICP-MS, anions, nutrients, TDS and TSS. Detailed effluent results are presented in Appendix B. Overall, four different operating conditions; 90 minutes retention time at 10.5 pH (#1A), 60 minutes retention time at 9.5 pH (#2A), 60 minutes retention time at 10.5 pH (#3A), and 40 minutes retention time at 10.5 pH (#4A), were tested in the pilot plant. Discussion of the test results and the implications of the results on process effectiveness and design follow below.

1.1. Optimization of pH

Samples for metals ICP analysis were collected every 12 hours and submitted to ALS Environmental in Vancouver; detailed results are shown in Appendix B. The feed was neutralized to pH 9.5 and 10.5 with 60 minute retention time using hydrated lime and the results for clarifier overflow samples collected are summarized in Table 3 below. Since water (pH 2.54) from the second spiked tank was used for the last three tests, the feed quality was consistence for all discussed tests.

Table 3: Clarifier Overflow Analysis Summary for pH Optimization Tests (mg/L)

Dissolved Metals	Feed	Test #2A	Test #3A
Dissolved Metals	reed	pH 9.6	pH 10.5
Lab pH		8.36	9.84
Aluminum (AI)-Dissolved	31.3	2.13	2.13
Antimony (Sb)-Dissolved	0.00077	<0.00050	<0.00050
Arsenic (As)-Dissolved	0.130	<0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0910	0.0236	0.0173
Beryllium (Be)-Dissolved	0.0193	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.0025	< 0.0025	< 0.0025
Boron (B)-Dissolved	<0.050	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.0402	0.000065	0.000085
Calcium (Ca)-Dissolved	162	626	482
Chromium (Cr)-Dissolved	0.0209	0.00418	0.00517
Cobalt (Co)-Dissolved	0.496	0.00064	<0.00050
Copper (Cu)-Dissolved	23.6	0.0032	0.0042
Iron (Fe)-Dissolved	235	<0.050	0.051
Lead (Pb)-Dissolved	0.0391	<0.00025	<0.00025
Lithium (Li)-Dissolved	0.0133	0.0112	0.0047
Magnesium (Mg)-Dissolved	24.9	18.2	1.11
Manganese (Mn)-Dissolved	15.6	0.116	0.00261
Mercury (Hg)-Dissolved	0.000042	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0146	0.0241	0.0234
Nickel (Ni)-Dissolved	0.189	<0.0025	<0.0025
Phosphorus (P)-Dissolved	< 0.30	<0.30	< 0.30
Potassium (K)-Dissolved	1.88	1.92	1.87
Selenium (Se)-Dissolved	0.119	0.0628	0.0635
Silicon (Si)-Dissolved	6.73	0.063	0.149
Silver (Ag)-Dissolved	0.00523	<0.000050	<0.000050
Sodium (Na)-Dissolved	3.96	4.26	4.18
Strontium (Sr)-Dissolved	0.894	0.905	0.801
Thallium (TI)-Dissolved	0.000149	0.000067	<0.000050
Tin (Sn)-Dissolved	<0.00050	<0.00050	<0.00050
Titanium (Ti)-Dissolved	0.96	0.012	<0.010
Uranium (U)-Dissolved	0.00236	<0.000050	<0.000050
Vanadium (V)-Dissolved	0.0072	<0.0050	<0.0050
Zinc (Zn)-Dissolved	3.42	<0.0050	<0.0050
Sulphate	1540	1630	1130

As shown in Table 3, most of metals of concern were removed to below the BC discharge limit, while aluminum concentration remained high at both pH values tested. Also, as expected, manganese concentration was much higher in Test #2A at pH 9.5 compared to Test #3A at pH 10.5. A similar trend was observed for several other elements including lithium, cobalt, and magnesium with better removal efficiencies at higher pH. On the other hand, pH did not seem to have any impact on removal efficiencies of several key parameters including arsenic, cadmium, copper, selenium and zinc which is most likely due to high iron to total metals ratio. Molybdenum concentration increased after HDS treatment for both pH levels tested. The change in molybdenum concentration might be due to elevated pH which facilitates dissolving more MoS₂ to the treated water. Molybdenum is typically removed at low pH (around 4.0) with high iron to molybdenum ratio (similar to Brenda mine); however, the produced sludge from this process is very unstable and small increases in pH could dissociate the sludge and return molybdenum into the solution. That phenomenon could explain why the molybdenum concentration in treated water was higher than the original molybdenum concentration.

The observed removal efficiency for selenium was approximately 47%. Based on SGS previous experiences it was expected that HDS would have no significant effect on removing selenium (VI). Since 50% of the feed solution was selenium (IV), the removal efficiency could be considered primarily for selenium (IV). To confirm the type of removed selenium, samples of treated water were submitted for selenium speciation. The results are as follows:

Table 4: Selenium Speciation Results from Pilot Plant Effluent

		μg/L	μg/L
Location	Sample	Se (IV)	Se (VI)
Pilot plant	Effluent	9.1	63.5
Pilot plant	Effluent	9.7	66.5
Average	Effluent	9.4	65

As illustrated in table 5, the total selenium removal efficiency is more than 38 %

Table 5: Total Selenium Removal

Initial Selenium (mg/L)	Final Selenium (mg/l)	% removal
0.12084	0.0744	38.43

As ICP results indicated, in all conducted tests the mercury concentration dropped down below detection limit. Therefore, it was concluded that HDS process could successfully remove mercury to below discharge limit without any future treatment.

For treatment at either pH 9.5 or 10.5, clarifier overflow solution would need to be acidified to pH 7.5-8.0 in order to precipitate aluminum. As shown in Table 6 above, a pH drop was observed between the field pH and lab pH indicating that pH may drop naturally. In any case, proper clarifier operation becomes extremely critical since any suspended solids in the clarifier overflow would dissolve back into solution during acidification. For a small scale pilot plant, it is difficult to consistently maintain low TSS concentrations as the sludge recycle flow rate is constantly being changed to increase sludge density. Furthermore, the clarifier rake was operating at much higher speed than a typical clarifier in order to move all solids to the centre of the clarifier cone. For the KSM pilot plant, the average TSS in the clarifier overflow at each test is illustrated in Table 6. The TSS was on average 8-14 mg/L.

Table 6: TSS for pH Optimization Tests (mg/L)

ITEM	Test #2A	Test #3A
Retention Time (min.)	60	60
рН	9.5	10.5
TSS (mg/l)	7.7	14.1

In an HDS system sulphate concentration in the effluent is typically between 1400 - 1800 mg/L, which is sulphate saturation in water and excess sulphate is precipitated as gypsum (CaSO₄ x $2H_2O$). Sulphate precipitation is dependent on calcium concentration and retention time. Sulphate concentration also showed expected trend where sulphate concentration decreased slightly at higher pH as a result of high lime addition and calcium available for gypsum precipitation. Optimized results are presented in Table 7.

Test #2A to 3A were completed to determine the optimum operating pH that would produce an effluent which meets the discharge targets as well as minimize lime consumption. Two alternative pH values (9.6 and 10.5) were tested with 60 minute retention time and the results are summarized in Table 7. As expected, the lime consumption increased from 0.55 kg/m³ at pH 9.6 to 1.19 kg/m³ at pH 10.5.

Table 7: Summary of Results for pH Optimization Tests

Test Parameter	Test #2A	Test #3A
Feed Rate - ml/min	632	683
Underflow Recycle Rate - ml/min	162	95
Lime Retention Time - min.	60	62
pH - Feed	2.73	2.73
pH - Reactor 1	9.67	10.62
pH - Reactor 2	9.66	10.6
pH – Clarifier Overflow	9.61	10.47
Solids Generation - g/L	1	1
Lime Ca(OH) ₂ Consumption - kg/m ³	0.55	1.19
Flocculant Consumption – mg/L	6	4
Thickener Underflow slurry density	1.1	1.12
Thickener Underflow % Solids	13.5	15.2
Sludge Recycle Ratio (dry solid ratio)	35:1	19:1

1.2. Retention Time Optimization Tests

For these retention time optimization tests, the ARD solution was neutralized to pH 10.5; however the retention time was varied from 20 minutes to 90 minutes. Results for samples collected are provided in Table 8.

Table 8: Clarifier Overflow Analysis Summary for Retention Time Optimization Tests (mg/L)

Dissolved Metals	Feed	Test #1A	Test #3A	Test #4A	Test #4A
Dissolved Metals	reed	90 min	60 min	40 min	20 min
pH		8.89	9.84	10.64	
Aluminum (AI)-Dissolved	35.2	2.27	2.13	3.22	3.96
Antimony (Sb)-Dissolved	0.00051	<0.00020	<0.00050	< 0.00050	<0.00050
Arsenic (As)-Dissolved	0.135	<0.00020	<0.00050	< 0.00050	<0.00050
Barium (Ba)-Dissolved	0.0935	0.0118	0.0173	0.0225	0.0277
Beryllium (Be)-Dissolved	0.0186	<0.00020	<0.00050	< 0.00050	<0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0010	< 0.0025	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	<0.020	<0.050	< 0.050	<0.050
Cadmium (Cd)-Dissolved	0.0430	0.000121	0.000085	0.000054	0.000058
Calcium (Ca)-Dissolved	167	341	482	526	541
Chromium (Cr)-Dissolved	0.0242	0.00422	0.00517	0.00417	0.0038
Cobalt (Co)-Dissolved	0.525	0.0002	<0.00050	< 0.00050	<0.00050
Copper (Cu)-Dissolved	24.2	0.00412	0.0042	0.0082	0.0109
Iron (Fe)-Dissolved	247	0.029	0.051	0.074	0.107
Lead (Pb)-Dissolved	0.0336	<0.00010	<0.00025	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0128	0.0058	0.0047	0.0054	0.0067
Magnesium (Mg)-Dissolved	25.1	1.11	1.11	1.3	4.85
Manganese (Mn)-Dissolved	15.5	0.00167	0.00261	0.00461	0.00689
Mercury (Hg)-Dissolved	0.000030	<0.000010	<0.000010	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0116	0.0579	0.0234	0.0178	0.0139
Nickel (Ni)-Dissolved	0.203	< 0.0010	< 0.0025	< 0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Potassium (K)-Dissolved	1.97	1.36	1.87	1.9	1.98
Selenium (Se)-Dissolved	0.131	0.0463	0.0635	0.066	0.066
Silicon (Si)-Dissolved	6.68	0.112	0.149	0.152	0.092
Silver (Ag)-Dissolved	0.00457	<0.000020	< 0.000050	< 0.000050	< 0.000050
Sodium (Na)-Dissolved	4.42	4.73	4.18	4.26	4.56
Strontium (Sr)-Dissolved	0.792	0.615	0.801	0.839	0.884
Thallium (TI)-Dissolved	0.000120	0.000027	< 0.000050	< 0.000050	< 0.000050
Tin (Sn)-Dissolved	0.00182	0.00092	<0.00050	<0.00050	<0.00050
Titanium (Ti)-Dissolved	0.95	0.014	< 0.010	< 0.010	< 0.010
Uranium (U)-Dissolved	0.00199	<0.000020	<0.000050	< 0.000050	< 0.000050
Vanadium (V)-Dissolved	0.0070	<0.0020	< 0.0050	<0.0050	<0.0050
Zinc (Zn)-Dissolved	3.62	<0.0020	< 0.0050	<0.0050	< 0.0050

Similar to previous tests, most metals with the exception of aluminum were removed with high efficiency. With extended retention time, aluminum concentration also decreased slightly as more aluminum was precipitated. However, a pH adjustment to 7.5 for aluminum precipitation would still be needed to remove aluminum to acceptable levels. As expected, several metals such as iron, magnesium and manganese showed improved removal efficiency with longer retention time. Although, the observed concentrations were suggesting that a 60 minute retention time is sufficient for water quality, the lime consumption would increase by 30% for the shorter retention time. The additional lime consumption and decreased retention time would reduce the flocculent consumption by 33%.

It should be noted that the underflow density was increasing throughout the campaign and reached as high as 19% underflow solids near the end of the pilot trial. Typically, HDS pilot plants are operated for a minimum of 3 weeks so all the transitional sludge (combination of Low Density and High Density) is converted to high density and the underflow density reaches steady-state; however, for the KSM pilot plant the density continued to increase after 9 days of running due to lack of water availability resulting in pilot plant termination. However, it should be noted that higher sludge density does not have a significant

impact on the effluent quality but rather improves the overall operation of the plant by producing lower TSS in the clarifier overflow, lower volume of sludge and slightly higher lime utilization.

Table 9: Summary of Results for Retention Time Optimization

Test Parameter	Test #1A	Test #3A	Test #4A
Feed Rate - ml/min	389	683	1018
Underflow Recycle Rate - ml/min	112	95	94
Lime Retention Time - min.	96	62	43
pH - Feed	2.79	2.73	2.73
pH - Reactor 1	10.64	10.62	10.51
pH - Reactor 2	10.61	10.6	10.6
pH – Clarifier Overflow	10.55	10.47	10.64
Solids Generation - g/L	1	1	1
Lime Ca(OH) $_2$ Consumption - kg/m 3	0.83	1.19	1.15
Flocculant Consumption - mg/L	6	4	2.7
Thickener Underflow slurry density	1.09	1.12	1.15
Thickener Underflow % Solids	12.8	15.2	18.5
Sludge Recycle Ratio (dry solid ratio)	35:1	19:1	15:1

Test#4A was conducted at 40 minutes of retention time to determine optimum requirements for neutralization. The test was conducted at pH 10.5 in the clarifier overflow and the lime consumption was 1.15 kg/m³ which are significantly higher than Test#1A conducted at similar operating pH but 90 minute of retention time. The underflow density in test #4A was approximately 19% solids with a specific gravity of 1.15. Samples from each reactor tanks were also collected to determine the effluent quality at 20 and 30 minutes. In addition, the flocculent consumption was reviewed for select retention times. As it was expected the trend of flocculent consumption was opposite of the lime consumption trend. This indicates the presence of excesses lime during the test with shorter retention time was modifying the settling process and reducing required flocculent consumption. The impact of retention time on effluent chemistry is further discussed below. During the piloting campaign, the sludge recycle ratio was varied from 15:1 (dry basis) to 35:1. All recycle ratio tests were conducted at pH 10.5 in the clarifier overflow. The lime consumption at pH 10.5 varied from 0.83 kg/m³ at recycle ratio 35:1 and 90 minutes to 1.15 kg/m³ at recycle ratio 15:1 and 40minutes retention time. The lime consumption at optimum operating condition, recycle ratio 35:1 and 90 minutes retention time was 0.8 kg/m³.

2. Observations

The initial commissioning of the pilot plant was completed over a period of 96 hours and was terminated as the clarifier underflow density reached 1.09 (or %12.8 solid); however, it was expected that the clarifier underflow would continue to increase due to high metal content in the feed. Figure 3 below shows the underflow density over the duration of the pilot plant trial. The underflow sludge density continued to increase throughout the pilot campaign approaching 1.15 (~19% solids) as the pilot plant was terminated.

Based on previous pilot studies and HDS plants designed by SGS, the clarifier underflow density typically increases with scale-up to the industrial plants compared to that achieved at the pilot level as the sludge bed is considerably greater in industrial size clarifier due to the influence of a substantial compression zone to which releases water. Therefore, it is critical to account for the higher density in the industrial plant. Although the limited data from pilot plant test confirmed 19% solids (1.15 SG) it is not unusual to expect that an industrial plant would achieve greater underflow density in the 25 to 30% solid rang.

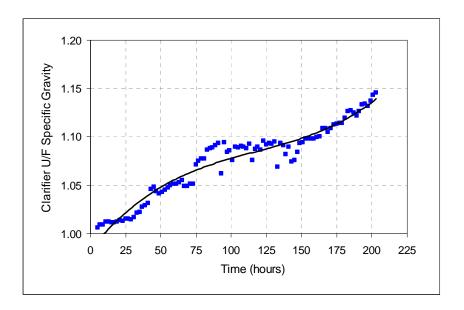


Figure 3: Clarifier Underflow Density as a Function of Operating Time

3. Clarifier Underflow

3.1. Underflow Density and Percent Solids

Clarifier underflow sludge samples were collected daily to determine the percent solids in the underflow. The clarifier underflow slurry density was proportionally related to the percent solids; Figure 4 illustrates this relationship. As the specific gravity increased, the percent solids also increased linearly.

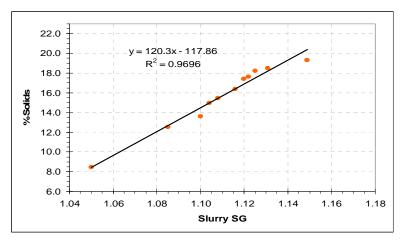


Figure 4: Percent Solids as a Function of SG

The solids percent were calculated by measuring the weight of a sludge pulp sample, and the sludge was then filtered and dried in the oven at 95° C for 24 hours. Maximum percent solids achieved during the pilot trail was 18.7% solids (or 1.15 SG). Due to low sludge production in the ARD feed (0.8 - 1.0 g/L) tested during the pilot campaign, a minimal amount of sludge per day (approximately 300 g) was discharged from the clarifier in order to build up the sludge bed.

3.2. Sludge Recycle Ratio

Sludge recycle is based on the ratio of the recycled solids to the generated solids from the feed solution. An appropriate sludge recycle ratio is critical to control the level of scale formation and maintain appropriate HDS conditions for optimal operation. Typically, scaling is reduced with higher sludge recycle as the high recycle provides increased surface area for the reaction to take place. Conversely, too high sludge recycle increases the solids concentration in the reactors which increases the mixing requirements, as well as higher flocculent requirements.

Initially, during the commissioning phase, the pilot plant was operating with 21:1 sludge recycle ratio to allow adequate solids circulation in the system. During the pilot plant, the sludge recycle ratio was varied from 15:1 to 35:1 in order to determine the impact on flocculent and lime consumptions as well as underflow density. Furthermore, the clarifier overflow clarity was observed to be similar at all recycle ratios.

Due to low sulphate concentration (below gypsum saturation limit), gypsum scaling was not expected to be a concern for this pilot plant. However, gypsum scaling is significantly reduced with an HDS system compared to conventional treatment options. The HDS system can minimize scaling with sludge recycle, as the recycled sludge provides nucleated sites for incoming particles to precipitate onto; therefore, enhancing the precipitation reactions and increasing sludge density.

3.3. Sludge Characterization

The filter cake sample was dried and submitted to ALS Environmental for TCLP, modified SWEP and total digestion. As the sludge analysis illustrated the sludge is mainly composed of gypsum (CaSO₄, 127,000 mg/kg of calcium) and metal hydroxides, predominantly iron hydroxide (195,000 mg/kg of iron). Detailed results of the TCLP, modified SWEP and total digestion are provided in Appendix G.

4. Lime Consumption

Lime consumption in the pilot study with a 90 minute retention time at pH 10.5 with an underflow recycle ratio of approximately 35:1 is observed to be approximately 0.83 kg/m³. Lime is a slow-reacting agent and a 90 minute residence time is optimum for high lime utilization. This is observed in the retention time optimization tests where lime consumption (1.19 kg/m³) increases by 30% when retention time was reduced to 60 minutes.

Typically, the HDS process produces a reduction in lime use over straight lime neutralization as a portion of un-reacted lime reports back to the lime/sludge agitation tank with the recycled sludge. Hence, lime consumption can be decreased by increasing the clarifier underflow recycle rate (not recommended as this would increase solids content in the reactors).

Results illustrating lime consumption in Table 10 for different operating conditions are as expected, with lime consumption reduced at constant pH by increasing retention time. Figure 5 illustrates the effect of retention time on lime consumption at constant operating pH.

Table 10: Lime Consumption at Different Operating Conditions

Test ID	рН	Retention time (min)	Lime consumption (kg/m³)
1A	10.5	90	0.83
3A	10.5	60	1.19
4A	10.5	40	1.15

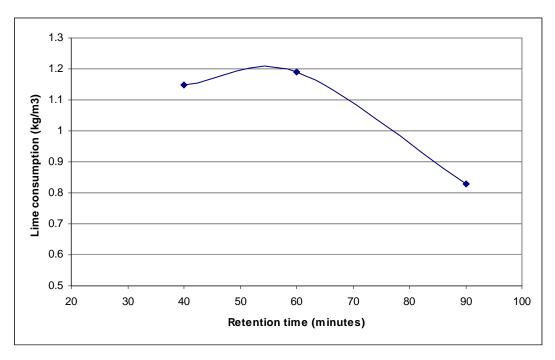


Figure 5: Lime Consumption with Retention Time (pH 10.5)

5. Flocculent Consumption

Flocculent addition affects the overflow TSS (clarity) and clarifier underflow density. High flocculation interferes with the formation of high density clarifier underflow sludge; on the other hand, insufficient flocculent could lead to high TSS in effluent. Flocculent scoping test with Magnafloc 10 were conducted before and during the neutralization pilot study (detailed analysis of flocculent scoping test is provided in Appendix D). The flocculent consumption ranged between 2.7 to 6.0 mg/L. The flocculent consumption decreased in short retention time, due to increase in un-reacted lime. The residual lime in the treated water modified the settling process and reduces the overall flocculent consumption. In a typical HDS plant with similar solids loading, the polymer addition rate is usually between 1.0 to 1.5 mg/L. Usually the total suspended solids in the effluent for a full size HDS plant is much lower than achieved in a pilot plant study with same flocculent addition due to the differences in the dynamics of a full size clarifier compared to the pilot plant clarifier.

6. Settling Test and Clarifier Sizing

One-litre samples of overflow from Reactor #2 were collected and used to conduct settling tests. The detailed results are attached in Appendix D. Tests were conducted in a 1.0L graduated cylinder. The settled pulp density after 3 hours ranged from 15 to 19%. The pulp density achieved with settling tests is lower than the clarifier underflow sludge due to the differences in the mechanics of a clarifier compared to

a 1.0L graduated cylinder. Appendix D is illustrates that additional amounts of flocculent had a negative impact on both settling time and pulp density. Using 3 mL of flocculent in the first test caused a 2 minute delay in creating a clear interface at the start of the test. In addition, the observed pulp density was never higher than 14.1. During the other test carried out with 2 mL of flocculent, the clear interface appeared immediately after adding flocculent and the observed pulp density at the end of test was more than 18.5. Therefore, it was concluded that 2 mL of flocculent was the optimum amount required to improve the settling process without reducing pulp density.

7. Solids Generation

The solids generation rate is an important parameter in the design of a water treatment plant as it affects aeration recycle rate and mixing requirements, filtering and pumping and sludge disposal requirements. Test conducted at optimum condition confirmed that the average solids generation rate of the feed water was 1.05 g/L.

8. Sulphide Precipitation Tests

The sulphide test results are illustrated in Appendix F. As the results indicated, sulphide alone was not sufficient in removing heavy metals; therefore, sulphide followed by lime treatment at pH 10.5 is required. Comparing results of sulphide treatment to the HDS process (Test #4); no significant improvements were observed for most metals of concern with the exception of molybdenum which was significantly lower.

9. Toxicity Testing

Samples from Test #3A and 4A were collected and submitted for toxicity testing. The sample's initial pH was adjusted to 7.3 and 8.5 for rainbow trout and D. magna respectively. The results for the toxicity testing for 100% v/v solution are summarized in Table 11.

Table 11: Toxicity Test Results

Sample ID	Collection Date and Time	Type of Test	Result
PP Effluent	October 28, 2012	96-h LC50 (%v/v)	>100
Tox test 1	@0200h	48-h LC50 (%√v)[with	16.5
		95% confidence limits)	(14.5- 18.8)

Conclusions and Recommendations

The pilot test program demonstrated the viability of using the HDS process for removal of contaminants from ARD solution and determined the optimum parameters for an industrial plant. Project objectives, as outlined in the test proposal were established for the solution tested, with several conclusions and recommendations:

- Effluent with low metal concentration was regularly produced
- The optimum HDS condition reduced mercury concentration in feed from 0.000049 mg/L to below 0.000010 mg/L (detection limit).
- Aluminum concentration was observed to be high for all tests ranging from 2.1 mg/L at 90 minutes retention time to 3.96 mg/L with 20 minutes. A pH adjustment to 7.5 for clarifier overflow is required to remove aluminum concentration below 0.2 mg/L.
- Approximately 47% of the selenium was removed by HSD which is most likely Se(IV).
- 60 minute retention time would be sufficient to remove most metals however as expected the lime consumption was much higher compared to the 90 minute retention time.
- The clarifier underflow density increased throughout the pilot test program and reached as high
 as 1.15 (19% solids). It was expected to produce clarifier underflow solids up to 25%. The sludge
 was further thickened to 38 to 40% solids by filtration.
- Observed lime consumption in the pilot study with a 90 minute retention time at pH 10.5 (optimum operating condition) with an underflow recycle ratio of approximately 35:1 was 0.83 kg/m³. With the same operating condition the flocculent consumption was 6 mg/L.

One issue with the pilot plant study was the limitation of feed water available once steady state operating conditions were achieved. This limitation did not permit the clarifier underflow to reach the maximum targeted density of 25 to 30% solids. Based on the sludge consistency and the clarifier performance, it is very likely that 25% sludge solids will be achievable in a full-scale operating plant. The steady state operating period was more than adequate to demonstrate the efficiency of metals removal.

Appendix A – Pilot Plant Operation Data

PILOT SCALE TESTING OF THE HIGH DENSITY SLUDGE PROCESS

			Food	Floc.	a E	Ппв	Clar, U/F		Clarifier U/F		Calc.	Actual			핍	_	
Date	Time	Hours		[0.5 g/L]		Consumb.	Recycle	Vol	WL	S.G.	Clar, U/F	Clar. U/F	Recycle Ratio		ſ		
			(ml/min)	(mL/min)	(1)	(L/hr)	(m/Jmju)	(ml.)	(ā)		Spilloc oz	spilos «		Feed	E	H2	Clar O/
20-031	15,00	0	760	12.0	12.50										10.67	80.00	
	16.00		870	12.0	12.00	0.50	305								10.69	10.68	
	18.00	m	740	12.0	11,00	0.50	2224	250							+	10.80	
	20:00	9	680	10.0	950	0.75	360	252	251.62	1.0065	4,3		g.		10.33	11.34	
	22:00	7	980	10.0	606	0.25	300	250	252.38	1,0095	4.8		30		4	10,83	
21-Oct	0.00	6	888	10.0	8,50	0.35	300	250	752.35	1,0094	4.6		88		4	10.65	
	2:00	=	000	10.0	8.00	520	310	250	253.07	1,0123	4.9		21		-	10.61	
	450	97	8	10.5	7.00	0.50	908	250	259.10	1.0124	4.9		25 11		۲	10.58	
	90.9	15	200	10.5	6,00	0.50	305	250	252.87	1,0115	6.5		21		-	10.01	
	8.00	12	2000	10.5	5.00	0.50	300	97	250 88	51101	4.8		20		10,89	10,77	10.78
	9000	0	200	101	4.50	0.25	160	250	253.10	1,0124	6,4		13		-	10,58	10.7
	12:00	10	200	10.5	17.50	1.00	153	250	253.47	1,0139	5.0		11		10.55	10.54	10.53
	2007		2007	10.5	18.50	0.0	180	350	253.19	1.0128	67		22		H	10.42	10,57
	00.91	36	おおが	105	16.00	025	158	250	253,79	1,0151	-50		12 11		H	10,43	10.0
	00.01	33	670	10.5	18.00	0.50	158	256	251.92	1.0157	5.2		E CY		Н	10.41	10,43
	00.00	000	270	10.5	14.00	0.50	155	250	253.56	1,0142	8.0		12		10.60	10,46	103
	20:00	48	200	100	19.00	050	156	58	354.30	1,0168	5.3		170		H	10.52	10,4
200 000	0000	5 66	000	104	500.51	920	156	250	355.32	1,0213	5.7		1.4		٠	10,43	10,45
20000	000	2	500	000	11.50	200	150	250	255.65	1,0226	22.8		24		10.52	10.42	16.5
	400	60	980	004	11.00	950	156	250	256.84	1.0274	13		51		+	10,39	10.35
	000	***	200	000	90.00	0.50	35:	500	257.31	1.0592	6.5		2		H	10,51	16.8
	200	1	088	10.0	\$ 00	(6.50)	158	250	257.83	1,0313	6.7		91		10,57	10.49	10.53
	00:01	438	640	10.0	8.00	0.50	252	252	261.57	1,5452	6.1		61		16.61	10.57	10.64
	10.62	77	e g	10.0	7.50	800	181	250	262.01	1.0480	83		50		10.63	10.51	10.59
	14:00	10	630	0.0	6.50	0.50	156	250	260.97	1,0439	7.9		19		10.54	10,41	10.42
	16:00	48	009	0.6	5.50	95'0	153	255	250,23	1.0413	2.5		63		10.32	10.60	10.71
	18:00	150	580	8.0	200	0.25	150	250	380,69	1,0428	7.8		20		10.75	10.65	10.70
	20:00	63	:650	10.0	4.50	0.25	154	250	261.35	1.0454	8.1		F.		10.63	10.51	10.49
	22:00	2	840	100	18.50	0.50	156	88	261,89	1,0476	6.3		20		10.52	10.67	10.64
23-Oct	900	57	640	9,5	17,50	63	158	280	282.51	1.0500	8.5		23		10.64	10.52	10.51
	2:00	65	640	5:8	18,50	950	156	250	262.82	1,0513	10		77		10.78	10,60	10.58
	450	19	820	40	15.50	050	#2	50	28.2.86	1,0514	8.6		21		10.58	10.52	10
	00'9	63	650	87.00	14.50	050	156	250	263,16	1,0526	8.8		55		10,54	10.62	10.58
	8:00	3	099	9.5	14.00	0,25	154	952	263.87	1,0555	0.0		63		10.55	10.63	10.59
	10-00	29	630	9.6	12.50	6.75	200	250	262,25	1,0490	8,4		92		10.62	10.86	10.58
	12:00	20	510	9.5	12.00	0.25	183	550	262,35	1,0494	8.4		22		10.72	10,65	10.
	14300	11.	650	6.5	11.50	530	183	Si	262,82	1,0513	3.6		20		10.61	10.52	10.36
	16:00	12	2019	50	10.50	0.50	183	250	262.83	1,0613	8.6		24		10.65	10.53	10.55
	18:00	ħ	099	6.5	10,00	0,25	182	250	267.78	1,0711	10.5		8		10.50	10.43	10.49
	20.00	11.	740	10,000	00'6	950	180	520	268.83	1,0752	10.9		30		10.01	10.57	10.58
	22.00	7.9	740	9,6	8.00	0.50	130	250	269.41	1,0776	15.2		2		10.51	10.58	10.59
24-Oct	00:0	18	740	0.0	7.50	0.25	183	250	265,38	1,0775	11.2		27		10.65	10.53	10.49
	200	83	745	10.5	6.50	.050	68	250	271.71	1.0868	12.1		30		10.53	10.68	10.48
	4:00	65	740	14.0	5.00	0.75	180	250	272.07	1,0883	12.2		8		10.77	10.56	10.50
	6300	2.0	755	14.5	3.50	0.75	176	88	272.27	1.0891	12.3		81		10.38	10.5	10.45
	8,00	063	740	140	553	8	176	850	272.81	1,0012	12.5		R		10.51	10.53	10
	1000	19	640	14.0	17.50	000	175	250	273.34	1.0934	12.7		000		10.63	10.55	
	12:00	83	670	14.0	17.00	9570	200	250	255.49	1,0520	6		12		10.45	10.54	10,40
									1	-			100		-202	03.00	

5700 min 3913.22449 0.44

10,59 10,53 10,53 Feed
Reactor 1
Reactor 2
Clar. O/F

687 mL/.min 190 mLmin 21 :1 55 minutes 0.8 kg/m³ 1.06 kg/m³ Feed Rate
Califier UF Flexyde Rate
Recycle Rate
Lime Retention Time
Solds deneation Tale
Lime Consumption Rate
Time Consumption Rate
Flocoulant Consumption Rate

Date	Time	Cimmil		Floc.		Lime	Clar II/F		Clarifier IVE								
			Feed	10501	Lime	Consumo	Recycle	IoV	We District		Calc.	Actual	Berycle Batio		0.	됩	
		Hours	NOW OF THE PERSON		200	14.000	100000	1,000		5.6.	% Solids	% Solids		1	-	6	4000
			(uncome)	(mFmin)	2	(CIN)	(will-min)	(wr)	69					2000	4	1	Curo
			ĺ			0	0 min retention	n time (pH 10	S.	į							
24-Oct	14,00	0	380	14.0	16.00		104	8							10.54	10.52	10,51
	16.80	iv.	370	0	15.50	0.250	C.	S.	271,13	1,085	11.5		x		10.53	50.00	10.46
	10.00		370	n o	15.00		211	250	ZV1.43	1,086	12.0		8		10.51	10.63	10.54
	20:00	8	370	0.0	14,50		114	8	208.94	1.076	11.0		34		10.77	10.68	10.56
	2200		400	0.0	14.00		315	82	272.33	06071	12.3		38		10.40	10.60	10.64
25-Oct	000	10	400	0.6	13.50		112	250	272.22	1,089	123		8		10.85	10.62	10.59
	2.00	125	005	9:0	13,00		112	250	272.59	1.090	12.4		18		10,50	10.63	10.61
	4:00	14	400	9.0	12.50		112	20	272.34	1.089	12.3		**	_	10.55	10.01	10.58
	00.9	18	929	9.0	1230		114	\$50	272,00	1,088	12.2		32		10,78	10,72	10.70
	00-0	9	380	ce	15.0		211	256	273,165	1.093	12.6		19		10.34	16.7	10.70
	200	2	200	2			ci	950	300 000	1075	44.0		20		10.72	10.64	46.60
	-	3		1	-				200000	1	2					1	2000
	1200	ä	330	C th	11		211	2002	671.880	1.087	121		9		1001	63	10.50
	8	54	3863	01	11.0		115	91	272.450	1,090	12.3		8		10.62	102	10.60
	16.00	56	385	365	10.5		112	250	271.560	1.086	12.0		25		10,84	10.55	10.54
	18300	28	385	8.5	10.0		112	250	273,920	1,095	12.9		38		10.68	19'91	10.56
	20.00	30	200	9.0	10		110	250	272 510	1,092	125		35		10.61	10.6	10.58
	19.00	8	390	50	20		112	250	273.400	1.094	12.7		37	_	10.65	10.68	10.67
26-Det	00.0		300	0	0		114	250	273 120	1.092	12.6		37		10.57	10.63	10.68
	202	19	330	6	6		114 250 273	250	273.69	1,035	12.8		33		10.59	10.62	10.65
Feed Rate	389 n	389 mL/min	1,6		Feed												
Claritier U/F Recycle Rate Recycle Batio	112 mL/1	112 mL/min 35 :1			Reactor 1	10.64			2160 min 840.126316	E							
Lime Restrictor Tetre Solids Generation Rate Lime Consumption Rate	96 minutes 1,0 kg/m³ 0,83 kg/m³	96 minutes 1,0 kg/m³ 1,83 kg/m³			Clar. O/F	10.55			0,194								
TEST ID. Test 2A	Test 2A																
		Cummin	Feed	Floc.	l imo	Lime	Clar. U/F		Chrifter UF		Calc.	Actual				F	
Date	TIme	Hours	-	[0.5 g/L]		Consump.	Recycle	Vol	W	SG	Clar. U/F	_	Recycle Ratio	_			
			(mL/min)	(mL/min)	<u> </u>	(L/hr)	(mL/min)	(mr)	6		% Solids			Feed	Æ	R2	Clar O/F
							pH 9.5 (6	pH 9.5 (60min RT)	10						44.04	20.00	
2000	500	0	635	9.0	9.00		184								10.58	10.62	10.65
	4:00	N	605	9.0	9.00	o	191	250	267.27	1,089	10.3		31		896	9.93	3.35
	6.00	*	600	9,5	35	0.25	12	220	273.39	185	12.7		82		9.50	587	9.19.1
	8.50	ø	000	12.0	00.0	0.25	174	520	272.79	1001	12.5		36		9.83	3.80	2.67
	10:00	00	630	52.0	7.50	0.25	174	250	270.59	1,082	13.6		88	1	9.65	196	2
	12:00	ē	8	53.5	193	6	12	82	272.39	1,290	12.3		3		9.61	2	3.62
	14:00	23	909	10:01	2.00	0.15	133	250	268.49	1,074	10.8		8		9:38	9,61	9.60
	18:00	7	009	10.0	000	0.25	185	022	208.95	1,976	11.0		8	1	9,69	9.64	9.52
	15:00	38	630	12.0	6.00	0.25	830	8	271.12	1,084	11.8		8		196	9.53	57
	20:00	28	645	11,0	2.5	0.25	152	550	273,340	1,093	127		8		99.6	98.0	9.58
	22:00	ß	UES.		5.0	0.25	g	S.	273,470	1,004	12.7		10		3	190	9.55
2002	000	22	9	#	3	0.25	96	250	274.540	1.098	13.2		92		9.55	976	9.47
	5:00	24	685	=	-	0.25	88	250	274.6	1,098					i di	15.5	8.43
Feed Rate	632 1	632 mL/min	0.4		Feed	730			1440								
Clarities O/r necycle nate	20 20				Posetor 2	100			1440								
Lime Retending Time	09	minutes			Clar, O/F	961			0.208								
Solids Generation Rate	1.0 1	1.0 kg/m ³															
Lime Consumption Rate	0,55	kg/m²															
Flocculant Consumption Rate	4.4 mg/L	John															

Consump. Recycle Viol	TEST	TEST ID, Test 3A															١	l
100 200	Date	I.	Cummul.	Feed	Floc. [0.5 a/L]	Lime	Consump.	Glar. U/F Recycle	Vot	Wr.		Clar, U/F	Clar. U/F	Recycle Ratio		ā	핊	
100 2			Hours	(ml/mln)	(rest project)	60	(L/hr)	(ent./enin)	(Just)	(0)	j j	% Solids	% Solids		Feed	æ	22	Char O.F.
100 2 200 1 1 1 1 1 1 1 1 1								200									t	
1,000 2 2,000 2 2,000 2 2,000 2 2,40			1					DH 10.5 (6	SOUTH HES									
100 100	22-0ct	2.00	o	989	11.0	000		92	250	274.6	1,088	13.2		36		9.54	9.51	14/5
100 100		:00:9	ne	100	0.11	3,00	6.5	15	100	274.60	1,038	13.2		Ø4	10	10.60	800	10,49
100 100		9008	*	589	11.0	16.00		96	250	274.58	1,008	13.2		100		10.53	10.46	10,43
1000 8 683 110 1150 0.75 94 250 277.19 1109		8:00	G.	680	11.0	15,00	0.5	76	250	274.91	1,100	13.3		191		10.54	10.48	10.48
1200 11 1200 110 110		10.00	×	583	11.0	13.50	0.75	16	250	275.16	1017	13.4		18		10.38	15.01	10.47
14:00 12 2890 11.0 11.00 0.55 94 280 277.72 11.08 16:00 18 6890 11.0 10.00 0.55 94 280 277.72 11.08 20:00 22 6890 11.0 10.00 0.55 94 280 277.72 11.08 20:00 22 6890 11 8.3 0.55 94 280 277.82 11.18 20:00 22 6890 11 8.3 0.55 94 280 277.82 11.18 20:00 22 6890 11 8.3 0.55 94 280 277.82 11.18 20:00 22 6890 11 8.3 0.55 94 280 277.82 11.18 20:00 22 6890 11 12.0 0.05 94 280 278.85 11.18 20:00 22 10.00 11.0 11.0 11.0 20:00 22 10.00 11.0 11.0 20:00 23 10.00 11.0 11.0 20:00 24 10.00 11.0 11.0 20:00 24 10.00 11.0 12.00 0.75 94 280 281.89 1.18 20:00 24 10.00 11.0 12.00 0.75 94 280 281.89 1.18 20:00 24 10.00 11.0 12.00 0.75 94 280 281.89 1.18 20:00 24 10.00 11.0 12.00 0.75 94 280 281.89 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 281.89 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 281.89 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00 0.75 94 280 282.80 1.18 20:00 25 10.00 11.0 12.00		1000	40	Ash	11.0	12.00	0.75	3	280	277.13	1,109	14.2		10		10.82	10.54	10.48
16,000 14 6500 11.00 16,000 6,255 94 2500 276,229 1,1150 20,000 16 6400 11.00 16,000 0,255 94 2500 277,17 1,1150 20,000 22 6890 11 9.0 0,255 94 2500 277,17 1,1150 20,000 22 6890 11 73.3 0,55 94 2500 278,559 1,1144 20,000 22 6890 11 73.3 0,55 94 2500 278,559 1,1144 19 31 10 sqm² 11 10 sqm² 1,1144 19 4 10 sqm² 1,1144 19 5 10 sqm² 1,1144 19 6 10 sqm² 1,1444 19 6 10 sqm² 1,1444 19 6 10 sqm² 1,1444 1		0000	100	100	011	5	0.6	-0.1	05%	277.19	1.108	14.2		10				
1800 14 250 277.75 11.00 1		14:00	7	200		200	200		020	200.000		1				40.05	40.40	080
1900 16 640 110 1000 0.85 914 250 2771.17 1109 1109 1109 1113 1113 1114 1100 0.85 914 250 2771.17 1109 1113 1114 1114 1100 0.85 914 250 2771.17 1114 1		16:00	*	N.	0 11	10.50	g	ň	007	27072	9	130				00.01	9	300
10 10 10 10 10 10 10 10		58:00	16	089	11.0	10.00	0.25	*	250	277.17	1,109	14.2		8		10.52	10.53	10.44
SECON 22 SSO 11 S.O O.55 SSO 276.350 1.114		20:00	82	689	11.0	9.5	0.25	346	250	278.150	1,113	14.5		8		10.45	10.61	10.70
1,100 22 889 11 7.3 0.5 94 250 278.500 1,114 1,14		1000	1			0	25.0	200	250	078 350	1 1155	377		8		10.3	10.92	10.83
1000 22 589 11 73 0.43 59 120 2.00 1.114 SS mL/min S		2000	2	3			0.00	5	950	202.500		44.7				40 98	10.89	10.81
10 10 10 10 10 10 10 10	28-Oct	000	2	3		0,0	000	95	707	ALOCOIN.	100					11111	0000	100
Feed min Feed Fee		200	24	685	Ę	7.3	900	96	200	S.C. D.	1,114	14.5		707		16/6/	2000	10.55
Time																		
19 11 10 10 10 10 10 10	d Rate	683	mL/min	0.0		Leed .	00 01			4	.1							
Time	ilier U/F Recycle Rate	38	m/min			Heactor 1	29.01			0440	u u							
1.19 kg/m² Time	sycle Ratio	19	3 :1 minutes			Reactor 2	10.60			983,076923								
Time Commund Feed [0.5 q.L] Lime Clar. U/F Vot Wit. S.G.	ds Generation Rate e Consumption Rate culant Consumption Rate	1.0 1.19 4.0	kg/m³ s kg/m³ mg/L															
Time	TEST	D, Test 4A											- 1				1	
Time Cultimota Feed [0.5.gt], Cultimota Christomp, Recycle Vol. Wit. S.G.		_		Present Company	Floc.	1	Lime	Clar. U/F		Charifus U.F.		si B	-	-		-	F	
2.00 0	Date	Time	Hours	Deed !	[0.5 g/L]	П	Consump.	Recycle	Vol	WE	S.G.	Clar, U/F	Clar. U/F	Recycle Ratio	°		6	Sign of Sign
Color Colo		$\frac{1}{1}$		(minchine)	(mr/mm)	3	1	(ML/min)	(ML)				4		2000			
2.006 0							4	Omin Retonbor	n Time (pH 1)	(5.0)								
4.00 2 1910 11.0 6.00 0.65 98 25.0 27346 1119 6.00 4 1000 11.0 2.00 0.75 94 250 27346 1119 6.00 6 1000 11.0 2.00 0.75 94 250 28143 1.127 7.00 10 100 11.0 2.00 0.75 94 250 28143 1.127 7.00 10 100 11.0 12.50 0.75 94 250 28143 1.127 7.00 11 100 11.0 12.50 1.25 94 250 28143 1.128 7.00 12 100 11.0 12.50 1.25 94 250 28247 1.132 7.00 20 100 11.0 10.0 0.5 94 250 28247 1.132 7.00 20 102 11.0 2.00 0.5 94 250 28247 1.132 7.00 20 102 11 2.00 0.5 94 250 28240 1.132 7.00 20 102 11 2.00 0.5 94 250 28240 1.132 7.00 20 102 11 2.00 0.5 94 250 28240 1.132 7.00 20 102 11 2.0 0.5 94 250 28248 1.144 7.00 20 102 11 2.0 0.5 94 250 28258 1.144 7.00 20 102 11 2.0 0.5 94 250 28258 1.144 7.00 20 102 11 2.0 0.5 94 250 28258 1.144 7.00 20 102 11 2.0 0.5 94 250 28258 1.144 7.00 20 102 11 2.0 0.5 94 250 28258 1.144 7.00 20 20 20 20 20 20 7.00 20 20 20 20 20 20 7.00 20 20 20 20 20 7.00 20 20 20 20 20 20 7.00 20 20 20 20 20 20 7.00 20 20 20 20 20 20 7.00 20 20 20 20 20 20 7.00 20 20 20 20 20 20 7.00 20 20 20 20 20 20 20	28 Oct	200	0	1010	11.0	7.30		8	252	27854	1,114	14.7		14		10.81	10.88	10.22
6500 6 1000 11,0 5,00 0.5 944 250 251,53 1,125 1		4:00	2	1010	11.0	6.00	0.65	86	250	279.86	1.119	152		12		10.60	11.05	11,19
1,000 6 1000 11,0 2,00 0,05 944 250 28139 1,127 1,000 8 1,000 11,0 15,00 17 944 250 28139 1,125 1,000 10 11,0 15,00 17 944 250 2803.9 1,125 1,000 10 11,0 15,00 1,2 84 250 2803.9 1,125 1,000 11 11,0 15,00 1,2 84 250 2803.9 1,125 1,000 11 11,0 12,00 0,5 94 250 2803.9 1,135 1,000 11 11,0 12,00 0,5 94 250 2803.9 1,135 1,000 10 11,0 11,0 0,5 94 250 2803.9 1,135 1,000 10 11,0 10,00 0,5 94 250 2803.9 1,135 1,000 10 10 11,0 10,00 0,5 94 250 2803.9 1,135 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 1,14 1,000 10 10 1,14 1,000 10 10 1,14 1,000 10 10 1,14 1,000 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14 1,000 10 10 10 10 1,14		0039	9	1000	.11.0	5.00	6.0	X	952	28153	1,126	15.9		4		10.55	10,72	11,022
1,0,00 E 1,000 11,0 2,00 0,75 94 250 281.59 1,185		8:00	4	1000	41.0	3.50	0.75	55	250	281.81	1,127	16.0		18:		10.58	10.49	10.31
11200 10 1000 110 15,500 1 944 2500 2800.40 1,122 1,100		10:00	a	1000	110	2.00	0.76	94	255	281.30	1,125	15.8		15		10,49	10.33	3.87
14500 12 1020 11.0 12.50 1225 94 259 2681.61 1.1253 1		10.00	40	1030	11.0	15.00		3	92	280.40	1,122	15.4		14		10.41	10.53	10.43
1600 14 1030 11,0 11,00 0,5 94 250 286.25 1,183		00.41	0	ULUL		1250	1.25	3	250	281.61	1,126	15.9		14		10,45	10,61	10.42
16500 15 1500 11,0 10,000 0,15 550 525,47 1,134 1,		1600	2	0604	011	811	30	90	550	283.25	1,153	16.5		15		10.65	10,01	10.37
100 100 110		18000	15	4000	140	90 00	0.75	59	500	521.47	1153	16.6		15		10.25	10,61	10.59
22.00 10.00 11.0		2000	2	VIII.	×	90	9.5	65	950	982 980	4 130	16.4		35		10.48	10:59	11.04
1000 22 1022 11 7.6 0.5 94 220 286.410 1.142 200 24 1020 11 5.4 0.75 94 220 286.48 1.142 1018 mL/,min 0.0 Feed 1.651 1.664 1.665.47892 1018 mL/,min 0.0 Feed 1.665.47892 1.665.47892 1018 mL/,min 1.665.47892 1.665.47892 1.665.47892 1018 mL/,min 1.665.47892 1.665.47892 1.665.47892 1018 mL/,min 1.665.47892 1.665.47892 1.665.47892 1018 mL/,min 0.0 1.665.47892 1.665.47892 1.665.47892 1.665.47892 1018 mL/,min 0.0 1.665.47892 1.665.47		20000	000	0007			200	2 2	175	262 440	125.	98		9.		10=3	10.64	11.01
200 24 1020 11 44 0.75 94 250 2505-50 1.142 201 24 1020 11 64 0.75 94 250 2505-50 1.142 202 24 1020 1.142 1.142 203 203 203 1.142 203 203 203 1.142 203 203 203 1.142 203 203 203 1.142 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 203 20		426.00	2	1020		0	200		550	044 700	1 142	17.4		9		301	16.71	16.99
1018 mL/min 0.0 Feed 10,51 94 289 285,58 1,1442 min 1018 mL/min 0.0 Feed 10,51 1440 min 1440 min 1440 min 1445 min 145,11 1465,47692 1455,47602 1455,47602 1455,47602	2900	0:00	21	1000	-	9	2	ž.	3	014.002	7			2		000		Corne
1018 m.L/min 0.0 Feed 10.51 94 m.L/min 9.0 Reactor 10.51 94 m.L/min Reactor 10.60 1465.4 43 minutes Clar. OF 10.64 10.64		2.00	24	1020	¥	575	0.75	94	250	285.58	1.142	17.4		91		10.47	10.63	10,45
99 mLmin Reactor 1 0.51 145.54 15.1 145.54 14.55.4 13.00 14.00 10.60 1465.4	ed Rale	1018	3 mL/min	0.0		Feed												
15 :1 Reactor 2 10,80 1465.5 43 minutes Clar, O/F 10,84	rifler LI/F Recycle Bate	86	1 mL/min			Reactor 1	10,51			1440	' min							
1 Time 43 minutes Clar. O/F 10.64	wele Ratio	15	11.0			Reactor 2	10,60			1465 47692								
	e Retention Time	84	3 minutes			Clar, O/F	10.64			0.700								
1.0 kg/m²	Ide Generation Rate	0.1	ka/m³															
4 5 V/m	O CONTRACTOR OF THE PROPERTY O	4 4 6	5 ko/m3															
			,															

Appendix B – Water Quality Data

RESULTS OF ANALYSIS

11200210 01 1111121010									
Sample ID	1298-010 OCT21A - EFFLUENT	1298-014 OCT21B - EFFLUENT	1298-018 OCT22A - EFFLUENT	1298-022 OCT22B - EFFLUENT	1298-026 OCT23A - EFFLUENT	1298-030 OCT23B - EFFLUENT	1298-033 OCT24A - EFFLUENT	1298-037 OCT24B EFFLUENT	
Date Sampled	21-OCT-12	21-OCT-12	22-OCT-12	22-OCT-12	23-OCT-12	23-OCT-12	24-OCT-12	24-OCT-12	
Time Sampled	14:00	14:00	02:00	14:00 L1227710-1	02:00 L1227707-1	14:00 L1228195-1	02:00 L1228156-1	14:00 L1228980-1	
ALS Sample ID Matrix	L1227084-1 Water	L1227088-1 Water	L1227087-1 Water	Water	Water	Water	Water	Water	
TELEVISION	rvator	******							Average
Physical Tests				4450	4400	1010	4000	4240	
Hardness (as CaCO3)	1250 10 23	1260 9 62	1340 9 25	1150 9.19	1180 9.62	1210 9.49	1230 8 75	1310 9.14	
pH Tolal Suspended Solids	80	13 0	6.0	14 0	13.3	5.3	24 0	93	11.6
Total Dissolved Solids	1740	1730	1850	1750	1720	1600	1630	1700	
Turbidity	5 12	8 87	3 45	10 1	14.8	7.69	35 4	9 77	
Anlons and Nutrients									
Acidity (as CaCO3)	<1 0	<1.0	<1.0	<1.0	<1.0	<10	<1.0	<1 0	
Alkalinity, Bicarbonate (as CaCO3)	<1,0	27	5,7	12 3	10 8	11.7	15 3	13 9	
Alkalinity, Carbonate (as CaCO3) Alkalinity, Hydroxide (as CaCO3)	32 4 7 2	28 4 <1 0	22 3 <1 0	6.9 <1.0	14 1 <1 0	14 4 <1 0	5 5 <1 0	8 1 <1 0	
Alkalinity, Total (as CaCO3)	39 6	31 1	28 0	21 2	24.9	26 1	20 B	22.0	
Ammonía, Total (as N)	0.0349	0.0438	0.0504	0.0408	0 0500	0 0606	0 0562	0 0579	
Bromide (Br)	<1,0	<1.0	<1 0 <10	<1 0 <10	<1.0 <10	<1 0 <10	<1 0 <10	<1 0 <10	
Chloride (CI) Fluoride (F)	<10 0.41	<10 0.43	0 44	<0.40	<0.40	<0.40	<0.40	<0,40	
Nitrate (as N)	0.74	0.73	0 75	0.83	0.73	0.85	0,90	0.74	
Nitrite (as N)	0.024	0 021	<0 020	0.022	0 026	0 031	0 037	0 036	
Orthophosphate-Dissolved (as P)	<0 0010 <0 0020	<0 0010 <0 0020	<0 0010 <0 0020	<0 0010 <0 0020	<0.0010 <0.0020	<0.0010 <0.0020	<0 0010 <0 0020	<0.0010 <0.0020	
Phosphorus (P)-Total Sulfate (SO4)	1160	1160	1240	1170	1140	1130	1150	1190	
Total Metals	262	4 40	4 27	3 51	3.08	2 92	4.06	3.47	
Aluminum (Al)-Total Antimony (Sb)-Total	3 62 <0 00050	4.48 <0.00050	<0.00050	<0.00050	<0.00050	<0,00050	<0.00050	<0.00050	
Arsenic (As)-Total	0.00224	0.00194	0 00069	0.00171	0 00177	0 00160	0 00398	0 00204	
Barium (Ba)-Total	0 0284	0.0264	0 0240	0 0230	0 0216	0 0193	0 0236	0.0193	
Beryllium (Be)-Total	<0.00050 <0.0025	<0 00050 <0 0025	<0 00050 <0 0025	<0 00050 <0 0025	<0.00050 <0.0025	<0 00050 <0 0025	<0.00050 <0.0025	<0.00050 <0.0025	
Bismuth (Bi)-Total Boron (B)-Total	<0.050	<0.050	<0.0025	<0.050	<0.050	<0.050	<0.050	<0.0023	
Cadmium (Cd)-Total	0.000676	0 000614	0 000285	0.000554	0 000630	0 000615	0 00137	0 000756	
Calcium (Ca)-Total	475	465	482	451	453	457	493	496	
Chromium (Cr)-Total Cobalt (Co)-Total	0 00248 0 00613	0 00288 0 00586	0 00360 0 00229	0.00422	0.00495	0.00402	0 00553 0 0145	0 00537 0 00785	
Copper (Cu)-Total	0.267	0 260	0 0954	0 222	0 264	0 245	0.607	0 334	
Iron (Fe)-Total	3.26	3,01	1 13	2 57	3 10	2 86	7 02	3 76	
Lead (Pb)-Total	0.00055	0 00049	<0 00025 0 0064	0.00048	0 00054 0 0062	0.00029	0.00128 0.0072	0 00064 0 0054	
Lithium (Li)-Total Magnesium (Mg)-Total	0 0088 1 02	0 0057 1 47	3 62	2.64	2 21	1.61	2 50	3 52	
Manganese (Mn)-Total	0.178	0 171	0.0618	0 139	0 161	0 159	0.401	0 206	
Mercury (Hg)-Total	<0.000010	<0 000010	<0.000010	<0.000010	<0 000010	<0.000010	0.000012	0 000013	
Molybdenum (Mo)-Total Nickel (Ni)-Total	0 118 0 0025	0 0821 <0 0025	0.0726 <0.0025	0.0793 <0.0025	0 0807 0 0026	0 0876 <0 0025	0.0825 0.0058	0 0779 0 0031	
Phosphorus (P)-Total	< 0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	
Potassium (K)-Total	1.76	1,71	1 72	1 73	1 69	1 74	1.70	1 69	
Selenium (Se)-Total	0 0637	0 0635	0 0656	0 0637	0 0629	0.0609	0 0646 0 383	0 0635 0 243	
Silicon (Si)-Total Silver (Ag)-Total	0 240 0 000053	0 220 0 000054	0.114 0.000057	0 181 0 000070	0.229 0.000091	0.211 0.000063	0 000162	0 000101	
Sodium (Na)-Total	5.87	5.74	5.79	5 78	5 81	6 54	6 52	5 85	
Strontium (Sr)-Total	0.862	0 833	0 810	0 853	0 859	0.853	0 835	0 853	
Thallium (TI)-Total Tin (Sn)-Total	<0 000050 0 00109	<0 000050 0 00100	<0.000050 0.00095	<0 000050 0 00123	<0 000050 0 00099	<0.000050 0.00086	<0 000050 0 00101	<0.000050 0.00093	
Titanium (Ti)-Total	0.021	0 020	0.012	0 020	0 022	0 025	0 040	0 029	
Uranium (U)-Total	<0.000050	< 0.000050	<0 000050	<0 000050	<0.000050	< 0.000050	0 000112	0.000055	
Vanadium (V)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0 0050 0 046	<0.0050 0.111	<0 0050 0 061	
Zinc (Zn)-Total	0 052	0 051	0.027	0 046	0,051	0.046	0111	0 001	
Dissolved Metals								20.0	
Dissolved Metals Filtration Location	FIELD	FIELD 4 03	FIELD 4.36	FIELD 3,06	FIELD 2 81	FIELD 2.71	FIELD 3 32	FIELD 3 09	3.33
Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved	3 26 <0 00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0 00
Arsenic (As)-Dissolved	<0.00050	<0 00050	<0 00050	<0 00050	<0 00050	<0.00050	<0 00050	<0 00050	
Barium (Ba)-Dissolved	0 0281	0 0251	0.0240	0.0198	0 0201	0 0186	0.0198	0.0182	
Beryllium (Be)-Dissolved Bismuth (Bi)-Dissolved	<0 00050 <0 0025	<0.00050 <0.0025	<0.00050 <0.0025	<0.00050 <0.0025	<0.00050 <0.0025	<0.00050 <0.0025	<0 00050 <0 0025	<0.00050 <0.0025	
Boron (B)-Dissolved	<0.050	<0.050	< 0.050	<0.050	<0 050	< 0 050	< 0 050	<0.050	
Cadmium (Cd)-Dissolved	0 000090	0 000099	0 000063	0 000074	0 000101	0 000088	0 000089	0.000088	
Calcium (Ca)-Dissolved Chromium (Cr)-Dissolved	499 0 00194	503 0.00241	531 0.00334	457 0 00374	470 0,00433	481 0,00386	491 0 00384	520 0 00477	
Cobalt (Co)-Dissolved	<0 00050	<0.00050	<0 00050	<0.00050	<0.00050	<0.00050	< 0 00050	<0 00050	
Copper (Cu)-Dissolved	0.0010	< 0.0010	<0 0010	0 0013	0.0044	0.0016	0 0075	0.0022	
Iron (Fe)-Dissolved	<0.050	<0 050 <0 00025	<0 050 <0 00025	<0.050 <0.00025	<0.00025	<0.050 <0.00025	<0.050 <0.00025	<0.050 <0.00025	
Lead (Pb)-Dissolved Lithium (Li)-Dissolved	<0 00025 0 0085	0.00025	0 0065	0 0060	0 0062	0 0073	0 0056	0 0054	
Magnesium (Mg)-Dissolved	0.74	1,33	4 02	2 47	1 99	1 39	1.76	3 20	
Manganese (Mn)-Dissolved	0 00026	0 00049	0 00083	0.00082	0.00211	0 00096	0.00400	0.00136	
Mercury (Hg)-Dissolved	<0 000010 0 117	<0 000010 0 0776	<0.000010 0.0730	<0.000010 0.0749	<0.000010 0.0791	<0.000010 0.0885	<0.000010 0.0783	<0.000010 0.0799	0 084
Molybdenum (Mo)-Dissolved Nickel (Ni)-Dissolved	<0 0025	<0.0025	<0.0025	<0.0025	<0.0025	<0 0025	<0.0025	<0 0025	0 004
Phosphorus (P)-Dissolved	<0.30	<0.30	<0 30	<0.30	<0,30	<0.30	<0.30	<0.30	
Potassium (K)-Dissolved	1 68	1 63	1 78	1.62	1.71	1 69	1.66	1.71 0.0633	
Selenium (Se)-Dissolved Silicon (Si)-Dissolved	0 0647 0 125	0 0639 0 110	0 0668	0.0587	0 0616 0 114	0 0617 0 107	0 0621 0 105	0 0633	
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0 000050	<0 000050	<0 000050	<0 000050	<0 000050	<0.000050	
Sodium (Na)-Dissolved	6 01	5 58	6 07	5.58	5 71	6 57	6.55	5 90	
Strontium (Sr)-Dissolved	0 840	0.780	0 821 <0 000050	0.815 <0.000050	0 835 <0 000050	0.852 <0.000050	0 818 <0 000050	0 858 <0 000050	
Thallium (TI)-Dissolved Tin (Sn)-Dissolved	<0.000050 0.00107	0,000071 0 00097	0 000050	0.00100	0 00098	0 00091	0 00110	0.00086	
Titanium (Ti)-Dissolved	<0.010	< 0.010	< 0 010	0 011	0.011	0 016	0.015	0.015	
Uranium (U)-Dissolved	<0 000050	<0 000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Vanadium (V)-Dissolved Zinc (Zn)-Dissolved	<0 0050 <0 0050	<0.0050 <0.0050	<0 0050 <0 0050	<0 0050 <0 0050	<0.0050 <0.0050	<0 0050 <0 0050	<0.0050 <0.0050	<0 0050 <0 0050	
and fair advantage	-0 0000	-0.0000	.5.5500	5,5500	+ +300	+ - 300	300		

RESULTS OF ANALYSIS

RESULTS OF ANALTSIS								
Sample ID Date Sampled Time Sampled	1298-012 OCT21A - REACTOR2 21-OCT-12 14:00	1298-015 OCT21B - REACTOR2 21-OCT-12 14:00	1298-019 OCT22A - REACTOR2 22-OCT-12 02:00	- REACTOR2 22-OCT-12 14:00	1298-027 OCT23A - REACTOR2 23-OCT-12 02:00	- REACTOR2 23-OCT-12 14:00	- REACTOR2 24-OCT-12 02:00	REACTOR2 24-OCT-12 14:00
ALS Sample ID Matrix	L1227084-3 Water	L1227088-2 Water	L1227087-2 Water	L1227710-2 Water	L1228152-1 Waler	L1228195-2 Water	L1228156-2 Water	L1228980-2 Water
Physical Tests Hardness (as CaCO3)	1280	1310	1260	1170	1230	1180	1210	1310
pH	4	-	-	7 = 1	-	1.0	*	-
Total Suspended Solids Total Dissolved Solids					3	2	\$	3
Turbidity	2	-	2	\$ P	3	ác	*	-
Anions and Nutrients								
Acidity (as CaCO3)		-	3	- 3	ĕ	셄	- 5	.5
Alkalinity, Bicarbonate (as CaCO3) Alkalinity, Carbonate (as CaCO3)	\$	- 3	9		-	31	*	
Alkalinity, Hydroxide (as CaCO3)	*	100	ŝ	124	ā	103	5	8
Alkalinity, Total (as CaCO3) Ammonia, Total (as N)	-	-	8	IIS.		15%	8	
Bromide (Br) Chloride (Cl)	5	- 5	i i	183	¥	74.1	2	1.4
Fluoride (F)	-		3	-	3	-	3	
Nitrate (as N)	7.0	F:		[64]	8	2.6	~	3
Nitrite (as N) Orthophosphate-Dissolved (as P)	2	5	3	(5)	8	720	2	4
Phosphorus (P)-Total		•	*	*	3	57		3
Sulfate (SO4)	1.7	-				- 20		
Total Metals Aluminum (AI)-Total	92	6		18	2		2	4
Antimony (Sb)-Total	· ·	-	25	- 5	ð.	(23)	*	
Arsenic (As)-Total Barium (Ba)-Total	-	- 5	<u>.</u>			163	-	3
Beryllium (Be)-Tolal		- 6			2	(5)	8	6.
Bismuth (Bi)-Total Boron (B)-Total		**	9			190	Ĭ	(4)
Cadmium (Cd)-Total	-		ů.	31	5	7.4	-	
Calcium (Ca)-Total Chromium (Cr)-Total				-				
Cobalt (Co)-Total		₽.	\$	- 6	Ş	:43	- 2	à
Copper (Cu)-Total Iron (Fe)-Total		3	3	5		-01	-	
Lead (Pb)-Total		¥0		- 5	25	183		21.
Lithium (Li)-Total Magnesium (Mg)-Total	9	25	2	5	\$	-	Ţ.	
Manganese (Mn)-Total	3	#	12	5	*	-0.	3	255
Mercury (Hg)-Total Molybdenum (Mo)-Total	-	2: 2:	i a		9			563
Nickel (Ni)-Total	-	2	3	- 6	2		8	127
Phosphorus (P)-Total Potassium (K)-Total		*0	04				3	-
Selenium (Se)-Total		4	-	+	74	F :	2	121
Silicon (Si)-Total Silver (Ag)-Total		-	4	3	12	-	2	2
Sodium (Na)-Total	54	*	=	*1	(÷			
Strontium (Sr)-Total Thallium (TI)-Total	-	-	- 1	돸	5	2	ş	120
Tin (Sn)-Total	9	Š	- 6	8	18	-		
Titanium (Ti)-Total Uranium (U)-Total	5	ŝ	-	*	-		*	263
Vanadium (V)-Total	- 3	5	8	3	2		*	
Zinc (Zn)-Total								
Dissolved Metals Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	377	5 27 <0.00050	3 74 <0 00050	2 92 <0 00050	2 69 <0 00050	2 78 <0 00050	2 86 <0 00050	3 12 <0 00050
Antimony (Sb)-Dissolved Arsenic (As)-Dissolved	<0 00050 <0 00050	<0 00050	<0.00050	<0 00050	< 0 00050	<0 00050	<0 00050	<0 00050
Barium (Ba)-Dissolved	0 0287 <0 00050	0.0286 <0.00050	0.0222 <0.00050	0 0209 <0 00050	0 0221 <0 00050	0 0190 <0 00050	0.0188 <0.00050	0.0180 <0.00050
Beryllium (Be)-Dissolved Bismulh (Bi)-Dissolved	<0 00050	<0 00050	<0 0025	<0 0025	< 0 0025	< 0 0025	<0 0025	< 0.0025
Boron (B)-Dissolved	<0.050	<0.050	<0.050 0.000063	<0.050 0.000088	<0.050 0.000089	<0,050 0.000080	<0 050 0 000071	<0.050 0.000072
Cadmium (Cd)-Dissolved Calcium (Ca)-Dissolved	0 000069 5 1 0	0 000075 521	502	464	491	472	482	520
Chromium (Cr)-Dissolved	0.00202	0 00193	0 00329	0.00387	0 00492 <0 00050	0,00408 <0.00050	0 00393	0 00429 <0.00050
Cobalt (Co)-Dissolved Copper (Cu)-Dissolved	<0 00050 0 0035	<0 00050 0 0122	<0 00050 0 0023	0 0141	0 0011	<0.0010	0 0046	<0.00030
Iron (Fe)-Dissolved	<0.050	0.135	<0.050	0 146	<0.050	<0.050	<0.050 <0.00025	<0.050
Lead (Pb)-Dissolved Lithium (Li)-Dissolved	<0 00025 0 0085	<0 00025 0 0062	<0 00025 0 0067	<0 00025 0 0064	<0.00025 0.0075	<0.00025 0.0073	0 0064	<0.00025 0.0054
Magnesium (Mg)-Dissolved	0.68	1.72	1.64	2,38	1_31	1.44	2 14	3 55
Manganese (Mn)-Dissolved Mercury (Hg)-Dissolved	0 00151 <0 000010	0 00851 <0 000010	0 00132 <0 000010	0.00894	0 00070 <0 000010	0 00064 <0 000010	0 00277 <0 000010	0 00077 <0 000010
Molybdenum (Mo)-Dissolved	0 102	0 0771	0 0803	0.0772	0.0826	0 0851	0 0786	0.0763
Nickel (Ni)-Dissolved Phosphorus (P)-Dissolved	<0 0025 <0 30	<0.0025 <0.30	<0 0025 <0 30	<0 0025 <0 30	<0 0025 <0 30	<0 0025 <0 30	<0 0025 <0 30	<0.0025 <0.30
Potassium (K)-Dissolved	1 75	1 76	1.77	1.63	1.83	1.75	1 61	1.68
Selenium (Se)-Dissolved Silicon (Si)-Dissolved	0 0669 0 163	0.099	0.093	0 0599	0 0663 0 109	0 0613 0 112	0 0602	0.0639 0.088
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0 000050	<0 000050	<0 000050	<0 000050	<0 000050	<0.000050
Sodium (Na)-Dissolved	6 16 0 870	5 96 0 843	5 90 0 824	5 52 0 844	6 67 0 871	6 59 0 850	6 56 0 807	5 79 0 841
Strontium (Sr)-Dissolved Thallium (TI)-Dissolved	<0 000050	< 0.000050	<0 000050	<0 000050	< 0 000050	<0.000050	< 0.000050	<0.000050
Tin (Sn)-Dissolved	0 00105 <0 010	0 00098 <0 010	0 00096 <0 010	0.00097	0 00099	0.00098	0.00089	0 00095 0 016
Titanium (Ti)-Dissolved Uranium (U)-Dissolved	<0.000050	<0.000050	<0.000050	<0 000050	<0 000050	< 0.000050	<0.000050	<0.000050
Vanadium (V)-Dissolved	<0.0050 <0.0050	<0 0050 <0 0050	<0 0050 <0 0050	<0 0050 <0 0050	<0 0050 <0 0050	<0 0050 <0 0050	<0.0050 <0.0050	<0.0050 <0.0050
Zinc (Zn)-Dissolved	~0 0000	~0000	-0,0000	40.000	-5 0000	.0.000	-5,0000	

RESULTS OF ANALYSIS

Sample I	(D	1298-013 OCT21A 1 - REACTOR1	298-016 OCT21B - REACTOR1	1298-020 OCT22A - - REACTOR1	1298-024 OCT22B - REACTOR1	1298-028 OCT23A - REACTOR1	1298-032 OCT23B - REACTOR1	1298-035 OCT24A - REACTOR1	1298-039 OCT24B REACTOR1
Date San Time San ALS San	mpled impled	21-OCT-12 14:00 L1227084-4	21-OCT-12 14:00 L1227088-3	22-OCT-12 02:00 L1227087-3	22-OCT-12 14:00 L1227710-3	23-OCT-12 02:00 L1227707-3	23-OCT-12 14:00 L1228195-3	24-OCT-12 02:00 L1228156-3	24-OCT-12 14:00 L1228980-3
Matrix	mpic ib	Water							
	at Tests as (as CaCO3)	1280	1310	1250	1180	1160	1210	1190	1270
pH Total Sus	spended Solids	- E	Ta.		*	162	2	141	*
	ssolved Solids	3						721	
	and Nutrients								
Acidity (a	as CaCO3)	20	*	8		5	5	100	÷
	y, Bicarbonate (as CaCO3) y, Carbonate (as CaCO3)	- 2	- 6	*0		5	8	(*)	8
	y, Hydroxide (as CaCO3)	÷	4	5	S	3	8	1	8
	y, Total (as CaCO3) ia, Total (as N)	8	- 1	*				557	Ď.
Bromide Chloride		-	- 1				36	10.2	-
Fluoride	(F)	5	2	9	8	-	Ğ	100	ži
Nitrate (a Nitrite (as				**		-	2	· 6	5
	osphale-Dissolved (as P)		4	-		=	3	192	8
Sulfate (orus (P)-Total (SO4)	ij		2	2		3	103	٥
Total Me					**	2.1	G.	ID.	
	ım (Al)-Total ıy (Sb)-Total	×.			34				8
Агвеліс ((As)-Total	3		2	2		· ·	163 100	2
	(Ba)-Tolal π (Be)-Tolal			5	Ğ			1	8
Bismuth Boron (B	(Bi)-Total B)-Total	*	4	2:	5i	-	- X		-
Cadmiun	m (Cd)-Total	3		\$	-	=		-	2
	ı (Ca)-Total um (Cr)-Total	*			(i)		3	3	~
Cobalt (0	Co)-Total	*	4	8	(A	-	-	-	i i
Iron (Fe)	(Cu)-Tolal)-Total	8		*		2	2	\$	8
Lead (Pt	b)-Total (Li)-Total			8		5	3		ŏ
	ium (Mg)-Total	Ş	à	*	8	*0	(÷		<u>=</u>
	nese (Mn)-Total / (Hg)-Total	Ğ	5	2	ž.	2	š	8	4
Molybde	enum (Mo)-Total	ă	21	ğ	3	5	*	1	2
Nickel (N Phospho	orus (P)-Total	Ş.	å	-		**	-	5	8
	um (K)-Total m (Se)-Total	÷	5	2	\$	퓛	£	- 5	ž.
Silicon (S	Si)-Total	8	91	8		#	ā	5	8
Silver (A	Ag)-Total (Na)-Total			ŝ		90		-	-
Strontiur	m (Sr)-Total	9	12	8		9			î.
Tin (Sn)-	n (TI)-Total)-Total	9	(0.0	9	3			6	
	n (Ti)-Total n (U)-Total	ĵ.	196	- č	9	÷	-		*
Vanadiu	ım (V)-Tolal	-	7	8		î.	-	20	2
Zinc (Zn		_			a	**	,	-	
Dissolve	red Metals ed Metals Estrution Location	FIELD							
	um (Al)-Dissolved nv (Sb)-Dissolved	5 00 <0 00050	5 85 <0.00050	3 74 <0 00050	3 04 <0 00050	2 98 <0 00050	3 41 <0 00050	3.21 <0.00050	3.43 <0.00050
	(As)-Dissolved	<0.00050 0.0303	0 00062 0 0301	<0 00050 0 0226	<0.00050 0.0205	<0.00050 0.0193	<0.00050	<0.00050	<0.00050 0.0195
	(Ba)-Dissolved m (Be)-Dissolved	<0 00050	<0.00050	<0 00050	<0.00050	<0.00050	<0.00050	<0 00050	<0 00050
	n (Bi)-Dissolved B)-Dissolved	<0 0025 <0 050	<0.0025 <0.050	<0 0025 <0 050	<0 0025 <0 050				
Cadmiu	ım (Cd)-Dissolved	0.000056	<0 000050	0 000070	0 000134	0 000059	0 000077	0 000062	0 000084
	n (Ca)-Dissolved um (Cr)-Dissolved	512 0.00163	521 0.00215	497 0.00331	467 0 00402	461 0,00405	482 0 00380	471 0 00372	502 0 00436
Cobalt ((Co)-Dissolved	<0 00050 0 0012	<0.00050 0.0016	<0.00050 0.0015	0.00074	<0 00050 <0 0010	<0 00050 <0 0010	<0 00050 0 0032	<0.00050 0.0019
	(Cu)-Dissolved e)-Dissolved	<0.050	< 0 050	< 0 050	0 334	< 0.050	< 0.050	< 0.050	<0.050
	Pb)-Dissolved (Li)-Dissolved	<0 00025 0 0079	<0.00025 0.0058	<0.00025 0.0069	<0 00025 0 0061	<0.00025 0.0060	<0.00025 0.0079	<0 00025 0 0059	<0 00025 0 0057
Magnes	sium (Mg)-Dissolved	0.85	2 49	1.63	2 26	1 42	1 80	2 76	4.90
	nese (Mn)-Dissolved y (Hg)-Dissolved	0 00095 <0 000010	0 00114	0 00071 <0 000010	0 0198 <0 000010	0.00034 <0.000010	0 00072 <0 000010	0 00211 <0 000010	0 00137 <0 000010
Molybde	enum (Mo)-Dissolved	0.0901	0.0717	0 0785	0 0746	0 0797	0 0853 <0 0025	0.0767	0 0719 <0 0025
	Ni)-Dissolved norus (P)-Dissolved	<0 0025 <0 30	<0.0025 <0.30	<0 0025 <0 30	<0 0025 <0 30	<0.0025 <0.30	< 0.30	< 0.30	<0.30
Potassiu	ium (K)-Dissolved	1 83 0 0641	1 74 0 0675	1 71 0 0638	1 55 0 0566	1.71 0.0606	1.71 0.0630	1 69 0 0625	1,64 0.0615
	m (Se)-Dissolved (Si)-Dissolved	0.127	0.107	0.105	0 119	0 123	0 112	0 093	0.091
Silver (A	Ag)-Dissolved 1 (Na)-Dissolved	<0.000050 6.09	<0,000050 5.90	<0.000050 5.97	<0 000050 5.36	<0 000050 5 83	<0 000050	<0 000050 6 24	<0.000050 5.83
Strontiu	ım (Sr)-Dissolved	0 822	0 823	0 821	0 788	0,854	0.871	0.814	0.831
	m (TI)-Dissolved I)-Dissolved	<0.000050 0.00097	0.000053	<0 000050 0 00093	<0.000050 0.00099	<0.000050 0.00111	<0.000050 0.00102	<0 000050 0 00097	<0 000050 0 00092
Titanium	m (TI)-Dissolved	<0.010	< 0010	< 0 010	0 012 <0 000050	<0 010 <0 000050	0 015 <0 000050	0 014 <0 000050	0 015 <0 000050
	m (U)-Dissolved um (V)-Dissolved	<0.000050 <0.0050	<0 000050 <0 0050	<0.000050 <0.0050	<0.0050	<0,0050	<0 0050	< 0.0050	< 0.0050
* GITGGIG		<0.0050	< 0 0050	< 0.0050	0.0072	<0,0050	< 0 0050	< 0 0050	< 0.0050

Sample ID	- FEED	- FEED	- FEED	- FEED	- FEED	- FEED	FEED	
Date Sampled	21-OCT-12	21-OCT-12	22-OCT-12	22-OCT-12	23-OCT-12	24-OCT-12	24-OCT-12	
Time Sampled	14:00	14:00	02:00	14:00	02:00	02:00	14:00	
ALS Sample ID	L1227084-2	L1227088-4	L1227087-4	L1227710-4	L1227707-4	L1228156-4	L1228980-4	
Matrix	Water	Water	Water	Water	Water	Water	Water	Aug
Physical Tests								Average
Hardness (as CaCO3)	370	374	374	365	371	387	395	
pH	2.63	=	7.0	160		1000	V	
Total Suspended Solids	37.3	-					0	
Total Dissolved Solids	1950		2	16		120	Si .	
Turbidity	68.6	==	35	[83			20	
Anions and Nutrients Acidity (as CaCO3)	984		2	2.	8	100	8	
Alkalinity, Bicarbonate (as CaCO3)	<10	3	Ş.	-	÷	- 0	2	
Alkalinity, Carbonate (as CaCO3)	<1.0				-			
Alkalinity, Hydroxide (as CaCO3)	<1.0				2		2	
Alkalinity, Total (as CaCO3)	<10		200	100	~	-	×	
Ammonia, Total (as N)	0.0085		- 5		8		2	
Bromide (Br)	<1,0	100		-	8	60	*	
Chloride (Cl)	<10	-			-	1.47	7	
Fluoride (F)	1 38	25	- 2	25	-	172	2	
Nitrate (as N)	0.81	40	13	12	=	1.00	- 5	
Nitrite (as N)	0 030	-	12	100	-	727	2	
Orthophosphate-Dissolved (as P)	0 0340			F.3	*		8	
Phosphorus (P)-Total	<0.20	7/	- 3	5.5	- 3	17.1	5	
Sulfate (SO4)	1350	-	9	1,5		(4)	×	
Total Metals								
Aluminum (Al)-Total	33 6	-	98	P.		367	8	
Antimony (Sb)-Total	0 00207	4		6	8		2	
Arsenic (As)-Total	0.138		, A	i.	¥	6.	¥	
Barium (Ba)-Total	0 0870	- 5				1.75		
Beryllium (Be)-Total	0.00271	-	7.0	-	~	10.7	×	
Bismuth (Bi)-Total	<0 0025	- 5	3.	55	8	JIS .	~	
Boron (B)-Total	<0.050					-	0	
Cadmium (Cd)-Total	0 0423	-			*	•	*	
Calcium (Ca)-Total	101	- 2	2	12	8	(5)	8	
Chromium (Cr)-Total	0 0232	-				De S	*	
Cobalt (Co)-Total	0 470 20 3	- 8	- 3	5	8		8	
Copper (Cu)-Total Iron (Fe)-Total	233							
Lead (Pb)-Total	0 0378	-			0		Ģ	
Lithium (Li)-Total	0 0117	2	2		8	- 62	3	
Magnesium (Mg)-Total	22 2	-				10.5	-	
Manganese (Mn)-Total	13.5	2	7				-	
Mercury (Hg)-Total	0 000039	41	7.0		>	190		
Molybdenum (Mo)-Total	0.124				*	5.0	2	
Nickel (Ni)-Total	0.185	2	8	n	9	16.1		
Phosphorus (P)-Total	< 0.30	+1			19	12.0		
Potassium (K)-Total	1 65				2	F :	2	
Selenium (Se)-Total	0.112		2	63	25	IN.	8	
Silicon (Si)-Total	6 37				~	-		
Silver (Ag)-Total	0.00382	A)	Ch.		96	F.3	*	
Sodium (Na)-Total	5 66	**	1.5	5		7.5		
Strontium (Sr)-Total	0.754	*1		F-1		P.3	-	
Thallium (TI)-Total	0 000122			- 6	- 3	.18	**	
Tin (Sn)-Total	0 00112			-				
Titanium (Ti)-Total	0 832	**	- 0	E:		-		
Uranium (U)-Total	0 00194	2	- 5	3	8	5	8	
Vanadium (V)-Total Zinc (Zn)-Total	0 0064 3 64		1.0	- E				
Dissolved Metals Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	
Aluminum (Al)-Dissolved	34.4	34.5	35.1	31.7	34.7	35.3	34 2	34.3
Antimony (Sb)-Dissolved	<0 00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Arsenic (As)-Dissolved	0,129	0.138	0.132	0.118	0 127	0 122	0 120	
Barium (Ba)-Dissolved	0 0835	0 0837	0 0870	0 0783	0.0900	0.0827	0.0840	
Beryllium (Be)-Dissolved	0 00257	0 00263	0 00255	0 00269	0 00275	0.00295	0 00269	
Diamodh (Di) Diaeahad	<0.0025	<0.0026	-0.0026	<0.0025	<0.0025	<0.0025	<0.0025	

Anions and Nutrients									
Acidity (as CaCO3)	984				*	(8)	*		
Alkalinity, Bicarbonate (as CaCO3)	<10			16.			*		
Alkalinity, Carbonate (as CaCO3)	<1.0	- 5		- 151	0				
Alkalinity, Hydroxide (as CaCO3)	<1.0	-		I .		-	>:		
Alkalinity, Total (as CaCO3)	<10			. 9	8	-	5		
Ammonia, Total (as N)	0 0085	- 5			-	-	-		
Bromide (Br)	<1.0	F		-	8	100	∞		
Chloride (Cl)	<10	2	2	(2)		1.26	7		
Fluoride (F)	1 38	-		65		90	20		
Nitrate (as N)	0.81		15	. 54			- 5		
Nitrite (as N)	0 030	-			-	741			
Orthophosphate-Dissolved (as P)	0 0340	-		F.	*		*		
Phosphorus (P)-Total	<0.20	72		51	- X	100			
Sulfate (SO4)	1350	E.	9.	1.5		145	(A)		
Total Metals									
Aluminum (Al)-Total	33 6	20	27			36	5		
Antimony (Sb)-Total	0 00207	- 5		6			-		
Arsenic (As)-Total	0,138		- A	b.	-	6.	₩.		
Barium (Ba)-Total	0 0870	- 5			0	1.70			
Beryllium (Be)-Total	0_00271	-		F .	2	10.7	~		
Bismuth (Bi)-Total	<0 0025	45	3.	100	8	JIS.			
Boron (B)-Total	<0.050	-			-	100	-		
Cadmium (Cd)-Total	0 0423	-				€	8		
Calcium (Ca)-Total	101	5	10	51		100			
Chromium (Cr)-Total	0 0232		18	20	~	-	~		
Cobalt (Co)-Total	0 470	*	25	5	× .		*		
Copper (Cu)-Total	20 3	25	- 2		~		~		
Iron (Fe)-Total	233				=		*		
Lead (Pb)-Total	0 0378	7.1	25			100	8		
Lithium (Li)-Total	0 0117	-	- 9		14	240			
Magnesium (Mg)-Total	22 2	7	2.0	E.	:7	.753	-		
Manganese (Mn)-Total	13.5	20				1.00	*		
Mercury (Hg)-Total	0 000039	61	26		8	369			
Molybdenum (Mo)-Total	0 124	7	7				8		
Nickel (Ni)-Total	0.185		- Si	h.1	Gir.	16.			
Phosphorus (P)-Total	< 0.30	#1	100	51		100			
Potassium (K)-Total	1 65				14	F .	-		
Selenium (Se)-Total	0.112	**	25	- 5	25	PS.	×		
Silicon (Si)-Total	6 37				~	-	-		
Silver (Ag)-Total	0 00382	A)	(A	-	9	F.2	*		
Sodium (Na)-Total	5 66	**	1.7	* 1	7.	1,61			
Strontium (Sr)-Total	0,754	#1	1.0	F .		P.7	-		
Thallium (TI)-Total	0 000122	10		FS	13	15.			
Tin (Sn)-Total	0 00112								
Tin (Sn)-Total Titanium (Ti)-Total	0 00112 0 832	-	9	E:	-	36			
Titanium (Ti)-Total			0	6		36	i		
Titanium (Ti)-Total Uranium (U)-Total	0 832	1 1	2	2	\$	∋e 12	į		
Titanium (Ti)-Total	0 832 0 00194	10 12 12 13		2	3 3)e 2 			
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total	0 832 0 00194 0 0064	12 12 13 14 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16		5 5 5	3)E			
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total	0 832 0 00194 0 0064			8 8 8	3. 500 %	36 2 8	Š		
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total	0 832 0 00194 0 0064	FIELD		FIELD	FIELD	FIELD	FIELD		
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals	0 832 0 00194 0 0064 3 64		59	31.7	34.7	35.3	34 2		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals	0 832 0 00194 0 0064 3 64	FIELD	FIELD	31.7 <0.00050	34.7 <0.00050	35.3 <0.00050	34 2 <0 00050		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (Al)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4	FIELD 34.5	FIELD 35.1	31.7 <0.00050 0.118	34.7 <0.00050 0.127	35 3 <0 00050 0 122	34 2 <0 00050 0 120		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (2n)-Total Dissolved Metals Dissolved Metals Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050	FIELD 34.5 <0.00050	FIELD 35.1 <0.00050	31.7 <0.00050	34.7 <0.00050	35.3 <0.00050	34 2 <0 00050		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved Arsonic (As)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129	FIELD 34.5 <0.00050 0.138	FIELD 35.1 <0.00050 0.132	31.7 <0.00050 0.118	34.7 <0.00050 0.127	35 3 <0 00050 0 122	34 2 <0 00050 0 120		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanium (U)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Banium (Ba)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0,129 0 0835	FIELD 34.5 <0.00050 0.138 0.0837 0.00263 <0.0025	FIELD 35.1 <0.00050 0.132 0 0870 0 00255 <0.0025	31.7 <0 00050 0.118 0 0783 0 00269 <0 0025	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025	35.3 <0.00050 0.122 0.0827 0.00295 <0.0025	34 2 <0 00050 0 120 0 0840 0 00269 <0 0025		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Barium (Be)-Dissolved Beryllum (Be)-Dissolved Bismuth (Bi)-Dissolved Boront (B)-Dissolved Boront (B)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0935 0 00257 <0,0025	FIELD 34.5 <0.00050	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.0025	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.050	34,7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.050	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.050	34 2 <0 00050 0 120 0 0840 0 00269 <0 0025 <0 050		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Bismuth (Bl)-Dissolved Bismuth (Bl)-Dissolved Cadmium (Cd)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0835 0 00257 <0.0025 <0.0025	FIELD 34.5 <0.00050	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 0.050 0.0455	31.7 <0.00050 0.118 0.0763 0.00269 <0.0025 <0.050 0.0413	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.050 0.0453	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.050 0.0422	34 2 <0 00050 0 120 0 0840 0 00269 <0 0025 <0 050 0 0442		34.3
Titanium (Ti)-Total Uranium (U)-Total Uranium (U)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Barlum (Ba)-Dissolved Beryillum (Be)-Dissolved Beryillum (Be)-Dissolved Bismuth (Bi)-Dissolved Bismuth (Bi)-Dissolved Cadmium (Cd)-Dissolved Cadmium (Cd)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0835 0 00257 <0.0025 <0.050 0 0422 109	FIELD 34.5 <0 00050	FIELD 35.1 <0.00050 0.132 0 0870 0 00255 <0.0025 <0.050 0 0455 110	31.7 <0 00050 0.118 0 0763 0 00269 <0 0025 <0 050 0 0413 106	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.050 0.0453 109	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.050 0.0422 114	34.2 <0.00050 0.120 0.0840 0.00269 <0.0025 <0.050 0.0442 116		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zino (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Arsonic (As)-Dissolved Barium (Ba)-Dissolved Berylium (Be)-Dissolved Bismuth (Bi)-Dissolved Bismuth (Bi)-Dissolved Cadmium (Cd)-Dissolved Cadmium (Cd)-Dissolved Calcium (Ca)-Dissolved Catomium (Ca)-Dissolved Catomium (Ca)-Dissolved Catomium (Ca)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0895 0 00257 <0.0025 <0.0025 0 0422 109 0 0242	FIELD 34.5 <0.00050	FIELD 35.1 <0.00050	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.050 0.0413 106 0.0226	34/7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.050 0.0453 109 0.0242	35.3 <0,00050 0 122 0.0827 0.00295 <0 0025 <0 050 0 0422 114 0.0227	34 2 <0,00050 0 120 0.0840 0.00269 <0.0025 <0.050 0.0442 116 0,0245		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Filtration Location Aluminum (Ai)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Barium (Ba)-Dissolved Beryllum (Be)-Dissolved Bismuth (Bi)-Dissolved Bismuth (Bi)-Dissolved Cadmium (Cq)-Dissolved Cadmium (Cq)-Dissolved Cadmium (Cq)-Dissolved Chotalt (Co)-Dissolved Chotalt (Co)-Dissolved Chotalt (Co)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0835 0 00257 <0.0025 <0.0025 0 0.0422 109 0 0242 0 0481	FIELD 34.5 <0.00050 0.138 0.0837 0.00263 <0.0025 <0.0025 110 0.0251 0.496	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.0050 0.0455 110 0.0245 0.499	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.050 0.0413 106 0.0226 0.450	34,7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0050 0.0453 109 0.0242 0.495	35.3 <0.00050 0.122 0.0827 0.00295 <0.0025 <0.050 0.0422 114 0.0227 0.507	34.2 <0.00050 0.120 0.0840 0.00269 <0.0025 <0.050 0.0442 116 0.0245 0.492		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zino (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Arsonic (As)-Dissolved Barium (Ba)-Dissolved Berylium (Be)-Dissolved Bismuth (Bi)-Dissolved Bismuth (Bi)-Dissolved Cadmium (Cd)-Dissolved Cadmium (Cd)-Dissolved Calcium (Ca)-Dissolved Catomium (Ca)-Dissolved Catomium (Ca)-Dissolved Catomium (Ca)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0,129 0 0835 0 00257 <0.0025 <0,050 0 0,422 109 0 0242 0 481 20,7	FIELD 34.5 <0.00050	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.0025 110 0.0245 110 0.0245 0.499 21,7	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.050 0.0413 106 0.0226 0.450 20.5	34/7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.050 0.0453 109 0.0242 0.495 22.4	35.3 <0.00050 0.122 0.0827 0.00295 <0.0025 <0.050 0.0422 114 0.0227 0.507 21.7	34.2 <0.00050 0.120 0.0840 0.00269 <0.0025 <0.050 0.0442 116 0.0245 0.492 22.3		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadum (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Aluminum (Al)-Dissolved Antimony (Sh)-Dissolved Arsenic (Sh)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Benyilum (Be)-Dissolved Born (B)-Dissolved Cadmium (Ce)-Dissolved Cadmium (Ce)-Dissolved Cadmium (Ce)-Dissolved Chromium (Ce)-Dissolved Chromium (Ce)-Dissolved Cobalt (Co)-Dissolved Cobalt (Co)-Dissolved Cobalt (Co)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0835 0 00257 <0.0025 <0.0025 0 0422 109 0 0242 0 481 20 7 232	FIELD 34.5 <0.00050	FIELD 35.1 <0.00050	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.050 0.0413 106 0.0226 0.450 20.5	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.050 0.0453 109 0.0242 0.495 22.4	35.3 <0,00050 0 122 0.0827 0.00295 <0 0025 <0 050 0 0422 114 0.0227 0.507 21 7 231	34.2 <0,00050 0.120 0.0840 0.00269 <0.0025 <0.050 0.0442 116 0.0245 0.492 22.3 231		34.3
Titanium (Ti)-Total Uranium (U)-Total Uranium (U)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Arisnon(Ca)-Dissolved Barium (Ba)-Dissolved Beryllum (Be)-Dissolved Beryllum (Be)-Dissolved Bismuth (Bi)-Dissolved Bismuth (Bi)-Dissolved Cadmium (Cd)-Dissolved Cadmium (Cd)-Dissolved Chotal (Co)-Dissolved Chotal (Co)-Dissolved Copper (Cu)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved	0 832 0 00194 0 0064 3 84 FIELD 34.4 <0 00055 0 .129 0 0835 0 .00257 <0 .0025 <0 .050 0 .0422 109 0 0242 0 .481 20.7 232 0 0345	FIELD 34.5 <0.00050 0.138 0.0837 0.00263 <0.0025 <0.0025 <0.0050 0.0453 110 0.0251 0.496 21.9 235 0.0429	FIELD 35.1 <0.00050 0.132 0.0070 0.00255 <0.00255 <0.0025 110 0.0025	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.0050 0.0413 106 0.0226 0.450 20.5 219	34.7 <0.00050 0.127 0.0900 0.00275 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0369	35.3 <0.00050 0.122 0.0827 0.00295 <0.0025 <0.0050 0.0422 114 0.0227 0.507 21.7 231 0.0370	34.2 <0.00050 0.120 0.0840 0.0025 <0.050 0.0442 116 0.0245 0.492 22.3 231 0.0389		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadum (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Fitration Location Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Bismuth (Bl)-Dissolved Bismuth (Bl)-Dissolved Cadmium (Cd)-Dissolved Cadmium (Cd)-Dissolved Chromium (Ca)-Dissolved Chopper (Cu)-Dissolved Lead (Pb)-Dissolved Lithium (LI)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0935 <0.0257 <0.0025 <0.050 0.0422 109 0 0242 0 481 20 7 232 0 0345 0.0104	FIELD 34.5 < 0.00059 < 0.138 < 0.00263 < 0.0026 < 0.0026 < 0.0026 < 0.0026 < 0.0025 < 0.050 < 0.0453 < 110 < 0.0251 < 0.496 < 219 < 235 < 0.0429 < 0.0107	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.0050 0.0455 110 0.0245 0.499 21.7 241 0.0382 0.0107	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.050 0.0413 106 0.0226 0.450 20.5 219 0.0366 0.0119	34.7 <0.00050 0.127 0.0900 0.00275 <0.0505 <0.050 0.0453 109 0.0242 0.495 22.4 22.1 0.069 0.0123	35.3 <0,00050 0.122 0.0827 0.00295 <0.00295 <0.0050 0.0422 114 0.0227 0.507 21.7 231 0.0370 0.0134	34 2 <0,00050 0.120 0.0840 0.00259 <0.0050 0.0442 116 0.02245 0.492 22.3 231 0.0389 0.0116		34.3
Titanium (Ti)-Total Uranium (U)-Total Uranium (U)-Total Zinc (Zn)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Barium (Ba)-Dissolved Beryllium (Ba)-Dissolved Beryllium (Be)-Dissolved Boron (B)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Chromium (Ca)-Dissolved Chobat (Co)-Dissolved Cobat (Co)-Dissolved Lobat (Dissolved Lobat (0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00065 0.129 0 0835 0 00257 <0.0025 <0.050 0.0422 109 0 0242 0.481 20.7 232 0 0345 0.0104 23.7	FIELD 34.5 0.00050 0.138 0.0937 0.00263 <0.0025 <0.0025 <0.0050 0.0453 110 0.0251 0.496 21.9 235 0.0429 0.0107 24.1	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.050 0.455 110 0.0245 0.499 21.7 24.1 0.0382 0.0107 24.0 0.0107 24.0 0.0107 24.0 0.0107 0.	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.0025 <0.050 0.0413 106 0.0226 0.450 20.5 219 0.0366 0.0119 24.3	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0389 0.0123 24.0	35.3 <0,00050 0 122 0.0827 0.00295 <0.0025 <0.050 0.0422 114 0.0227 0.507 21.7 231 0.0370 0.0134 24.9	34.2 <0.00050 0.120 0.0040 0.00269 <0.0025 <0.050 0.0442 116 0.0245 0.492 22.3 231 0.0389 0.0116 25.9		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Aliminum (Al)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Beryllium (Ba)-Dissolved Beryllium (Ba)-Dissolved Beryllium (Ba)-Dissolved Bismuth (Bi)-Dissolved Gardnium (Ca)-Dissolved Cacinium (Ca)-Dissolved Calcium (Ca)-Dissolved Calcium (Ca)-Dissolved Cobalt (Co)-Dissolved Cobalt (Co)-Dissolved Libium (Li)-Dissolved Lidium (Li)-Dissolved Lidium (Li)-Dissolved Manganese (Mn)-Dissolved Manganese (Mn)-Dissolved Manganese (Mn)-Dissolved Manganese (Mn)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0835 0 00257 <0.0050 0,0422 109 0 0242 0.481 20.7 232 0 0345 0.0104 23.7 13.8	FIELD 34.5 < 0.00050 < 0.138 < 0.0025 < 0.0025 < 0.0025 < 0.0025 < 0.0025 < 0.0025 < 0.0025 < 0.0050 < 0.0453 < 110 < 0.0251 < 0.496 < 21 9 < 235 < 0.0429 < 0.0107 < 24 1 < 14 1	FIELD 35.1 <0.00050	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.0050 0.0413 106 0.0226 0.450 20 5 219 0.0366 0.0119 24.3 13.4	34.7 <0.0050 0.127 0.0900 0.00275 <0.050 0.0453 109 0.0242 0.495 22.4 22.1 0.0369 0.0123 24.0 14.7	35.3 <0,00050 0 122 0.0827 0.00295 <0 0050 0 0422 114 0.0227 0.5007 21 7 231 0.0370 0.0134 24 9 14 8	34.2 <0.00050 0.120 0.0840 0.0025 <0.050 0.0442 116 0.0245 0.492 22.3 231 0.0389 0.0116 25.9		34.3
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved Arsonic (As)-Dissolved Banium (Ba)-Dissolved Banium (Ba)-Dissolved Benjilum (Be)-Dissolved Bismuth (Bl)-Dissolved Cadmium (Ce)-Dissolved Cadmium (Ce)-Dissolved Cadmium (Ce)-Dissolved Chromium (Ce)-Dissolved Chromium (Ch)-Dissolved Cobalt (Co)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Lithium (II)-Dissolved Magnesium (Mg)-Dissolved Margunese (Mn)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0835 0.00257 <0.0025 <0.0025 <0.0025 <0.0422 109 0 0242 0.481 20.7 232 0 0345 0.0104 23.7 13.8 <0.000010	FIELD 34.5 0.00050 0.138 0.0937 0.00263 <0.0025 <0.0050 0.0453 110 0.0251 0.496 21 9 235 0.0429 0.0107 24 1 1.1 1 0.000015	FIELD 35.1 -0.00050 0.132 0.0870 0.00255 -0.0025 -0.055 0.0455 110 0.0245 0.499 21.7 241 0.0362 0.0107 24.0 14.2 0.000014	31.7 <0.00050 0.118 0.0763 0.00259 <0.0025 <0.0025 <0.050 0.0413 106 0.0226 0.450 20 5 219 0.0366 0.0119 24 3 13 4 0.00017	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0369 0.0123 24.0 14.7 0.000020	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.0025 <0.0025 <0.0025 114 0.0227 0.507 217 231 0.0370 0.0134 24.9 14.8 0.0000021	34 2 <0,00050 0 120 0,0840 0 00259 <0 0025 <0 050 0 0442 116 0 02245 0 492 22 3 231 0,0389 0,0116 25 9 14,4 0,000015		
Titanium (Ti)-Total Uranium (U)-Total Uranium (U)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Filtration Location Aluminum (Ai)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Barium (Ba)-Dissolved Beryllum (Be)-Dissolved Beryllum (Be)-Dissolved Beryllum (Be)-Dissolved Cadmium (Cd)-Dissolved Cadmium (Cd)-Dissolved Chotalt (Co)-Dissolved Chotalt (Co)-Dissolved Chotalt (Co)-Dissolved Iron (Fe)-Dissolved Lithium (Li)-Dissolved Magnesium (Mg)-Dissolved Magnesium (Mg)-Dissolved Magnesium (Mg)-Dissolved Magnesium (Mg)-Dissolved Magnesium (Mg)-Dissolved Mercury (Hg)-Dissolved Molybdednum (Mg)-Dissolved Molybdenum (Mg)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00065 0 .129 0 0835 0 .00257 <0 .0025 <0 .050 0 .0422 109 0 0242 0 .481 20.7 232 0 0345 0 0104 23.7 13.8 <0 000010 0 0756	FIELD 34.5 -0.00050 -0.138 -0.00250 -0.0025 -0	FIELD 35.1 <0.00050 0.132 0.0070 0.0255 <0.0025 <0.0050 0.0455 110 0.0245 0.499 21.7 241 0.0362 0.0107 24.0 0.0205 0.0107 24.0 0.00014 0.00522	31.7 <0.00050 0.118 0.0783 0.00259 <0.0025 <0.0025 <0.050 0.0413 106 0.0226 0.450 20.5 219 0.366 0.0119 24.3 13.4 0.00017 0.000017	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0369 0.0123 24.0 14.7 0.000020 0.0805	35.3 <0,00050 0 122 0.0827 0.0027 0.00295 <0.0025 <0.050 0.0422 114 0.0227 0.507 21.7 231 0.0370 0.0134 24.9 14.8 0.000021 0.0829	34.2 <0.00050 0.120 0.0840 0.0025 <0.050 0.0442 116 0.0245 0.492 22.3 231 0.0389 0.0116 25.9 14.4 0.000015 0.0850		34.3 0.002
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Arsonic (As)-Dissolved Antimony (Sh)-Dissolved Arsonic (As)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Berylium (Be)-Dissolved Brium (Bi)-Dissolved Cadmium (Ci)-Dissolved Cadmium (Ci)-Dissolved Cadmium (Ci)-Dissolved Chromium (Ci)-Dissolved Choper (Ci)-Dissolved Lead (Ph)-Dissolved Lead (Ph)-Dissolved Lithium (Li)-Dissolved Magnesium (Mj)-Dissolved Manganese (Mn)-Dissolved Marcury (Hj)-Dissolved Molybdenum (Mo)-Dissolved Mickel (Mi)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 0 00050 0.129 0 0835 0 00257 <0.0025 <0.0025 <0.0026 0.0422 109 0 0242 0.481 20.7 232 0 0345 0.0104 23.7 13.9 <0.00010 0 0758 0.0166	FIELD 34.5 < 0.00059 0.138 0.00837 0.00263 < 0.0025 < 0.0026 < 0.0025 < 0.050 < 0.0453 < 110 < 0.0251 < 0.496 < 21 9 < 235 < 0.0429 < 0.0107 < 24 1 < 14 1 < 0.00015 < 0.0871 < 0.0971 < 0.0194	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.0050 0.0455 110 0.0245 0.499 24.17 24.1 0.0362 0.0107 24.0 0.00014 0.0822 0.00021 0.00021 0.000014 0.00021 0.000014 0.00021 0.000014 0.00021 0.000014	31.7 <0.00050 0.118 0.0783 0.00259 <0.0025 <0.0025 <0.0050 0.0413 106 0.0226 0.450 20 5 219 0.0366 0.0119 24 3 13 4 0.000017 0.0009 0.185	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0369 0.0123 24.0 14.7 0.000020 0.0805	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.0025 <0.0050 0.0422 114 0.0227 0.507 217 231 0.0370 0.0134 24.9 14.8 0.000021 0.0829 0.191	34 2 <0,00050 0.120 0.0840 0.00258 <0.0050 0.0442 116 0.02245 0.492 22.3 231 0.0389 0.0116 25 9 14.4 0.000015 0.0850 0.194		
Titanium (Ti)-Total Uranium (U)-Total Uranium (U)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Arsenic (As)-Dissolved Barium (Ba)-Dissolved Beryllium (Ba)-Dissolved Beryllium (Ba)-Dissolved Boron (B)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Calcium (Ca)-Dissolved Chobait (Ca)-Dissolved Chobait (Ca)-Dissolved Lithium (L)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Magnesium (Mg)-Dissolved Magnesium (Mg)-Dissolved Mercury (Hg)-Dissolved Nickel (NI)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00065 0.129 0 0835 0 00257 <0.0025 <0.050 0.0422 109 0 0242 0.481 20.7 232 0 0345 0.0104 23.7 13.8 0.000010 0.0758 0.166 <0.30	FIELD 34.5 0.00050 0.138 0.0059 0.00263 <0.0025 <0.0025 <0.0050 0.0453 110 0.0251 0.496 21.9 225 0.0429 0.0107 24.1 14.1 10.000015 0.0871 0.194 <0.30	FIELD 35.1 <0.00050	31.7 <0.00050 0.118 0.0783 0.00259 <0.0025 <0.0025 <0.0025 <0.050 0.0413 106 0.0226 0.450 20.5 219 0.0366 0.0119 24.3 13.4 0.00017 0.0809 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 <0.300 0.185 0.300 0.185 0.300 0.3	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 221 0.0369 0.0123 24.0 14.7 0.00020 0.0805 0.199 -0.30	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.0050 0.0422 1.14 0.0227 0.507 2.1.7 2.31 0.0370 0.0134 2.4.9 1.4.8 0.000021 0.0829 0.191 -0.30	34.2 <0.00050 0.120 0.0840 0.00259 <0.0025 <0.050 0.0442 116 0.0245 0.492 22.3 231 0.0389 0.0118 25.9 14.4 0.000015 0.0850 0.194 <0.30		
Titanium (Ti)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Auminum (A)-Dissolved Antimony (Sb)-Dissolved Arisonic (As)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Bismuth (Bi)-Dissolved Calorium (Ca)-Dissolved Cadrium (Ca)-Dissolved Calorium (Ca)-Dissolved Chromium (Ca)-Dissolved Chromium (Ca)-Dissolved Loper (Ca)-Dissolved Loper (Ca)-Dissolved Loper (Ca)-Dissolved Lithium (Li)-Dissolved Manganese (Mn)-Dissolved Manganese (Mn)-Dissolved Metal (Ni)-Dissolved Molybdenium (Mo)-Dissolved Nickel (Ni)-Dissolved Phosphorus (P)-Dissolved Phosphorus (P)-Dissolved Phosphorus (P)-Dissolved Phosphorus (P)-Dissolved Phosphorus (P)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00050 0.129 0 0835 0 00257 <0.0055 <0.050 0.0422 109 0 0242 0 481 20.7 232 0 0345 0 0104 23.7 13.8 <0 000010 0 0758 0 186 <0 30 1.75	FIELD 34.5 < 0.00059 < 0.138 < 0.0025 < 0.025 < 0.0026 < 0.0026 < 0.0026 < 0.0026 < 0.0026 < 0.0050 < 0.0453 < 110 < 0.0251 < 0.496 < 21 9 < 235 < 0.0429 < 0.0107 < 24 1 < 14 1 < 1.000015 < 0.00015 < 0.00015 < 0.00015 < 0.00015 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00017 < 0.00	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.0050 0.0455 110 0.0245 0.499 21,7 241 0.0362 0.0107 24,0 14.2 0.000014 0.0822 0.193 <0.30 1.74	31.7 <0.00050 0.118 0.0783 0.00259 <0.0025 <0.0055 0.0413 106 0.0226 0.450 20 5 219 0.0368 0.0119 24 3 13 4 0.00017 0.0809 0.185 <0.30 0.185 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.00017 0.000017 0.	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0123 24.0 0.1123 24.0 14.7 0.000020 0.0805 0.199 <0.30 0.199 <0.30 0.199 <0.30 0.191	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.0025 <0.0025 0.0422 114 0.0227 0.507 217 231 0.0370 0.0134 24.9 14.8 0.000021 0.0829 0.191 -0.30 1.77	34 2 <0,00050 0.120 0.0840 0.00269 <0.0025 <0.050 0.0442 116 0.02245 0.492 22.3 231 0.0389 0.0116 25.9 14.4 0.000015 0.0850 0.194 <0.30 1.68		
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Titanium (Ti)-Total Uranium (U)-Total Uranium (U)-Total Zinc (Zn)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Ansenic (As)-Dissolved Barium (Ba)-Dissolved Beryllium (Ba)-Dissolved Beryllium (Ba)-Dissolved Boron (B)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Chotalt (Co)-Dissolved Chotalt (Co)-Dissolved Lithium (LI)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Magnesium (Mg)-Dissolved Manganese (Mn)-Dissolved Mercury (Hg)-Dissolved Mickel (NI)-Dissolved Molybdenum (Mo)-Dissolved Nickel (NI)-Dissolved Potassium (K)-Dissolved Potassium (K)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Tin (Ma)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00065 0.129 0 0835 0 00257 <0.0025 <0.050 0.0422 109 0 0242 0.481 20.7 232 0 0345 0.0104 23.7 13.8 0.000010 0.0758 0.166 <0.30 1.75 0.166 <43 0.0039 5.78 0.665 0.00161 0.00101 0.797	FIELD 34.5 -0.00050 -0.138 -0.00050 -0.138 -0.0025 -0.0027 -0.0027 -0.0027 -0.0027 -0.0027 -0.0020 -0.	FIELD 35.1 <0.00050 0.132 0.0070 0.00255 <0.0050 0.0455 110 0.0245 0.499 21.7 241 0.0082 0.0107 24,0 0.0022 0.193 <0.00014 0.0082 0.0107 24,0 0.00014 0.0022 0.193 6.43 0.00073 6.00 0.741 0.00073 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00152	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 20.0025 20.0025 20.0025 20.0025 20.0025 20.0026 0.0119 24.3 13.4 0.000017 0.0809 0.185 <0.30 1.60 0.0994 6.53 0.00360 5.46 0.742 0.000108 0.00097 0.792 0.00199	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0369 0.0123 24.0 14.7 0.000020 0.0805 0.199 <0.30 1.81 0.100 6.39 0.00372 6.01 0.742 0.00124 0.0	35.3 <0,00050 0 122 0.0827 0.00295 <0.0025 <0.0050 0.0422 114 0.0227 0.507 21,7 231 0.0370 0.0134 24,9 14,8 0.000021 0.0829 0.191 <0.030 1.77 0.107 6.48 0.00408 6.38 0.785 0.00110 0.00110 0.00110 0.00110 0.00110 0.00110	34.2 <0.00050 0.120 0.0840 0.00256 <0.0050 0.0442 116 0.02245 0.492 22.3 231 0.0389 0.0118 25.9 14.4 0.000015 0.0850 0.194 <0.30 1.68 0.108 6.64 0.00363 5.62 0.788 0.00124 0.00122 0.840 0.00194	Λ.	
Titanium (Ti)-Total Uranium (U)-Total Vanadum (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Arsenic (As)-Dissolved Antimony (Sb)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Bismuth (Bi)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Chromium (Ca)-Dissolved Chromium (Ca)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Lithium (Li)-Dissolved Manganese (Mn)-Dissolved Manganese (Mn)-Dissolved Mickel (Ni)-Dissolved Mickel (Ni)-Dissolved Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Tin (Si)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 0 00050 0.129 0 0835 0 00257 <0.0025 <0.0055 <0.0422 109 0 0242 0 481 20.7 232 0 0345 0 0104 23.7 13.9 <0.00010 0 0758 0 166 <0.30 1,75 0 107 6,43 0,00338 5 78 0 685 0,000161 0,0107 0 00179 0 00179	FIELD 34.5 -0.00059 -0.138 -0.00250 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.00015 -0.00015 -0.00015 -0.00015 -0.00027 -0.00020 -0.00020 -0.00050 -0.000050 -0.000050 -0	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.050 0.0455 110 0.0245 0.499 21,7 241 0.0362 0.0107 24,0 14.2 0.000014 0.0822 0.193 <0.30 1.74 0.113 6.43 0.00373 6.00 0.741 0.000109 0.000109 0.00	31.7 <0.00050 0.118 0.0783 0.00259 <0.0025 <0.0025 <0.0055 0.0413 106 0.0226 0.450 2.05 2.05 2.05 2.05 2.05 2.05 2.05 2.	34.7 <0.00050 0 127 0.0900 0 127 0.0900 0 0.0275 <0.0025 <0.0050 0 0.453 109 0.0242 0.495 22 4 221 0.0869 0.0123 24 0 0.123 24 0 0.123 24 0 0.00020 0.0005 0	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.0025 <0.0025 <0.0025 <0.0050 0.0422 114 0.0227 0.507 217 231 0.0370 0.0134 24.9 14.8 0.000021 0.0829 0.191 <0.30 1.77 0.107 6.48 0.00408 6.38 0.785 0.00120 0.00118 0.798 0.000120 0.00118 0.798 0.00008	34 2 <0,00050 0.120 0.0840 0.00259 <0.0025 <0.0050 0.0442 116 0.02245 0.492 22.3 231 0.0389 0.0116 25.9 14.4 0.000015 0.0850 0.194 <0.30 1.68 0.108 6.64 0.00363 5.62 0.768 0.000124 0.00122 0.840 0.00194 <0.000122 0.840 0.00194 <0.0050	7	
Titanium (Ti)-Total Uranium (U)-Total Uranium (U)-Total Zinc (Zn)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Filtration Location Aluminum (A)-Dissolved Antimony (Sb)-Dissolved Ansenic (As)-Dissolved Barium (Ba)-Dissolved Beryllium (Ba)-Dissolved Beryllium (Ba)-Dissolved Boron (B)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Chotalt (Co)-Dissolved Chotalt (Co)-Dissolved Lithium (LI)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Magnesium (Mg)-Dissolved Manganese (Mn)-Dissolved Mercury (Hg)-Dissolved Mickel (NI)-Dissolved Molybdenum (Mo)-Dissolved Nickel (NI)-Dissolved Potassium (K)-Dissolved Potassium (K)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Tin (Ma)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved Tin (Mn)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 <0 00065 0.129 0 0835 0 00257 <0.0025 <0.050 0.0422 109 0 0242 0.481 20.7 232 0 0345 0.0104 23.7 13.8 0.000010 0.0758 0.166 <0.30 1.75 0.166 <43 0.0039 5.78 0.665 0.00161 0.00101 0.797	FIELD 34.5 -0.00050 -0.138 -0.00050 -0.138 -0.0025 -0.0027 -0.0027 -0.0027 -0.0027 -0.0027 -0.0020 -0.	FIELD 35.1 <0.00050 0.132 0.0070 0.00255 <0.0050 0.0455 110 0.0245 0.499 21.7 241 0.0082 0.0107 24,0 0.0022 0.193 <0.00014 0.0082 0.0107 24,0 0.00014 0.0022 0.193 6.43 0.00073 6.00 0.741 0.00073 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00109 0.00152	31.7 <0.00050 0.118 0.0783 0.00269 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 20.0025 20.0025 20.0025 20.0025 20.0025 20.0026 0.0119 24.3 13.4 0.000017 0.0809 0.185 <0.30 1.60 0.0994 6.53 0.00360 5.46 0.742 0.000108 0.00097 0.792 0.00199	34.7 <0.00050 0.127 0.0900 0.00275 <0.0025 <0.0025 <0.0050 0.0453 109 0.0242 0.495 22.4 22.1 0.0369 0.0123 24.0 14.7 0.000020 0.0805 0.199 <0.30 1.81 0.100 6.39 0.00372 6.01 0.742 0.00124 0.0	35.3 <0,00050 0 122 0.0827 0.00295 <0.0025 <0.0050 0.0422 114 0.0227 0.507 21,7 231 0.0370 0.0134 24,9 14,8 0.000021 0.0829 0.191 <0.030 1.77 0.107 6.48 0.00408 6.38 0.785 0.00110 0.00110 0.00110 0.00110 0.00110 0.00110	34.2 <0.00050 0.120 0.0840 0.00256 <0.0050 0.0442 116 0.02245 0.492 22.3 231 0.0389 0.0118 25.9 14.4 0.000015 0.0850 0.194 <0.30 1.68 0.108 6.64 0.00363 5.62 0.788 0.00124 0.00122 0.840 0.00194	Δ.	
Titanium (Ti)-Total Uranium (U)-Total Vanadum (V)-Total Zinc (Zn)-Total Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Dissolved Metals Arsenic (As)-Dissolved Antimony (Sb)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Barium (Ba)-Dissolved Bismuth (Bi)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Cadmium (Ca)-Dissolved Chromium (Ca)-Dissolved Chromium (Ca)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Lead (Pb)-Dissolved Lithium (Li)-Dissolved Manganese (Mn)-Dissolved Manganese (Mn)-Dissolved Mickel (Ni)-Dissolved Mickel (Ni)-Dissolved Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Silicon (Si)-Dissolved Tin (Si)-Dissolved	0 832 0 00194 0 0064 3 64 FIELD 34.4 0 00050 0.129 0 0835 0 00257 <0.0025 <0.0055 <0.0422 109 0 0242 0 481 20.7 232 0 0345 0 0104 23.7 13.9 <0.00010 0 0758 0 166 <0.30 1,75 0 107 6,43 0,00338 5 78 0 685 0,000161 0,0107 0 00179 0 00179	FIELD 34.5 -0.00059 -0.138 -0.00250 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.0025 -0.00015 -0.00015 -0.00015 -0.00015 -0.00027 -0.00020 -0.00020 -0.00050 -0.000050 -0.000050 -0	FIELD 35.1 <0.00050 0.132 0.0870 0.00255 <0.0025 <0.050 0.0455 110 0.0245 0.499 21,7 241 0.0362 0.0107 24,0 14.2 0.000014 0.0822 0.193 <0.30 1.74 0.113 6.43 0.00373 6.00 0.741 0.000109 0.000109 0.00	31.7 <0.00050 0.118 0.0783 0.00259 <0.0025 <0.0025 <0.0055 0.0413 106 0.0226 0.450 2.05 2.05 2.05 2.05 2.05 2.05 2.05 2.	34.7 <0.00050 0 127 0.0900 0 127 0.0900 0 0.0275 <0.0025 <0.0050 0 0.453 109 0.0242 0.495 22 4 221 0.0869 0.0123 24 0 0.123 24 0 0.123 24 0 0.00020 0.0005 0	35.3 <0,00050 0.122 0.0827 0.00295 <0.0025 <0.0025 <0.0025 <0.0025 <0.0050 0.0422 114 0.0227 0.507 217 231 0.0370 0.0134 24.9 14.8 0.000021 0.0829 0.191 <0.30 1.77 0.107 6.48 0.00408 6.38 0.785 0.00120 0.00118 0.798 0.000120 0.00118 0.798 0.00008	34 2 <0,00050 0.120 0.0840 0.00259 <0.0025 <0.0050 0.0442 116 0.02245 0.492 22.3 231 0.0389 0.0116 25.9 14.4 0.000015 0.0850 0.194 <0.30 1.68 0.108 6.64 0.00363 5.62 0.768 0.000124 0.00122 0.840 0.00194 <0.000122 0.840 0.00194 <0.0050		

RESULTS OF ANALYSIS					
	1298-033 OCT24A	1298-037 OCT24E	1298-041 OCT25A	1298-047 OCT25B	1298-050 OCT26A
Sample ID	- EFFLUENT	EFFLUENT	- EFFLUENT	EFFLUENT	EFFLUENT
Date Sampled	24-OCT-12 02:00	24-OCT-12 14:00	25-OCT-12 02:00	25-OCT-12 14:00	26-OCT-12 02:00
Time Sampled ALS Sample ID	L1228156-1	L1228980-1	L1228971-1	L1229605-1	L1229604-1
Matrix	Water	Water	Water	Water	Water

Physical Tests					
Hardness (as CaCO3)	1230	1310	973	848	857
pH Talal Supported Solids	8 75	9 14	8 79	9 37	8.89
Total Suspended Solids Total Dissolved Solids	24 0 1630	9 3 1700	22 0 1250	15 4 1260	24.5 1250
Turbidity	35 4	9.77	25.7	17.7	29.3
•					
Anions and Nutrients					
Acidity (as CaCO3)	<1.0	<10	<1.0	<10	<1.0
Alkalinity, Bicarbonate (as CaCO3)	15.3 5.5	13.9 8.1	10.1 3.4	11.8 10.4	15.3 5.2
Alkalinity, Carbonate (as CaCO3) Alkalinity, Hydroxide (as CaCO3)	<10	<1.0	3.4 <1.0	<1.0	5 Z <1.0
Alkalinity, Total (as CaCO3)	20.8	22.0	13.4	22.2	20.5
Ammonia, Total (as N)	0.0562	0 0579	0 0815	0 0833	0.0906
Bromide (Br)	<1.0	<1.0	< 0.50	<10	<1.0
Chloride (CI)	<10	<10	<50	<10	<10
Fluoride (F)	<0.40	<0.40	<0.20	<0.40	<0.40
Nitrate (as N) Nitrite (as N)	0 90 0 037	0.74 0.036	0 576 0 020	0 58 <0 020	0 61 0 036
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0 0020	<0 0020	<0.0020	0 0025	0 0020
Sulfate (SO4)	1150	1190	869	848	848
Total Metals	4.00	2-17	2.50	2.00	2.00
Aluminum (Al)-Total Antimony (Sb)-Total	4 06 <0.00050	3 47 <0 00050	2 58 <0 00020	3 03 <0 00020	2 96 <0 00020
Arsenic (As)-Total	0 00398	0.00204	0.00262	0.00364	0.00311
Barium (Ba)-Total	0.0236	0.0193	0.0131	0.0131	0 0162
Beryllium (Be)-Total	<0 00050	< 0.00050	< 0.00020	<0 00020	<0 00020
Bismuth (Bi)-Total	<0 0025	<0 0025	< 0.0010	< 0 0010	<0 0010
Boron (B)-Total	<0.050	< 0 050	<0 020	<0 020	<0 020
Cadmium (Cd)-Total	0.00137	0.000756	0,000885	0.00128	0.00119
Calcium (Ca)-Total Chromium (Cr)-Total	493 0 00553	496 0 00537	362 0 00500	331 0 00512	338 0 00505
Cobalt (Co)-Total	0.0145	0 00785	0.0100	0 00312	0 0130
Copper (Cu)-Total	0.607	0.334	0.403	0.609	0.506
Iron (Fe)-Total	7 02	3 76	4 38	6 11	5 35
Lead (Pb)-Total	0 00128	0.00064	0 00073	0 00104	0 00095
Lithium (Li)-Total	0.0072	0 0054	0 0057	0 0057	0 0062
Magnesium (Mg)-Total	2 50	3 52	1.69	2 15	1.90
Manganese (Mn)-Total Mercury (Hg)-Total	0.401 0.000012	0.206 0.000013	0.253 <0.000010	0.395 <0.000010	0.341 0.000010
Molybdenum (Mo)-Total	0.0825	0 0779	0.0658	0 0604	0 0576
Nickel (Ni)-Total	0.0058	0.0031	0 0041	0 0061	0 0052
Phosphorus (P)-Total	<0.30	<0.30	< 0.30	< 0.30	< 0.30
Potassium (K)-Total	1.70	1.69	1.36	1,32	1.33
Selenium (Se)-Total	0.0646	0 0635	0 0487	0 0465	0 0476
Silicon (Si)-Total	0.383	0 243	0 274	0 355	0 325
Silver (Ag)-Total Sodium (Na)-Total	0 000162 6 52	0.000101 5.85	0.000110 4.81	0 000153 4 65	0.000135 4.78
Strontium (Sr)-Total	D 835	0.853	0.655	0 622	0.645
Thallium (TI)-Total	<0 000050	< 0 000050	0.000028	0 000029	0.000029
Tin (Sn)-Total	0 00101	0 00093	0 00092	0 00093	0 00093
Titanium (Ti)-Tolal	0 040	0 029	0.030	0 036	0.033
Uranium (U)-Total	0 000112 <0.0050	0.000055	0.000063	0 000089	0.000073
Vanadium (V)-Total	<0.0050 0.111	<0.0050 0.061	<0 0020 0 0755	<0 0020 0 112	<0 0020 0 0971
Zinc (Zn)-Total	3111	0.001	0.0133	VIIZ	0.031 1
Dissolved Metals					
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	3 32	3.09	2.10	2 05	2.27
Antimony (Sb)-Dissolved	<0,00050	<0.00050	<0.00020	<0.00020	<0.00020 <0.00020
Arsenic (As)-Dissolved Barlum (Ba)-Dissolved	<0 00050 0 0198	<0 00050 0 0182	<0 00020 0 0126	<0 00020 0 0114	<0 00020 0 0118
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00020	<0 00020	<0.00020
Bismulh (Bi)-Dissolved	<0 0025	<0.0025	<0.0010	< 0.0010	<0.0010
Boron (B)-Dissolved	< 0.050	<0.050	<0.020	<0 020	<0.020
Cadmium (Cd)-Dissolved	0 000089	0 000088	0 000144	0 000112	0.000121
Calcium (Ca)-Dissolved	491	520	388	337	341
Chromium (Cr)-Dissolved Cobalt (Co)-Dissolved	0 00384 <0 00050	0 00477	0 00401 0 00034	0 00402 <0 00020	0 00422 0 00020
Copper (Cu)-Dissolved	0.0075	0 0022	0 0106	0 00398	0 00020
Iron (Fe)-Dissolved	<0.050	<0.050	0 119	<0 020	0 029
Lead (Pb)-Dissolved	< 0.00025	< 0.00025	< 0.00010	< 0 00010	<0 00010
Lithium (Li)-Dissolved	0 0056	0 0054	0.0057	0 0055	0 0058
Magnesium (Mg)-Dissolved	1.76	3 28	1.23	1 23	1 11
Manganese (Mn)-Dissolved	0 00400	0.00136	0 00672 <0.000010	0 00230	0 00167
Mercury (Hg)-Dissolved Molybdenum (Mo)-Dissolved	<0.000010 0.0783	<0.000010 0.0799	<0.000010 0.0670	<0.000010 0.0588	<0.000010 0.0579
Nickel (Ni)-Dissolved	<0.0025	<0.0025	<0.0010	< 0.0010	< 0.0010
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30
Polassium (K)-Dissolved	1 66	1,71	1.41	1 33	1 36
Selenium (Se)-Dissolved	0.0621	0.0633	0.0503	0 0449	0.0463
Silicon (Si)-Dissolved	0 105	0.095	0 125	0 100	0 112
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0.000020	<0.000020	<0.000020
Sodium (Na)-Dissolved Strontium (Sr)-Dissolved	6 55 0 818	5 90 0 858	4 91 0 658	4 65 0 608	4.73 0.615
Thallium (TI)-Dissolved	<0.000050	<0.000050	0 000027	0 000027	0.000027
Tin (Sn)-Dissolved	0.00110	0,00086	0.00112	0 00091	0.00092
Titanium (Ti)-Dissolved	0.015	0.015	0.016	0.013	0.014

 Uranium (U)-Dissolved
 < 0.00050</th>
 < 0.00050</th>
 < 0.00020</th>
 < 0.00020</th>
 < 0.00020</th>

 Vanadium (V)-Dissolved
 < 0.0050</td>
 < 0.0050</td>
 < 0.0020</td>
 < 0.0020</td>
 < 0.0020</td>

 Zinc (Zn)-Dissolved
 < 0.0050</td>
 < 0.0050</td>
 0.0025
 < 0.0020</td>
 < 0.0020</td>

Sample ID Date Sampled	- REACTOR2 24-OCT-12	REACTOR2 24-OCT-12	1298-042 OCT25A - REACTOR2 25-OCT-12	REACTOR 2 25-OCT-12	REACTOR 2 26-OCT-12
Time Sampled ALS Sample ID Matrix	02:00 L122B156-2 Water	14:00 L1228980-2 Water	02:00 L1228971-2 Water	14:00 L1229605-2 Water	02:00 L1229604-2 Water
Physical Tests Hardness (as CaCO3)	1210	1310	995	806	844
pH	2	5	8	. 2:	8
Total Suspended Solids Total Dissolved Solids		3		3	Ĕ
Turbidity			17		3.
Anions and Nutrienta					
Acidity (as CaCO3) Alkalinity, Bicarbonate (as CaCO3)					
Alkalinity, Carbonale (as CaCO3)	- 2	5		153	9
Alkalinity, Hydroxide (as CaCO3) Alkalinity, Total (as CaCO3)					- ÷
Ammonia, Total (as N)	2	-	2	(P)	0
Bromide (Br) Chloride (CI)			*	-	8
Fluoride (F)	8		8	5	2
Nitrate (as N) Nitrite (as N)	7				2
Orthophosphate-Dissolved (as P)	3	5	*	183	
Phosphorus (P)-Total Sulfate (SO4)		2	-		-
Total Metals Aluminum (Al)-Total					
Antimony (Sb)-Total	8	5	3	- 27	0
Arsenic (As)-Total	*				8
Barium (Ba)-Total Beryllium (Be)-Total	2		3	12	0
Bismuth (Bi)-Total	2		*	1.	7
Boron (B)-Total Cadmium (Cd)-Total		-			ž.
Calcium (Ca)-Total		-	3		8
Chromium (Cr)-Total Cobalt (Co)-Total	O		24		-
Copper (Cu)-Total				- 1	4
Iron (Fe)-Total Lead (Pb)-Total	7		7	3	3
Lithium (Li)-Total	8	E-	32		=
Magnesium (Mg)-Total Manganese (Mn)-Total			-	5	<u> Ş</u>
Mercury (Hg)-Total	8	5	3	8	8
Molybdenum (Mo)-Total Nickel (Ni)-Total	- 1	2			1
Phosphorus (P)-Total	7		3	E:	- 5
Potassium (K)-Total Selenium (Se)-Total	i e		28		
Silicon (Si)-Total	2	2	8	2.	2
Silver (Ag)-Total Sodium (Na)-Total	(*	-		-	-
Strontium (Sr)-Total	82	-	S	h.*	9
Thallium (TI)-Total Tin (Sn)-Total	92	5	i.		- 1
Titanium (Ti)-Total	98	5			(8)
Uranium (U)-Total Vanadium (V)-Total	3	- 5	8	- 3	ĝ
Zinc (Zn)-Total		=	2.5	5	7
Dissolved Metals Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	2.86	3 12	2 13	2 15	2 46
Antimony (Sb)-Dissolved Arsenic (As)-Dissolved	<0 00050 <0 00050	<0 00050 <0 00050	<0 00020 <0 00020	<0 00020 <0 00020	<0 00020 <0 00020
Barium (Ba)-Dissolved	0 0188	0 0180	0 0125	0.0113	0 0127
Beryllium (Be)-Dissolved Bismuth (Bi)-Dissolved	<0 00050 <0 0025	<0 00050 <0 0025	<0 00020 <0 0010	<0.00020 <0.0010	<0,00020 <0.0010
Boron (B)-Dissolved	<0 050	<0 050	<0 020	<0 020	<0 020
Cadmium (Cd)-Dissolved Calcium (Ca)-Dissolved	0.000071 482	0.000072 520	<0.00013 396	0,000100 321	0,000115 336
Chromium (Cr)-Dissolved	0.00393	0.00429	0 00452	0,00421	0 00463
Cobalt (Co)-Dissolved Copper (Cu)-Dissolved	<0 00050 0 0046	<0 00050 <0 0010	<0 00020 0 00214	<0.00020 0.00192	0 00021 0 00271
Iron (Fe)-Dissolved	<0.050	<0.050	0.032	< 0.020	0 021
Lead (Pb)-Dissolved Lithium (Li)-Dissolved	<0.00025 0.0064	<0.00025 0.0054	0 00015 0 0058	<0 00010 0 0054	<0 00010 0 0058
Magnesium (Mg)-Dissolved	2 14	3 55	1 31	1 16	1.09
Manganese (Mn)-Dissolved	0 00277 <0 000010	0 00077 <0 000010	0 00159 <0 000010	0 00082 <0 000010	0 00145 <0 000010
Mercury (Hg)-Dissolved Molybdenum (Mo)-Dissolved	0 0786	0 0763	0 175	0 0583	0 0579
Nickel (Ni)-Dissolved	<0 0025 <0 30	<0 0025 <0 30	<0 0010 <0 30	<0 0010 <0 30	<0 0010 <0 30
Phosphorus (P)-Dissolved Polassium (K)-Dissolved	1 61	1 68	1.43	1,35	1 51
Selenium (Se)-Dissolved	0 0602 0 102	0 0639 0 088	0 0504 0 228	0 0446	0 0467 0 098
Silicon (Si)-Dissolved Silver (Ag)-Dissolved	<0.00050	<0.000050	<0 000020	0 000043	<0 000020
Sodium (Na)-Dissolved	6 56	5 79	4 94	4.74	5 36
Strontium (Sr)-Dissolved Thallium (TI)-Dissolved	0 807 <0 000050	0 B41 <0 000050	0.667 0.000038	0 609 0 000024	0 630 0 000029
Tin (Sn)-Dissolved	0.00089	0 00095	0 00087	0 00086	0 00089
Titanium (Ti)-Dissolved	0 014	0 016	0 019	0 013	0 014

 Uranium (U)-Dissolved
 < 0,000050</th>
 < 0,000020</th>
 < 0,000020</th>
 < 0,000020</th>

 Vanadium (V)-Dissolved
 < 0,0050</td>
 < 0,0050</td>
 < 0,0020</td>
 < 0,0020</td>
 < 0,0020</td>

 Zinc (Zn)-Dissolved
 < 0,0050</td>
 < 0,0050</td>
 < 0,0020</td>
 < 0,0020</td>
 < 0,0020</td>

Sample ID Date Sampled Time Sampled ALS Sample ID	- REACTOR1 24-OCT-12 02:00 L1228156-3	REACTOR1 24-OCT-12 14:00 L1228980-3	- 1298-043 OCT25A - REACTOR1 25-OCT-12 02:00 L1228971-3	REACTOR1 25-OCT-12 14:00 L1229605-3	REACTOR 1 26-OCT-12 02:00 L1229604-3
Matrix	Water	Water	Water	Water	Water
Physical Tests	1190	1270	1000	801	860
Hardness (as CaCO3) pH	1190	1270	1000	3	3
Total Suspended Solids	- 1	2	127	22	
Total Dissolved Solids Turbidity			0€0 .#1		-
Anlons and Nutrients Acidity (as CaCO3)	2	- 2	321	2	797
Alkalinity, Bicarbonate (as CaCO3)	•			8	28
Alkalinity, Carbonale (as CaCO3) Alkalinity, Hydroxide (as CaCO3)	3	\$	8	Š	
Alkalinity, Total (as CaCO3)		9	99	-	255
Ammonia, Total (as N) Bromide (Br)			TIE:	Ô	-
Chloride (CI)		3	- 6	2	120
Fluoride (F)	n.		P :	8	41
Nitrate (as N) Nitrite (as N)		-	18	9	\$1°
Orthophosphate-Dissolved (as P)	F .	2	. 54	≅	- 5
Phosphorus (P)-Total Sulfate (SO4)			E	ž.	30
Total Metals					
Aluminum (Al)-Total		*	E7	*	125
Antimony (Sb)-Total Arsenic (As)-Total	21	2		-	545
Barium (Ba)-Total		Ĭ.	5	9	2
Beryllium (Be)-Total		- 4	A.1	₹	a r
Bismuth (Bi)-Tolal Boron (B)-Tolal		-		9	51
Cadmium (Cd)-Total	<u> </u>	3	8	8	251
Calcium (Ca)-Total Chromium (Cr)-Total			-	ũ	90
Cobalt (Co)-Total	-			*	1.71
Copper (Cu)-Total	-		F:	2	550
Iron (Fe)-Total Lead (Pb)-Total		2	8		121
Lithium (Li)-Total					
Magnesium (Mg)-Total Manganese (Mn)-Total			2	8	33
Mercury (Hg)-Total		27	53	¥	1,63
Molybdenum (Mo)-Total Nickel (Ni)-Total		N2 02		ia Se	-
Phosphorus (P)-Total	-			8	
Potassium (K)-Total	-	-	100	94	16.
Selenium (Se)-Total Silicon (Si)-Total	£		1	1	161
Silver (Ag)-Total	-	-	53	8	183
Sodium (Na)-Total Strontium (Sr)-Total			3	-	34.1
Thallium (TI)-Total	5	15	5.	2.	155
Tin (Sn)-Total Titanium (Ti)-Total			-	2	183
Uranium (U)-Total		8	-	ů.	503
Vanadium (V)-Total Zinc (Zn)-Total			-		
Dissolved Metals					
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved Antimony (Sb)-Dissolved	3 21 <0 00050	3 43 <0 00050	2 3B <0 00020	2 44 <0 00020	2 37 < 0.00020
Arsenic (As)-Dissolved	<0 00050	<0.00050	<0 00020	< 0.00020	<0.00020
Barium (Ba)-Dissolved	0 0202 <0 00050	0.0195 <0.00050	0 0132 <0 00020	0 0120 <0 00020	0 0116
Beryllium (Be)-Dissolved Bismuth (Bi)-Dissolved	<0 00050	<0.00050	<0.00020	<0 0010	<0.0010
Boron (B)-Dissolved	<0.050	<0.050	<0.020	<0.020	<0.020
Cadmium (Cd)-Dissolved Calcium (Ca)-Dissolved	0.000062 471	0,000084 502	<0 00017 399	0 000104 319	0 000098 342
Chromium (Cr)-Dissolved	0.00372	0_00436	0.00421	0 00395	0.00383
Cobalt (Co)-Dissolved Copper (Cu)-Dissolved	<0 00050 0 0032	<0 00050 0 0019	0.00032	<0 00020 0 00118	<0.00020 0.00322
Iron (Fe)-Dissolved	<0 050	< 0.050	0 068	< 0.020	0.021
Lead (Pb)-Dissolved Lithium (Li)-Dissolved	<0 00025 0 0059	<0 00025 0 0057	<0.00010 0.0055	<0 00010 0 0055	<0.00010 0.0057
Magnesium (Mg)-Dissolved	2 76	4 90	1 38	1 28	1 39
Manganese (Mn)-Dissolved	0.00211	0.00137	0,00663 <0,000010	0,00035 <0.000010	0 00233
Mercury (Hg)-Dissolved Molybdenum (Mo)-Dissolved	<0.000010 0.0767	<0 000010 0 0719	0 338	0 0597	0 0563
Nickel (Ni)-Dissolved	<0 0025	<0 0025	< 0.0010	< 0.0010	< 0.0010
Phosphorus (P)-Dissolved Potassium (K)-Dissolved	<0 30 1 69	<0.30 1.64	<0.30 1.42	<0 30 1 25	<0.30 1.35
Selenium (Se)-Dissolved	0 0625	0.0615	0 0509	0 0453	0 0470
Silicon (Si)-Dissolved	0 093 <0 000050	0 091 <0 000050	0.129 <0.000020	0.113 <0.000020	0 106 <0 000020
Silver (Ag)-Dissolved	6 24	5.83	5 04	4 66	4,68
Sodium (Na)-Dissolved				0.609	0.635
Strontium (Sr)-Dissolved	0.814	0.831	0,671		
	0 814 <0 000050 0 00097	0.831 <0.000050 0.00092	0.671 0.00028 0.00087	0 000025 0 00089	0 000027 0 00092

 Uranium (U)-Dissolved
 < 0.00050</th>
 < 0.00050</th>
 < 0.00020</th>
 < 0.00020</th>
 < 0.00020</th>

 Vanadium (V)-Dissolved
 < 0.0050</td>
 < 0.0050</td>
 < 0.0020</td>
 < 0.0020</td>
 < 0.0020</td>

 Zinc (Zn)-Dissolved
 < 0.0050</td>
 < 0.0050</td>
 0.0026
 < 0.0020</td>
 < 0.0020</td>

RESULTS OF ANALYSIS			
Sample ID	1298-036 OCT24A - FEED	1298-040 OCT24B FEED	
Date Sampled	24-OCT-12	24-OCT-12	
Time Sampled ALS Sample ID	02:00 L1228156-4	14:00 L1228980-4	
Matrix	Water	Water	
Physical Task			
Physical Tests Hardness (as CaCO3)	387	395	
pH	167	0	
Total Suspended Solids	000	ä	
Total Dissolved Solids Turbidity	18	1	
Anions and Nutrients Acidity (as CaCO3)	165		
Alkalinity, Bicarbonate (as CaCO3)	•	8	
Alkalinity, Carbonate (as CaCO3)		=	
Alkalinity, Hydroxide (as CaCO3) Alkalinity, Total (as CaCO3)		2	
Ammonia, Total (as N)	10	8	
Bromide (Br) Chloride (Cl)		5	
Fluoride (F)		ĵ.	
Nitrate (as N)	liei	8	
Nitrite (as N) Orthophosphate-Dissolved (as P)	3	ž.	
Phosphorus (P)-Total			
Sulfate (SO4)	5.5	8	
Total Metals			
Aluminum (Al)-Total	13	14	
Antimony (Sb)-Total	3	8	
Arsenic (As)-Total Barium (Ba)-Total	3		
Beryllium (Be)-Total	,	2	
Bismuth (Bi)-Total Boron (B)-Total	F:		
Cadmium (Cd)-Total		2	
Calcium (Ca)-Total	€		
Chromium (Cr)-Total Cobalt (Co)-Total	12	3	
Copper (Cu)-Total		8	
Iron (Fe)-Total	2		
Lead (Pb)-Total Lithium (Li)-Total			
Magnesium (Mg)-Total		3	
Manganese (Mn)-Total	<u>*</u> :	**	
Mercury (Hg)-Total Molybdenum (Mo)-Total	5	-	
Nickel (Ni)-Total		4	
Phosphorus (P)-Total		37	
Potessium (K)-Total Selenium (Se)-Total	Ē:	-	
Silicon (Si)-Total		.04	
Silver (Ag)-Total			
Sodium (Na)-Total Strontium (Sr)-Total			
Thallium (TI)-Total	*	-	
Tin (Sn)-Total Titanium (Ti)-Total	2	0	
Uranium (U)-Total	*	(E	
Vanadium (V)-Total	3		
Zinc (Zn)-Total	W-5		
Dissolved Metals	FIELD	FIELD	
Dissolved Metals Filtration Location Aluminum (Al)-Dissolved	95.3	34.2	
Antimony (Sb)-Dissolved	<0.00050	<0.00050	
Arsenic (As)-Dissolved	0 122 0 0827	0,120 0.0840	
Barium (Ba)-Dissolved Beryllium (Be)-Dissolved	0.00295	0 00269	
Bismuth (Bi)-Dissolved	<0 0025	<0.0025	
Boron (B)-Dissolved Cadmium (Cd)-Dissolved	<0 050 0 0422	<0 050 0 0442	
Calcium (Ca)-Dissolved	114	116	
Chromium (Cr)-Dissolved	0 0227	0.0245	
Cobalt (Co)-Dissolved Copper (Cu)-Dissolved	0 507 21 7	0.492 22.3	
Iron (Fe)-Dissolved	231	231	
Lead (Pb)-Dissolved	0 0370	0.0389	
Lithium (Li)-Dissolved Magnesium (Mg)-Dissolved	0 0134 24,9	0.0116 25.9	
Manganese (Mn)-Dissolved	14 8	14.4	
Mercury (Hg)-Dissolved	0 000021	0 000015	
Molybdenum (Mo)-Dissolved Nickel (Ni)-Dissolved	0 0829 0 191	0.0850 0.194	
Phosphorus (P)-Dissolved	<0.30	<0.30	
Potassium (K)-Dissolved	1 77	1 68	
Selenium (Se)-Dissolved Silicon (Si)-Dissolved	0 107 6.48	0 108 6 64	
Silver (Ag)-Dissolved	0.00408	0.00363	
Sodium (Na)-Dissolved	6,38	5.82	
Strontium (Sr)-Dissolved Thallium (TI)-Dissolved	0.785 0.000120	0 788 0 000124	
Tin (Sn)-Dissolved	0.00118	0 00122	
Titanium (Ti)-Dissolved	0.798 0.00208	0.840 0.00194	
Uranium (U)-Dissolved	ULWZUB	0 00 104	

Vanadium (V)-Dissolved Zinc (Zn)-Dissolved <0 0050 3 64 <0 0050 3 79

Consta ID	1298-010 OCT21A - EFFLUENT	1298-014 OCT21B - EFFLUENT	1298-018 OCT22A - EFFLUENT	1298-022 OCT22B - EFFLUENT
Sample ID	21-OCT-12	21-OCT-12	22-OCT-12	22-OCT-12
Date Sampled Time Sampled	14:00	14:00	02:00	14:00
ALS Sample ID	L1227084-1	L1227088-1	L1227087-1	L1227710-1
Matrix	Water	Water	Water	Water
Mathy	Water	******		
Physical Tests				
Hardness (as CaCO3)	1250	1260	1340	1150
рН	10.23	9.62	9.25	9.19
Total Suspended Solids	8.0	13.0	6.0	14.0
Total Dissolved Solids	1740	1730	1850	1750
Turbidity	5.12	8.87	3.45	10.1
Anions and Nutrients				
Acidity (as CaCO3)	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	<1.0	2.7	5.7	12.3
Alkalinity, Carbonate (as CaCO3)	32.4	28.4	22.3	8.9
Alkalinity, Hydroxide (as CaCO3)	7.2	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	39.6	31.1	28.0	21.2
Ammonia, Total (as N)	0.0349	0.0438	0.0504	0.0408
Bromide (Br)	<1.0	<1.0	<1.0	<1.0
Chloride (CI)	<10	<10	<10	<10
Fluoride (F)	0.41	0.43	0.44	<0.40
Nitrate (as N)	0.74	0.73	0.75	0.83
Nitrite (as N)	0.024	0.021	< 0.020	0.022
Orthophosphate-Dissolved (as P)	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Phosphorus (P)-Total	< 0.0020	< 0.0020	<0.0020	< 0.0020
Sulfate (SO4)	1160	1160	1240	1170
Total Metals				
Aluminum (Al)-Total	3.62	4.48	4.27	3.51
Antimony (Sb)-Total	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	0.00224	0.00194	0.00069	0.00171
Barium (Ba)-Total	0.0284	0.0264	0.0240	0.0230
Beryllium (Be)-Total	<0.00050	<0.00050	< 0.00050	< 0.00050
Bismuth (Bi)-Total	<0.0025	< 0.0025	< 0.0025	< 0.0025
Boron (B)-Total	<0.050	< 0.050	< 0.050	< 0.050
Cadmium (Cd)-Total	0.000676	0.000614	0.000285	0.000554
Calcium (Ca)-Total	475	465	482	451
Chromium (Cr)-Total	0.00248	0.00288	0.00360	0.00422
Cobalt (Co)-Total	0.00613	0.00586	0.00229	0.00504
Copper (Cu)-Total	0.267	0.260	0.0954	0.222
Iron (Fe)-Total	3.26	3.01	1.13	2.57
Lead (Pb)-Total	0.00055	0.00049	<0.00025	0.00048
Lithium (Li)-Total	0.0088	0.0057	0.0064	0.0062
Magnesium (Mg)-Total	1.02	1.47	3.62	2.64
Manganese (Mn)-Total	0.178	0.171	0.0618	0.139
Mercury (Hg)-Total	< 0.000010	< 0.000010	< 0.000010	< 0.000010
Molybdenum (Mo)-Total	0.118	0.0821	0.0726	0.0793
Nickel (Ni)-Total	0.0025	<0.0025	<0.0025	<0.0025

Phosphorus (P)-Total					
Selenium (Se)-Total	Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30
Silicon (S)-Total 0.240 0.220 0.114 0.181 Silver (Ag)-Total 0.00053 0.000054 0.000057 0.000070 Sodium (Na)-Total 5.87 5.74 5.79 5.78 Strontium (Sr)-Total 0.862 0.833 0.810 0.853 Thallium (Tr)-Total 0.000050 <0.000050	• • • • • • • • • • • • • • • • • • • •				
Silver (Ag)-Total	` '				
Sodium (Na)-Total	` ,	*			
Strontium (Sr)-Total 0.862 0.833 0.810 0.853 Thallium (TI)-Total <0.000050	, ,,				
Thailium (Ti)-Total	, ,				
Tin (Sn)-Total 0.00109 0.00100 0.00095 0.00123 Titanium (Ti)-Total 0.021 0.020 0.012 0.000050 <0.000050	• ,				
Titanium (Ti)-Total 0.021 0.020 0.012 0.020 Uranium (U)-Total <0.000050	. ,				
Uranitum (U)-Total <0,000050 <0.000050 <0.00050 <0.00050 Vanadium (V)-Total <0.0050	• •				
Vanadium (V)-Total <0.0050 <0.0050 <0.0050 <0.0050 Zinc (Zn)-Total 0.052 0.051 0.027 0.046 Dissolved Metals Dissolved Metals Filtration Location FIELD FIELD FIELD FIELD FIELD Al.03 4.36 3.06 Al.07 Al.36 3.06 Al.07 Al.36 3.06 Antimony (Sb)-Dissolved <0.00050	* *				
Dissolved Metals Dissolved Metals Filtration Location FIELD FIELD FIELD FIELD Aluminum (AI)-Dissolved 3.26 4.03 4.36 3.06 Antimony (Sb)-Dissolved 4.00050 4.0050 4.005	* *				
Dissolved Metals FIELD Aluminum (Al)-Dissolved 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 Antimony (Sb)-Dissolved <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <	, ,				
Dissolved Metals Filtration Location FIELD FIELD FIELD FIELD FIELD FIELD Aluminum (Al)-Dissolved 3.26 4.03 4.36 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 4.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050	Zinc (Zn)- I otal	0.052	0.051	0.027	0.046
Aluminum (Al)-Dissolved 3.26 4.03 4.36 3.06 Antimony (Sb)-Dissolved <0.00050	Dissolved Metals				
Antimony (Sb)-Dissolved	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Arsenic (As)-Dissolved <0.00050 <0.00050 <0.00050 Barium (Ba)-Dissolved 0.0281 0.0251 0.0240 0.0198 Berlyllium (Be)-Dissolved <0.00050	Aluminum (Al)-Dissolved	3.26	4.03	4.36	3.06
Arsenic (As)-Dissolved <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00055 <0.0025 <0.0025 <0.0025 <0.0025 <0.0050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.0007 <0.050 <0.0007 <0.0007 <0.0007 <0.0007 <0.0007 <0.0007 <0.0007 <0.0007 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <th< td=""><td>Antimony (Sb)-Dissolved</td><td>< 0.00050</td><td>< 0.00050</td><td>< 0.00050</td><td>< 0.00050</td></th<>	Antimony (Sb)-Dissolved	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Barium (Ba)-Dissolved 0.0281 0.0251 0.0240 0.0198 Beryllium (Be)-Dissolved <0.00055		< 0.00050	< 0.00050	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.00025 <0.00025 <0.000063 <0.000074 <0.000063 <0.000074 <0.000074 <0.000074 <0.000074 <0.000074 <0.000074 <0.000074 <0.000074 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.0005	Barium (Ba)-Dissolved	0.0281	0.0251	0.0240	0.0198
Boron (B)-Dissolved	Beryllium (Be)-Dissolved	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Cadmium (Cd)-Dissolved 0.000090 0.000099 0.000063 0.000074 Calcium (Ca)-Dissolved 499 503 531 457 Chromium (Cr)-Dissolved 0.00194 0.00241 0.00334 0.00374 Cobalt (Co)-Dissolved 0.0010 <0.00050	Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025	<0.0025	< 0.0025
Calcium (Ca)-Dissolved 499 503 531 457 Chromium (Cr)-Dissolved 0.00194 0.00241 0.00334 0.00374 Cobalt (Co)-Dissolved <0.00050	Boron (B)-Dissolved	< 0.050	< 0.050	< 0.050	< 0.050
Chromium (Cr)-Dissolved 0.00194 0.00241 0.00334 0.00374 Cobalt (Co)-Dissolved <0.00050 <0.00050 <0.00050 <0.00050 Copper (Cu)-Dissolved 0.0010 <0.0010 <0.0010 <0.0010 <0.0010 Iron (Fe)-Dissolved <0.050 <0.050 <0.050 <0.050 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <td>Cadmium (Cd)-Dissolved</td> <td>0.000090</td> <td>0.000099</td> <td>0.000063</td> <td>0.000074</td>	Cadmium (Cd)-Dissolved	0.000090	0.000099	0.000063	0.000074
Cobalt (Co)-Dissolved <0.00050 <0.00050 <0.00050 Copper (Cu)-Dissolved 0.0010 <0.0010	Calcium (Ca)-Dissolved	499	503	531	457
Copper (Cu)-Dissolved 0,0010 <0,0010 <0,0010 <0,0010 0,0010 0,0013 Iron (Fe)-Dissolved <0.050	Chromium (Cr)-Dissolved	0.00194	0.00241	0.00334	0.00374
Iron (Fe)-Dissolved <.0.050 <0.050 <0.050 <0.050 Lead (Pb)-Dissolved <0.00025	Cobalt (Co)-Dissolved	< 0.00050	<0.00050	< 0.00050	<0.00050
Lead (Pb)-Dissolved <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.0060 <0.00060 <0.00060 <0.00082 <0.00082 <0.00082 <0.00082 <0.000050 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <td>Copper (Cu)-Dissolved</td> <td>0.0010</td> <td>< 0.0010</td> <td><0.0010</td> <td>0.0013</td>	Copper (Cu)-Dissolved	0.0010	< 0.0010	<0.0010	0.0013
Lithium (Li)-Dissolved 0.0085 0.0064 0.0065 0.0060 Magnesium (Mg)-Dissolved 0.74 1.33 4.02 2.47 Manganese (Mn)-Dissolved 0.00026 0.00049 0.00083 0.00082 Mercury (Hg)-Dissolved <0.000010	fron (Fe)-Dissolved	< 0.050	< 0.050	< 0.050	<0.050
Magnesium (Mg)-Dissolved 0.74 1.33 4.02 2,47 Manganese (Mn)-Dissolved 0.00026 0.00049 0.00083 0.00082 Mercury (Hg)-Dissolved <0.000010	Lead (Pb)-Dissolved	< 0.00025	<0.00025	<0.00025	<0.00025
Manganese (Mn)-Dissolved 0.00026 0.00049 0.00083 0.00082 Mercury (Hg)-Dissolved <0.000010	Lithium (Li)-Dissolved	0.0085	0.0064	0.0065	0.0060
Mercury (Hg)-Dissolved <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000010 <0.000025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.00025 <0.030 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.00 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050	Magnesium (Mg)-Dissolved	0.74	1.33	4.02	2,47
Molybdenum (Mo)-Dissolved 0.117 0.0776 0.0730 0.0749 Nickel (Ni)-Dissolved <0.0025	Manganese (Mn)-Dissolved	0.00026	0.00049	0.00083	
Nickel (Ni)-Dissolved <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0025 <0.0030 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.058 <0.0587 <0.0587 <0.0587 <0.0058 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.000050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.00050 <0.000050 <0.00050 <0.00050 <0.00050 </td <td>Mercury (Hg)-Dissolved</td> <td>< 0.000010</td> <td><0.000010</td> <td><0.000010</td> <td>< 0.000010</td>	Mercury (Hg)-Dissolved	< 0.000010	<0.000010	<0.000010	< 0.000010
Phosphorus (P)-Dissolved <0.30 <0.30 <0.30 <0.30 Potassium (K)-Dissolved 1.68 1.63 1.78 1.62 Selenium (Se)-Dissolved 0.0647 0.0639 0.0668 0.0587 Silicon (Si)-Dissolved 0.125 0.110 0.077 0.092 Silver (Ag)-Dissolved <0.000050	Molybdenum (Mo)-Dissolved	0.117	0.0776	0.0730	
Potassium (K)-Dissolved 1.68 1.63 1.78 1.62 Selenium (Se)-Dissolved 0.0647 0.0639 0.0668 0.0587 Silicon (Si)-Dissolved 0.125 0.110 0.077 0.092 Silver (Ag)-Dissolved <0.000050	Nickel (Ni)-Dissolved	<0.0025			
Selenium (Se)-Dissolved 0.0647 0.0639 0.0668 0.0587 Silicon (Si)-Dissolved 0.125 0.110 0.077 0.092 Silver (Ag)-Dissolved <0.000050	Phosphorus (P)-Dissolved	< 0.30			
Silicon (Si)-Dissolved 0.125 0.110 0.077 0.092 Silver (Ag)-Dissolved <0.000050	Potassium (K)-Dissolved	1.68	1.63		
Silver (Ag)-Dissolved <0.000050 <0.000050 <0.000050 <0.000050 Sodium (Na)-Dissolved 6.01 5.58 6.07 5.58 Strontium (Sr)-Dissolved 0.840 0.780 0.821 0.815 Thallium (TI)-Dissolved <0.000050	Selenium (Se)-Dissolved	0.0647	0.0639		
Sodium (Na)-Dissolved 6.01 5.58 6.07 5.58 Strontium (Sr)-Dissolved 0.840 0.780 0.821 0.815 Thallium (TI)-Dissolved <0.000050	Silicon (Si)-Dissolved				
Strontium (Sr)-Dissolved 0.840 0.780 0.821 0.815 Thallium (TI)-Dissolved <0.000050	Silver (Ag)-Dissolved				
Thallium (TI)-Dissolved <0.000050 0.000071 <0.000050 <0.000050 Tin (Sn)-Dissolved 0.00107 0.00097 0.00090 0.00100 Titanium (Ti)-Dissolved <0.010	Sodium (Na)-Dissolved				
Tin (Sn)-Dissolved 0.00107 0.00097 0.00090 0,00100 Titanium (Ti)-Dissolved <0.010	Strontium (Sr)-Dissolved				
Titanium (Ti)-Dissolved <0.010 <0.010 <0.010 0.011 Uranium (U)-Dissolved <0.000050	• •				
Uranium (U)-Dissolved <0.00050 <0.00050 <0.00050 <0.00050 Vanadium (V)-Dissolved <0.0050					
Vanadium (V)-Dissolved <0.0050 <0.0050 <0.0050 <0.0050					
7 a.	• •				
Zinc (Zn)-Dissolved <0.0050 <0.0050 <0.0050 <0.0050					
	Zinc (Zn)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050

1000 000 OOT00A	1000 000 OCT00B	1000 022 OCT24A	1000 027 OCT24B	
- EFFLUENT	- EFFLUENT	- EFFLUENT	1298-037 OCT24B- EFFLUENT	
23-OCT-12	23-OCT-12	24-OCT-12	24-OCT-12	
02:00	14:00	02:00	14:00	
L1227707-1	L1228195-1	L1228156-1	L1228980-1	
Water	Water	Water	Water	
				Average
1180	1210	1230	1310	
9.62	9.49	8.75	9.14	
13.3	5.3	24.0	9.3	11.6
1720	1600	1630	1700	
14.8	7.69	35.4	9.77	
<1.0	<1.0	<1.0	<1.0	
10.8	11.7	15.3	13.9	
14.1	14.4	5.5	8.1	
<1.0	<1.0	<1.0	<1.0	
24.9	26.1	20.8	22.0	
0.0500	0.0606	0.0562	0.0579	
<1.0	<1.0	<1.0	<1.0	
<10	<10	<10	<10	
<0.40	<0.40	< 0.40	<0.40	
0.73	0.85	0.90	0.74	
0.026	0.031	0.037	0.036	
< 0.0010	< 0.0010	< 0.0010	<0.0010	
< 0.0020	< 0.0020	<0.0020	<0.0020	
1140	1130	1150	1190	
3.08	2.92	4.06	3.47	
<0.00050	<0.00050	<0.00050	<0.00050	
0.00030	0.00160	0.00398	0.00204	
0.0216	0.0193	0.0236	0.0193	
<0.0050	<0.0050	<0.00050	<0.00050	
<0.0025	<0.0025	<0.0025	<0.0025	
<0.050	<0.050	< 0.050	<0.050	
0.000630	0.000615	0.00137	0.000756	
453	457	493	496	
0.00495	0.00402	0.00553	0.00537	
0.00637	0.00596	0.0145	0.00785	
0.264	0.245	0.607	0.334	
3.10	2.86	7.02	3.76	
0.00054	0.00029	0.00128	0.00064	
0.0062	0.0071	0.0072	0.0054	
2.21	1.61	2.50	3.52	
0.161	0.159	0.401	0.206	
<0.000010	< 0.000010	0.000012	0.000013	
0.0807	0.0876	0.0825	0.0779	
0.0026	< 0.0025	0.0058	0.0031	

<0.30	<0.30	<0.30	< 0.30	
1.69	1.74	1.70	1.69	
0.0629	0.0609	0.0646	0.0635	
0.229	0.211	0.383	0.243	
0.000091	0.000063	0.000162	0.000101	
5.81	6.54	6.52	5.85	
0.859	0.853	0.835	0.853	
< 0.000050	< 0.000050	< 0.000050	< 0.000050	
0.00099	0.00086	0.00101	0.00093	
0.022	0.025	0.040	0.029	
< 0.000050	< 0.000050	0.000112	0.000055	
< 0.0050	< 0.0050	< 0.0050	< 0.0050	
0.051	0.046	0.111	0.061	
FIELD	FIELD	FIELD	FIELD	
2.81	2.71	3.32	3.09	
<0.00050	<0.00050	< 0.00050	<0.00050	
<0.00050	<0.00050	<0.00050	<0.00050	
0.0201	0.0186	0.0198	0.0182	
<0.0201	<0.0050	<0.0050	<0.00050	
<0.00050	<0.00050	<0.00050	<0.0025	
<0.050	< 0.050	< 0.050	<0.050	
0.000101	0.00088	0.000089	0.000088	
470	481	491	520	
	0.00386	0.00384	0.00477	
0.00433	<0.00380	< 0.00384	< 0.00050	
<0.00050		0.0075	0.0022	
0.0044	0.0016		<0.050	
<0.050	<0.050	<0.050		
<0.00025	<0.00025	<0.00025	<0.00025	
0.0062	0.0073	0.0056	0.0054	
1.99	1.39	1.76	3.28	
0.00211	0.00096	0.00400	0.00136	
<0.000010	<0.000010	<0.000010	<0.000010	
0.0791	0.0885	0.0783	0.0799	
<0.0025	<0.0025	<0.0025	<0.0025	
<0.30	<0.30	<0.30	<0.30	
1.71	1.69	1.66	1.71	
0.0616	0.0617	0.0621	0.0633	
0.114	0.107	0.105	0.095	
<0.000050	<0.000050	<0.000050	<0.000050	
5.71	6.57	6,55	5.90	
0.835	0.852	0.818	0.858	
<0.000050	<0.000050	<0.000050	<0.000050	
0.00098	0.00091	0.00110	0.00086	
0.011	0.016	0.015	0.015	
<0.000050	<0.000050	<0.000050	<0.000050	
<0.0050	<0.0050	<0.0050	<0.0050	
< 0.0050	< 0.0050	<0.0050	<0.0050	

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix	1298-012 OCT21A - REACTOR2 21-OCT-12 14:00 L1227084-3 Water	1298-015 OCT21B - REACTOR2 21-OCT-12 14:00 L1227088-2 Water	1298-019 OCT22A - REACTOR2 22-OCT-12 02:00 L1227087-2 Water	1298-023 OCT22B - REACTOR2 22-OCT-12 14:00 L1227710-2 Water
Physical Tests				
Hardness (as CaCO3)	1280	1310	1260	1170
pH	-	21	\$	
Total Suspended Solids		#2		
Total Dissolved Solids		₩:	-	
Turbidity	-	*		ŝ
Anions and Nutrients				
Acidity (as CaCO3)	45	*	~	
Alkalinity, Bicarbonate (as CaCO3)	_	*	8	9
Alkalinity, Carbonate (as CaCO3)				
Alkalinity, Hydroxide (as CaCO3)	5	2	*	i i
Alkalinity, Total (as CaCO3)				
Ammonia, Total (as N)	2	· ·	g.	÷
Bromide (Br)			,	
Chloride (Cl)	ş			
Fluoride (F)	>			G.
Nitrate (as N)	·	*		œ
Nitrite (as N)	,	€	<u>=</u>	72
Orthophosphate-Dissolved (as P)				
Phosphorus (P)-Total	2	=	72	2
Sulfate (SO4)	8	*	-	-
Canalis (CC I)				
Total Metals				
Aluminum (AI)-Total	-	2		340
Antimony (Sb)-Total	35	:*:		3
Arsenic (As)-Total	*			30
Barium (Ba)-Total	75	25	•	-
Beryllium (Be)-Total	*	00		· ·
Bismuth (Bi)-Total		-	-	:-41
Boron (B)-Total	*	*	(2)	:91
Cadmium (Cd)-Total	<u>~</u>		-	(*)
Calcium (Ca)-Total		-	30	(5)
Chromium (Cr)-Total		9	- SES	7. 4 .7 CC
Cobalt (Co)-Total			120	
Copper (Cu)-Total	-	3	-	336 740
Iron (Fe)-Total	3	287	5.2	
Lead (Pb)-Total	-	90 90	(€5 1020	16
Lithium (Li)-Total	557			
Magnesium (Mg)-Total	90	@1 20	589	180
Manganese (Mn)-Total	197			
Mercury (Hg)-Total	(9)	(*)	160	161
Molybdenum (Mo)-Total	-			
Nickel (Ni)-Total		(*	75.	

Phosphorus (P)-Total	160	•	*	-
Potassium (K)-Total	12	2:	ž.	÷
Selenium (Se)-Total				
Silicon (Si)-Total		*	≅	Ü
Silver (Ag)-Total	161			-
Sodium (Na)-Total		2		-
Strontium (Sr)-Total	,	5:		
Thallium (TI)-Total	F.	*	8	*
Tin (Sn)-Total	-			9
Titanium (Ti)-Total		*	*	*
Uranium (U)-Total	E-	2	2	7
Vanadium (V)-Total				*
Zinc (Zn)-Total	2	*	*	'≆
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	3.77	5.27	3.74	2.92
Antimony (Sb)-Dissolved	< 0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Barium (Ba)-Dissolved	0.0287	0.0286	0.0222	0.0209
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.0025	<0.0025	<0.0025	<0.0025
Boron (B)-Dissolved	<0.050	<0.050	<0.050	<0.050
Cadmium (Cd)-Dissolved	0.000069	0.000075	0.000063	0.000088
Calcium (Ca)-Dissolved	510	521	502	464
Chromium (Cr)-Dissolved	0.00202	0.00193	0.00329	0.00387
Cobalt (Co)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)-Dissolved	0.0035	0.0122	0.0023	0.0141
Iron (Fe)-Dissolved	<0.050	0.135	<0.050	0.146
Lead (Pb)-Dissolved	<0.00025	<0.00025	<0.00025	<0.00025
Lithium (Li)-Dissolved	0.0085	0.0062	0.0067	0.0064
Magnesium (Mg)-Dissolved	0.68	1.72	1.64	2.38
Manganese (Mn)-Dissolved	0.00151	0.00851	0.00132	0.00894
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.102	0.0771	0.0803	0.0772
Nickel (Ni)-Dissolved	<0.0025	<0.0025	<0.0025	<0.0025
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.75	1.76	1.77	1.63
Selenium (Se)-Dissolved	0.0669	0.0676	0.0651	0.0599
Silicon (Si)-Dissolved	0.163	0.099	0.093	0.097
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0.000050 5.90	<0.000050 5.52
Sodium (Na)-Dissolved	6.16	5.96	0.824	0.844
Strontium (Sr)-Dissolved	0.870	0.843		
Thallium (TI)-Dissolved	<0.000050	<0.000050 0.00098	<0.000050 0.00096	<0.000050 0.00097
Tin (Sn)-Dissolved	0.00105 <0.010	< 0.00098	< 0.00096	0.00097
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.000050
Uranium (U)-Dissolved	<0.00050	<0.000050 <0.0050	<0.0050	<0.0050
Vanadium (V)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050
Zinc (Zn)-Dissolved	<0.0000	<0.0000	CO.0030	20.0030

1298-027 OCT23A - REACTOR2 23-OCT-12 02:00 L1228152-1 Water	1298-031 OCT23B - REACTOR2 23-OCT-12 14:00 L1228195-2 Water	1298-034 OCT24A - REACTOR2 24-OCT-12 02:00 L1228156-2 Water	1298-038 OCT24B- REACTOR2 24-OCT-12 14:00 L1228980-2 Water
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FIELD	FIELD	FIELD	FIELD
2.69	2.78	2.86	3.12
<0.00050	<0.00050	<0.00050	<0.00050
<0.00050	<0.00050	<0.00050	<0.00050
0.0221	0.0190	0.0188	0.0180
<0.00050	<0.00050	<0.00050	<0.00050
<0.0025	<0.0025	<0.0025	<0.0025
<0.050	<0.050	<0.050	<0.050
0.000089	0.000080	0.000071	0.000072
491	472	482	520
0.00492	0.00408	0.00393	0.00429
<0.00050	<0.00050	<0.00050	<0.00050
0.0011	<0.0010	0.0046	<0.0010
<0.050	<0.050	<0.050	< 0.050
<0.00025	<0.00025	<0.00025	<0.00025
0.0075	0.0073	0.0064	0.0054
1.31	1.44	2.14	3.55
0.00070	0.00064	0.00277	0.00077
<0.000010	<0.000010	<0.000010	<0.000010
0.0826	0.0851	0.0786	0.0763
<0.0025	<0.0025	<0.0025	<0.0025
<0.30	<0.30	<0.30	<0.30
1.83	1.75	1.61	1.68
0.0663	0.0613	0.0602	0.0639
0.109	0.112	0.102	0.088
<0.000050	<0.000050	<0.000050	<0.000050
6.67	6.59	6.56	5.79
0.871	0.850	0.807	0.841
<0.000050	<0.000050	<0.000050	<0.000050
0.00099	0.00098	0.00089	0.00095
0.015	0.015	0.014	0.016
<0.000050	<0.000050	<0.000050	<0.000050
<0.0050	<0.0050	<0.0050	<0.0050
<0.0050	<0.0050	<0.0050	<0.0050

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix	1298-013 OCT21A - REACTOR1 21-OCT-12 14:00 L1227084-4 Water	1298-016 OCT21B - REACTOR1 21-OCT-12 14:00 L1227088-3 Water	1298-020 OCT22A - REACTOR1 22-OCT-12 02:00 L1227087-3 Water	1298-024 OCT22B - REACTOR1 22-OCT-12 14:00 L1227710-3 Water
Physical Tests				
Hardness (as CaCO3)	1280	1310	1250	1180
pH	¥	94		14
Total Suspended Solids	*			
Total Dissolved Solids	2	G.	3	-
Turbidity			=	3
,				
Anions and Nutrients				
Acidity (as CaCO3)	*	.≆	125	· ·
Alkalinity, Bicarbonate (as CaCO3)	· ·	12	*	:=
Alkalinity, Carbonate (as CaCO3)	*	×	95	3
Alkalinity, Hydroxide (as CaCO3)	-	-	72	
Alkalinity, Total (as CaCO3)	*		*	21
Ammonia, Total (as N)	₩	.9		30
Bromide (Br)		55		<u> </u>
Chloride (CI)				
Fluoride (F)		3	-	7
Nitrate (as N)	*	(E		(4)
Nitrite (as N)		22	4	107
Orthophosphate-Dissolved (as P)		±		
Phosphorus (P)-Total	ď.	=	:4	(4)
Sulfate (SO4)		=		-37
Total Metals				
Aluminum (Al)-Total	2	-		-
Antimony (Sb)-Total		la la	3	
Arsenic (As)-Total		9		3.77
Barium (Ba)-Total	e e	4	2	147
Beryllium (Be)-Total	9	90	00	580
Bismuth (Bi)-Total	4	347	90	
Boron (B)-Total			41	241
Cadmium (Cd)-Total	=	ia.	361	240
Calcium (Ca)-Total			1,00	350
Chromium (Cr)-Total		665	365	063
Cobalt (Co)-Total				
Copper (Cu)-Total	÷	(9)	⊕	(€
Iron (Fe)-Total		-	(2)	1/20
Lead (Pb)-Total			272	(*)
Lithium (Li)-Total	=	567	797	161
Magnesium (Mg)-Total	-	562	100	1 (6)
Manganese (Mn)-Total		141	-	· ·
Mercury (Hg)-Total		2.00	17	15:
Molybdenum (Mo)-Total	90	345	340	36
Nickel (Ni)-Total	31.	3.50	15	

Phosphorus (P)-Total			51	-
Potassium (K)-Total	IN:		±	*
Selenium (Se)-Total			=	€
Silicon (Si)-Total	36	•		*
Silver (Ag)-Total		Ē.	2	2
Sodium (Na)-Total	100		*	
Strontium (Sr)-Total	1.2	25	Ç.	\$
Thallium (TI)-Total		-	8	*
Tin (Sn)-Total	12:	-	2)	*
Titanium (Ti)-Total		•:		-
Uranium (U)-Total	12.5	ě:	*	×
Vanadium (V)-Total		5.		ž
Zinc (Zn)-Total	-	*0	*	8
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (AI)-Dissolved	5.00	5.85	3.74	3.04
Antimony (Sb)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved	<0.00050	0.00062	<0.00050	<0.00050
Barium (Ba)-Dissolved	0.0303	0.0301	0.0226	0.0205
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.0025	<0.0025	<0.0025	<0.0025
Boron (B)-Dissolved	< 0.050	< 0.050	<0.050	< 0.050
Cadmium (Cd)-Dissolved	0.000056	<0.000050	0.000070	0.000134
Calcium (Ca)-Dissolved	512	521	497	467
Chromium (Cr)-Dissolved	0.00163	0.00215	0.00331	0.00402
Cobalt (Co)-Dissolved	<0.00050	<0.00050	<0.00050	0.00074
Copper (Cu)-Dissolved	0.0012	0.0016	0.0015	0.0308
Iron (Fe)-Dissolved	<0.050	<0.050	< 0.050	0.334
Lead (Pb)-Dissolved	<0.00025	<0.00025	<0.00025	<0.00025
Lithium (Li)-Dissolved	0.0079	0.0058	0.0069	0.0061
Magnesium (Mg)-Dissolved	0.85	2.49	1.63	2.26
Manganese (Mn)-Dissolved	0.00095	0.00114	0.00071	0.0198
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010	< 0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0901	0.0717	0.0785	0.0746
Nickel (Ni)-Dissolved	< 0.0025	<0.0025	<0.0025	<0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30	< 0.30	< 0.30
Potassium (K)-Dissolved	1.83	1.74	1.71	1.55
Selenium (Se)-Dissolved	0.0641	0.0675	0.0638	0.0566
Silicon (Si)-Dissolved	0.127	0.107	0.105	0.119
Silver (Ag)-Dissolved	< 0.000050	<0.000050	<0.000050	<0.000050
Sodium (Na)-Dissolved	6.09	5.90	5.97	5.36
Strontium (Sr)-Dissolved	0.822	0.823	0.821	0.788
Thallium (TI)-Dissolved	<0.000050	0.000053	<0.000050	<0.000050
Tin (Sn)-Dissolved	0.00097	0.00098	0.00093	0.00099
Titanium (Ti)-Dissolved	< 0.010	<0.010	< 0.010	0.012
Uranium (U)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050
Vanadium (V)-Dissolved	< 0.0050	< 0.0050	<0.0050	< 0.0050
Zinc (Zn)-Dissolved	< 0.0050	<0.0050	<0.0050	0.0072

1298-028 OCT23A - REACTOR1 23-OCT-12 02:00 L1227707-3 Water	1298-032 OCT23B - REACTOR1 23-OCT-12 14:00 L1228195-3 Water	1298-035 OCT24A - REACTOR1 24-OCT-12 02:00 L1228156-3 Water	1298-039 OCT24B- REACTOR1 24-OCT-12 14:00 L1228980-3 Water
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FIELD	FIELD	FIELD	FIELD 3.43
2.98 <0.00050	3.41 <0.00050	3.21 <0.00050	<0.00050
<0.00050	<0.00050	<0.00050	<0.00050
0.0193	0.0199	0.0202	0.0195
<0.0050	<0.0050	< 0.00050	<0.00050
<0.00050	<0.0050	<0.00050	<0.0025
< 0.050	<0.050	<0.050	< 0.050
0.000059	0.000077	0.000062	0.000084
461	482	471	502
0.00405	0.00380	0.00372	0.00436
<0.00050	<0.00050	<0.00072	< 0.00050
< 0.0010	<0.0010	0.0032	0.0019
< 0.050	< 0.050	< 0.050	< 0.050
<0.00025	<0.00025	<0.00025	<0.00025
0.0060	0.0079	0.0059	0.0057
1.42	1.80	2.76	4.90
0.00034	0.00072	0.00211	0.00137
<0.000010	< 0.000010	< 0.000010	< 0.000010
0.0797	0.0853	0.0767	0.0719
< 0.0025	< 0.0025	< 0.0025	< 0.0025
< 0.30	< 0.30	< 0.30	< 0.30
1.71	1.71	1.69	1.64
0.0606	0.0630	0.0625	0.0615
0.123	0.112	0.093	0.091
< 0.000050	< 0.000050	<0.000050	<0.000050
5.83	6.49	6.24	5.83
0.854	0.871	0.814	0.831
<0.000050	<0.000050	<0.000050	<0.000050
0.00111	0.00102	0.00097	0.00092
<0.010	0.015	0.014	0.015
<0.000050	<0.000050	<0.000050	<0.000050
<0.0050	<0.0050	<0.0050	< 0.0050
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Sample ID	1298-011 OCT21A - FEED	1298-017 OCT21B - FEED	1298-021 OCT22A - FEED	1298-025 OCT22B - FEED
Date Sampled	21-OCT-12	21-OCT-12	22-OCT-12	22-OCT-12
Time Sampled	14:00	14:00	02:00	14:00
ALS Sample ID	L1227084-2	L1227088-4	L1227087-4	L1227710-4
Matrix	Water	Water	Water	Water
Physical Tests				
Hardness (as CaCO3)	370	374	374	365
pH	2.63	*		×
Total Suspended Solids	37.3	2	~	9
Total Dissolved Solids	1950	75		*
Turbidity	68.6	¥	-	u.
Anions and Nutrients				
Acidity (as CaCO3)	984		9	*
Alkalinity, Bicarbonate (as CaCO3)	<1.0	*		9
Alkalinity, Carbonate (as CaCO3)	<1.0	ÿ.	2	2
Alkalinity, Hydroxide (as CaCO3)	<1.0	×		
Alkalinity, Total (as CaCO3)	<1.0	2	4	*
Ammonia, Total (as N)	0.0085			
Bromide (Br)	<1.0	*	~	32
Chloride (CI)	<10	-		
Fluoride (F)	1.38	× ×	*	Œ.
Nitrate (as N)	0.81			74
Nitrite (as N)	0.030	· ·	3	
Orthophosphate-Dissolved (as P)	0.0340	i	S2	72
Phosphorus (P)-Total	<0.20			
Sulfate (SO4)	1350	살	, <u>s</u>	=
Total Metals				
Aluminum (Al)-Total	33.6	(*	:-	
Antimony (Sb)-Total	0.00207	2	:=	4
Arsenic (As)-Total	0.138			
Barium (Ba)-Total	0.0870		-	90
Beryllium (Be)-Total	0.00271	5	3	57
Bismuth (Bi)-Total	< 0.0025	(#	3	90
Boron (B)-Total	< 0.050	62	127	52
Cadmium (Cd)-Total	0.0423		28	(A)
Calcium (Ca)-Total	101	÷	97	ia.
Chromium (Cr)-Total	0.0232	i e	35	191
Cobalt (Co)-Total	0.470	-	14	G-2
Copper (Cu)-Total	20.3	,#	-25	
Iron (Fe)-Total	233	54	541	(40)
Lead (Pb)-Total	0.0378		30	*
Lithium (Li)-Total	0.0117	340	(9)	(*)
Magnesium (Mg)-Total	22.2	91	(A)	7.4
Manganese (Mn)-Total	13.5	30	· 20	583
Mercury (Hg)-Total	0.000039	24	Tay.	1.0
Molybdenum (Mo)-Total	0.124	Se.	:=2	1,20
Nickel (Ni)-Total	0.185	:21	**	290
Phosphorus (P)-Total	<0.30		4.70	2.50

Potassium (K)-Total	1.65	*:	*	
Selenium (Se)-Total	0.112	2.	i.	₹
Silicon (Si)-Total	6.37	5		5
Silver (Ag)-Total	0.00382	¥2	*	*
Sodium (Na)-Total	5.66	8	8	<u>u</u>
Strontium (Sr)-Total	0.754	**	*	
Thallium (TI)-Total	0.000122	2€	2	÷
Tin (Sn)-Total	0.00112	*1	*	
Titanium (Ti)-Total	0.832	₽	¥	۵
Uranium (U)-Total	0.00194	*		e.
Vanadium (V)-Total	0.0064	2:	-	5
Zinc (Zn)-Total	3.64	<u>.</u>		5
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (AI)-Dissolved	34.4	34.5	35.1	31.7
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050	< 0.00050	<0.00050
Arsenic (As)-Dissolved	0.129	0.138	0.132	0.118
Barium (Ba)-Dissolved	0.0835	0.0837	0.0870	0.0783
Beryllium (Be)-Dissolved	0.00257	0.00263	0.00255	0.00269
Bismuth (Bi)-Dissolved	<0.0025	< 0.0025	< 0.0025	<0.0025
Boron (B)-Dissolved	< 0.050	< 0.050	< 0.050	<0.050
Cadmium (Cd)-Dissolved	0.0422	0.0453	0.0455	0.0413
Calcium (Ca)-Dissolved	109	110	110	106
Chromium (Cr)-Dissolved	0.0242	0.0251	0.0245	0.0226
Cobalt (Co)-Dissolved	0.481	0.496	0.499	0.450
Copper (Cu)-Dissolved	20.7	21.9	21.7	20.5
Iron (Fe)-Dissolved	232	235	241	219
Lead (Pb)-Dissolved	0.0345	0.0429	0.0362	0.0366
Lithium (Li)-Dissolved	0.0104	0.0107	0.0107	0.0119
Magnesium (Mg)-Dissolved	23.7	24.1	24.0	24.3
Manganese (Mn)-Dissolved	13.8	14.1	14.2	13.4
Mercury (Hg)-Dissolved	< 0.000010	0,000015	0.000014	0.000017
Molybdenum (Mo)-Dissolved	0.0758	0.0871	0.0822	0.0809
Nickel (Ni)-Dissolved	0.186	0.194	0.193	0.185
Phosphorus (P)-Dissolved	< 0.30	< 0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.75	1.74	1.74	1.60
Selenium (Se)-Dissolved	0.107	0.110	0,113	0.0994
Silicon (Si)-Dissolved	6.43	6.42	6.43	6.53
Silver (Ag)-Dissolved	0.00338	0.00377	0.00373	0.00360
Sodium (Na)-Dissolved	5.78	5.84	6.00	5.46
Strontium (Sr)-Dissolved	0.665	0.762	0.741	0.742
Thallium (TI)-Dissolved	0.000161	0.000271	0.000109	0.000108
Tin (Sn)-Dissolved	0.00101	0.00101	0.00109	0.00097
Titanium (Ti)-Dissolved	0.797	0.804	0.800	0.792
Uranium (U)-Dissolved	0.00179	0.00201	0:00195	0.00199
Vanadium (V)-Dissolved	< 0.0050	< 0.0050	< 0.0050	<0.0050
Zinc (Zn)-Dissolved	3.75	3.88	3.90	3.59

- FEED	- FEED	1298-040 OCT24B- FEED	
23-OCT-12 02:00	24-OCT-12 02:00	24-OCT-12 14:00	
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FIELD	FIELD	FIELD	04.0
34.7	35.3	34.2	34.3
<0.00050	<0.00050	<0.00050	
0.127	0.122	0.120	
0.0900	0.0827	0.0840	
0.00275	0.00295	0.00269	
<0.0025	<0.0025	<0.0025	
<0.050	<0.050	<0.050	
0.0453	0.0422	0.0442	
109	114	116	
0.0242	0.0227	0.0245	
0.495	0.507	0.492	
22.4	21.7	22,3	
221	231	231	
0.0369	0.0370	0.0389	
0.0123	0.0134	0.0116	
24.0	24.9	25.9	
14.7	14.8	14.4	
0.000020	0.000021	0.000015	
0.0805	0.0829	0.0850	0.082
0.199	0.191	0.194	
<0.30	<0.30	<0.30	
1.81	1.77	1.68	
0.100	0.107	0.108	
6.39	6.48	6.64	
0.00372	0.00408	0.00363	
6.01	6.38	5.82	
0.742	0.785	0.788	
0.000124	0.000120	0.000124	
0.00128	0.00118	0.00122	
0.777	0.798	0.840	
0.00206	0.00208	0.00194	
<0.0050	<0.0050	<0.0050	
3.98	3.64	3.79	

	1298-010 OCT21A	1298-014 OCT21B		
Sample ID	 EFFLUENT 	- EFFLUENT	- EFFLUENT	- EFFLUENT
Date Sampled	21-OCT-12	21-OCT-12	22-OCT-12	22-OCT-12
Time Sampled	14:00	14:00	02:00	14:00
ALS Sample ID	L1227084-1	L1227088-1	L1227087-1	L1227710-1
Matrix	Water	Water	Water	Water
Physical Tests				
Hardness (as CaCO3)	1250	1260	1340	1150
pH	10.23	9.62	9.25	9.19
Total Suspended Solids	8.0	13.0	6.0	14.0
Total Dissolved Solids	1740	1730	1850	1750
Turbidity	5.12	8.87	3.45	10.1
Anions and Nutrients				
Acidity (as CaCO3)	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	<1.0	2.7	5.7	12.3
Alkalinity, Carbonate (as CaCO3)	32.4	28.4	22.3	8.9
Alkalinity, Hydroxide (as CaCO3)	7.2	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	39.6	31.1	28.0	21.2
Ammonia, Total (as N)	0.0349	0.0438	0.0504	0.0408
Bromide (Br)	<1.0	<1.0	<1.0	<1.0
Chloride (CI)	<10	<10	<10	<10
Fluoride (F)	0.41	0.43	0.44	< 0.40
Nitrate (as N)	0.74	0.73	0.75	0.83
Nitrite (as N)	0.024	0.021	<0.020	0.022
Orthophosphate-Dissolved (as P)	< 0.0010	< 0.0010	<0.0010	< 0.0010
Phosphorus (P)-Total	< 0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO4)	1160	1160	1240	1170
Total Metals				
Aluminum (Ai)-Total	3.62	4.48	4.27	3.51
Antimony (Sb)-Total	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	0.00224	0.00194	0.00069	0.00171
Barium (Ba)-Total	0.0284	0.0264	0.0240	0.0230
Beryllium (Be)-Total	< 0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.0025	<0.0025	<0.0025	<0.0025
Boron (B)-Total	< 0.050	< 0.050	< 0.050	< 0.050
Cadmium (Cd)-Total	0.000676	0.000614	0.000285	0.000554
Calcium (Ca)-Total	475	465	482	451
Chromium (Cr)-Total	0.00248	0.00288	0.00360	0.00422
Cobalt (Co)-Total	0.00613	0.00586	0.00229	0.00504
Copper (Cu)-Total	0.267	0.260	0.0954	0.222
Iron (Fe)-Total	3.26	3.01	1.13	2.57
Lead (Pb)-Total	0.00055	0.00049	< 0.00025	0.00048
Lithium (Li)-Total	0.0088	0.0057	0.0064	0.0062
Magnesium (Mg)-Total	1.02	1.47	3.62	2.64
Manganese (Mn)-Total	0.178	0.171	0.0618	0.139
Mercury (Hg)-Total	< 0.000010	< 0.000010	< 0.000010	<0.000010
Molybdenum (Mo)-Total	0.118	0.0821	0.0726	0.0793
Nickel (Ni)-Total	0.0025	< 0.0025	< 0.0025	< 0.0025
, ,				

Dhaanharra (D) Tatal	<0.30	<0.30	<0.30	<0.30
Phosphorus (P)-Total	1.76	<0.30 1.71	1.72	<0.30 1.73
Potassium (K)-Total Selenium (Se)-Total	0.0637	0.0635	0.0656	0.0637
Silicon (Si)-Total	0.240	0.220	0.114	0.181
Silver (Ag)-Total	0.000053	0.000054	0.000057	0.000070
Sodium (Na)-Total	5.87	5.74	5.79	5.78
Strontium (Sr)-Total	0.862	0.833	0.810	0.853
Thallium (TI)-Total	<0.00050	<0.000050	<0.00050	<0.00050
Tin (Sn)-Total	0.00109	0.00100	0.00095	0.00123
Titanium (Ti)-Total	0.021	0.020	0.012	0.020
Uranium (U)-Total	<0.000050	<0.000050	<0.00050	<0.000050
Vanadium (V)-Total	<0.0050	<0.0050	<0.0050	<0.0050
Zinc (Zn)-Total	0.052	0.051	0.027	0.046
Zino (Zin) Total	0.002	0.001	0.027	0.040
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (AI)-Dissolved	3.26	4.03	4.36	3.06
Antimony (Sb)-Dissolved	<0.00050	< 0.00050	<0.00050	< 0.00050
Arsenic (As)-Dissolved	<0.00050	< 0.00050	< 0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0281	0.0251	0.0240	0.0198
Beryllium (Be)-Dissolved	<0.00050	< 0.00050	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved ·	<0.0025	<0.0025	< 0.0025	< 0.0025
Boron (B)-Dissolved	<0.050	< 0.050	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.000090	0.000099	0.000063	0.000074
Calcium (Ca)-Dissolved	499	503	531	457
Chromium (Cr)-Dissolved	0.00194	0.00241	0.00334	0.00374
Cobalt (Co)-Dissolved	<0.00050	<0.00050	< 0.00050	< 0.00050
Copper (Cu)-Dissolved	0.0010	<0.0010	< 0.0010	0.0013
Iron (Fe)-Dissolved	<0.050	< 0.050	< 0.050	<0.050
Lead (Pb)-Dissolved	<0.00025	< 0.00025	< 0.00025	<0.00025
Lithium (Li)-Dissolved	0.0085	0.0064	0.0065	0.0060
Magnesium (Mg)-Dissolved	0.74	1.33	4.02	2.47
Manganese (Mn)-Dissolved	0.00026	0.00049	0.00083	0.00082
Mercury (Hg)-Dissolved	<0.000010	<0.000010	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.117	0.0776	0.0730	0.0749
Nickel (Ni)-Dissolved	<0.0025	<0.0025	<0.0025	< 0.0025
Phosphorus (P)-Dissolved	<0.30	< 0.30	< 0.30	<0.30
Potassium (K)-Dissolved	1.68	1.63	1.78	1.62
Selenium (Se)-Dissolved	0.0647	0.0639	0.0668	0.0587
Silicon (Si)-Dissolved	0.125	0.110	0.077	0.092
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050
Sodium (Na)-Dissolved	6.01	5.58	6.07	5.58
Strontium (Sr)-Dissolved	0.840	0.780	0.821	0.815
Thallium (TI)-Dissolved	<0.000050	0.000071	<0.000050	<0.000050
Tin (Sn)-Dissolved	0.00107	0.00097	0.00090	0.00100
Titanium (Ti)-Dissolved	<0.010	< 0.010	<0.010	0.011
Uranium (U)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050
Vanadium (V)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050
Zinc (Zn)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050

1298-026 OCT23A	1298-030 OCT23B	1298-033 OCT24A	1298-037 OCT24B-		
- EFFLUENT	- EFFLUENT	- EFFLUENT	EFFLUENT		
23-OCT-12	23-OCT-12	24-OCT-12	24-OCT-12		
02:00	14:00	02:00	14:00		
L1227707-1	L1228195-1	L1228156-1	L1228980-1		
Water	Water	Water	Water		
				Average	à
1180	1210	1230	1310		
9.62	9.49	8.75	9.14		
13.3	5,3	24.0	9.3	11.6	
1720	1600	1630	1700		
14.8	7.69	35.4	9.77		
<1.0	<1.0	<1.0	<1.0		
10.8	11.7	15.3	13.9		
14.1	14.4	5.5	8.1		
<1.0	<1.0	<1.0	<1.0		
24.9	26.1	20.8	22.0		
0.0500	0.0606	0.0562	0.0579		
<1.0	<1.0	<1.0	<1.0		
<10	<10	<10	<10		
< 0.40	< 0.40	< 0.40	<0.40		
0.73	0.85	0.90	0.74		
0.026	0.031	0.037	0.036		
< 0.0010	< 0.0010	< 0.0010	< 0.0010		
< 0.0020	< 0.0020	<0.0020	< 0.0020		
1140	1130	1150	1190		
3.08	2,92	4.06	3.47		
<0.00050	< 0.00050	< 0.00050	< 0.00050		
0.00177	0.00160	0.00398	0.00204		
0.0216	0.0193	0.0236	0.0193		
< 0.00050	< 0.00050	< 0.00050	< 0.00050		
< 0.0025	<0.0025	< 0.0025	< 0.0025		
< 0.050	< 0.050	< 0.050	< 0.050		
0.000630	0.000615	0.00137	0.000756		
453	457	493	496		
0.00495	0.00402	0.00553	0.00537		
0.00637	0.00596	0.0145	0.00785		
0.264	0.245	0.607	0.334		
3.10	2.86	7.02	3.76		
0.00054	0.00029	0.00128	0.00064		
0.0062	0.0071	0.0072	0.0054		
2.21	1.61	2.50	3.52		
0.161	0.159	0.401	0.206		
<0.000010	< 0.000010	0.000012	0.000013		
0.0807	0.0876	0.0825	0.0779		
0.0026	<0.0025	0.0058	0.0031		

< 0.30	< 0.30	< 0.30	< 0.30	
1.69	1.74	1.70	1.69	
0.0629	0.0609	0.0646	0.0635	
0.229	0.211	0.383	0.243	
0.000091	0.000063	0.000162	0.000101	
5.81	6.54	6.52	5.85	
0.859	0.853	0.835	0.853	
< 0.000050	< 0.000050	<0.000050	< 0.000050	
0.00099	0.00086	0.00101	0.00093	
0.022	0.025	0.040	0.029	
< 0.000050	< 0.000050	0.000112	0.000055	
< 0.0050	< 0.0050	< 0.0050	< 0.0050	
0.051	0.046	0.111	0.061	
FIELD	FIELD	FIELD	FIELD	
2.81	2.71	3.32	3.09	3.33
< 0.00050	< 0.00050	< 0.00050	< 0.00050	
< 0.00050	< 0.00050	< 0.00050	< 0.00050	
0.0201	0.0186	0.0198	0.0182	
< 0.00050	< 0.00050	< 0.00050	< 0.00050	
< 0.0025	<0.0025	< 0.0025	< 0.0025	
< 0.050	< 0.050	<0.050	< 0.050	
0.000101	0.000088	0.000089	0.000088	
470	481	491	520	
0.00433	0.00386	0.00384	0.00477	
< 0.00050	< 0.00050	< 0.00050	< 0.00050	
0.0044	0.0016	0.0075	0.0022	
< 0.050	< 0.050	< 0.050	<0.050	
< 0.00025	< 0.00025	< 0.00025	< 0.00025	
0.0062	0.0073	0.0056	0.0054	
1.99	1.39	1.76	3.28	
0.00211	0.00096	0.00400	0.00136	
<0.000010	< 0.000010	< 0.000010	< 0.000010	
0.0791	0.0885	0.0783	0.0799	0.084
< 0.0025	< 0.0025	< 0.0025	< 0.0025	
< 0.30	< 0.30	< 0.30	< 0.30	
1.71	1.69	1.66	1.71	
0.0616	0.0617	0.0621	0.0633	
0.114	0.107	0.105	0.095	
< 0.000050	<0.000050	< 0.000050	< 0.000050	
5.71	6.57	6.55	5.90	
0.835	0.852	0.818	0.858	
< 0.000050	< 0.000050	< 0.000050	< 0.000050	
0.00098	0.00091	0.00110	0.00086	
0.011	0.016	0.015	0.015	
< 0.000050	< 0.000050	< 0.000050	<0.000050	
< 0.0050	< 0.0050	< 0.0050	< 0.0050	
< 0.0050	<0.0050	< 0.0050	< 0.0050	

0 1 10		1298-015 OCT21B		
Sample ID	- REACTOR2	- REACTOR2 21-OCT-12	- REACTOR2	- REACTOR2 22-OCT-12
Date Sampled Time Sampled	21-OCT-12 14:00	14:00	22-OCT-12 02:00	14:00
ALS Sample ID	L1227084-3	L1227088-2	L1227087-2	L1227710-2
Matrix	Water	Water	Water	Water
Matrix	Water	vva(e)	Water	**alei
Physical Tests				
Hardness (as CaCO3)	1280	1310	1260	1170
pH	163	F2	4	2
Total Suspended Solids	2±2	E	•:	
Total Dissolved Solids				*
Turbidity	1.70	100	-	
Anions and Nutrients				
Acidity (as CaCO3)			9	*
Alkalinity, Bicarbonate (as CaCO3)	. 2	20	20	2'
Alkalinity, Carbonate (as CaCO3)	290	E:	52	8
Alkalinity, Hydroxide (as CaCO3)	165		49	2:
Alkalinity, Total (as CaCO3)	.83	*:	5	*
Ammonia, Total (as N)	163	4	20	₩.
Bromide (Br)	/e	7.0	51	5
Chloride (CI)	160	¥0	¥0	×
Fluoride (F)		-	- 5	8
Nitrate (as N)		*		*
Nitrite (as N)	-	26	2	2
Orthophosphate-Dissolved (as P)		10	9:	#
Phosphorus (P)-Total	2	*	¥	∓
Sulfate (SO4)	1.5	E.		*
Total Metals				
Aluminum (AI)-Total		*	×	*
Antimony (Sb)-Total	7.0	5	2	ž.
Arsenic (As)-Total			*1	8
Barium (Ba)-Total		2	2	9
Beryllium (Be)-Total	*	€	*	*
Bismuth (Bi)-Total	2	2	\$	*
Boron (B)-Total	60	5	2:	*
Cadmium (Cd)-Total	-	5	2	*
Calcium (Ca)-Total	#2	*:		5.
Chromium (Cr)-Total	25	*	*	
Cobalt (Co)-Total	50	5.	5:	*
Copper (Cu)-Total	. €	*	*	8
Iron (Fe)-Total	8		*	-
Lead (Pb)-Total	(•)	*	€	<u>¥</u>
Lithium (Li)-Total	-	2	-	
Magnesium (Mg)-Total	90	*	*	×
Manganese (Mn)-Total	۵.	-	~	*
Mercury (Hg)-Total	2		<u>=</u>	
Molybdenum (Mo)-Total	*	*		*
Nickel (Ni)-Total	±			•

Phosphorus (P)-Total	€		3	<u> </u>
Potassium (K)-Total	*	*	*	·
Selenium (Se)-Total	2	2	3	12
Silicon (Si)-Total	*1	*		3
Silver (Ag)-Total	2	¥	*	3
Sodium (Na)-Total	8			*
Strontium (Sr)-Total	2)	-	2	2
Thallium (TI)-Total	÷			3
Tin (Sn)-Total	*	*	24	9
Titanium (Ti)-Total	8	8	<u></u>	9
Uranium (U)-Total	8	8	*	
Vanadium (V)-Total	8	٥	2	2
Zinc (Zn)-Total	=			•
Discoluted Bilatele				
Dissolved Metals Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	3.77	5.27	3.74	2.92
Antimony (Sb)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Barium (Ba)-Dissolved	0.0287	0.0286	0.0222	0.0209
Beryllium (Be)-Dissolved	<0.00050	<0.00050	< 0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.0025	<0.0025	<0.0025	<0.0025
Boron (B)-Dissolved	< 0.050	<0.050	<0.050	<0.050
Cadmium (Cd)-Dissolved	0.000069	0.000075	0.000063	0.000088
Calcium (Ca)-Dissolved	510	521	502	464
Chromium (Cr)-Dissolved	0.00202	0.00193	0.00329	0.00387
Cobalt (Co)-Dissolved	< 0.00050	< 0.00050	<0.00050	<0.00050
Copper (Cu)-Dissolved	0.0035	0.0122	0.0023	0.0141
Iron (Fe)-Dissolved	<0.050	0.135	<0.050	0.146
Lead (Pb)-Dissolved	<0.00025	<0.00025	<0.00025	<0.00025
Lithium (Li)-Dissolved	0.0085	0.0062	0.0067	0.0064
Magnesium (Mg)-Dissolved	0.68	1.72	1.64	2.38
Manganese (Mn)-Dissolved	0.00151	0.00851	0.00132	0.00894
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.102	0.0771	0.0803	0.0772
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025	< 0.0025	<0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30	< 0.30	<0.30
Potassium (K)-Dissolved	1.75	1.76	1.77	1.63
Selenium (Se)-Dissolved	0.0669	0.0676	0.0651	0.0599
Silicon (Si)-Dissolved	0.163	0.099	0.093	0.097
Silver (Ag)-Dissolved	< 0.000050	< 0.000050	<0.000050	< 0.000050
Sodium (Na)-Dissolved	6.16	5.96	5.90	5.52
Strontium (Sr)-Dissolved	0.870	0.843	0.824	0,844
Thallium (TI)-Dissolved	< 0.000050	<0.000050	< 0.000050	< 0.000050
Tin (Sn)-Dissolved	0.00105	0.00098	0.00096	0.00097
Titanium (Ti)-Dissolved	<0.010	<0.010	< 0.010	0.011
Uranium (U)-Dissolved	< 0.000050	<0.000050	<0.000050	<0.000050
Vanadium (V)-Dissolved	< 0.0050	<0.0050	<0.0050	<0.0050
Zinc (Zn)-Dissolved	<0.0050	<0.0050	< 0.0050	<0.0050

1298-027 OCT23A - REACTOR2 23-OCT-12 02:00 L1228152-1 Water	1298-031 OCT23B - REACTOR2 23-OCT-12 14:00 L1228195-2 Water	1298-034 OCT24A - REACTOR2 24-OCT-12 02:00 L1228156-2 Water	1298-038 OCT248 REACTOR2 24-OCT-12 14:00 L1228980-2 Water
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122	-	5	
160	2	2:	-
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100	41	£	*
FIELD	FIELD	FIELD	FIELD
2.69	2.78	2.86	3.12
< 0.00050	< 0.00050	< 0.00050	< 0.00050
< 0.00050	< 0.00050	< 0.00050	< 0.00050
0.0221	0.0190	0.0188	0.0180
<0.00050	< 0.00050	< 0.00050	< 0.00050
< 0.0025	< 0.0025	< 0.0025	< 0.0025
< 0.050	< 0.050	< 0.050	< 0.050
0.000089	0.000080	0.000071	0.000072
491	472	482	520
0.00492	0.00408	0.00393	0.00429
< 0.00050	< 0.00050	< 0.00050	< 0.00050
0.0011	< 0.0010	0.0046	< 0.0010
< 0.050	< 0.050	< 0.050	< 0.050
< 0.00025	< 0.00025	< 0.00025	< 0.00025
0.0075	0.0073	0.0064	0.0054
1.31	1.44	2.14	3.55
0.00070	0.00064	0.00277	0.00077
< 0.000010	< 0.000010	< 0.000010	< 0.000010
0.0826	0.0851	0.0786	0.0763
< 0.0025	< 0.0025	<0.0025	< 0.0025
< 0.30	< 0.30	< 0.30	< 0.30
1.83	1.75	1.61	1,68
0.0663	0.0613	0.0602	0.0639
0.109	0.112	0.102	0.088
<0.000050	< 0.000050	< 0.000050	< 0.000050
6.67	6.59	6.56	5.79
0.871	0.850	0.807	0.841
<0.000050	< 0.000050	< 0.000050	< 0.000050
0.00099	0.00098	0.00089	0.00095
0.015	0.015	0.014	0.016
< 0.000050	<0.000050	< 0.000050	< 0.000050
< 0.0050	< 0.0050	<0.0050	<0.0050
< 0.0050	< 0.0050	< 0.0050	< 0.0050

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix Physical Tests	1298-013 OCT21A - REACTOR1 21-OCT-12 14:00 L1227084-4 Water	1298-016 OCT21B - REACTOR1 21-OCT-12 14:00 L1227088-3 Water	1298-020 OCT22A - REACTOR1 22-OCT-12 02:00 L1227087-3 Water	1298-024 OCT22B - REACTOR1 22-OCT-12 14:00 L1227710-3 Water
Hardness (as CaCO3)	1280	1310	1250	1180
pH	1200	16	14	741
Total Suspended Solids	-			
Total Dissolved Solids	-	-	-	9
Turbidity	5	5	-	3
Anions and Nutrients				
Acidity (as CaCO3)	¥	æ		3
Alkalinity, Bicarbonate (as CaCO3)	٥	2		37
Alkalinity, Carbonate (as CaCO3)		25	7.	91
Alkalinity, Hydroxide (as CaCO3)		7	4	[4]
Alkalinity, Total (as CaCO3)		*	=	253
Ammonia, Total (as N)	2	÷		561
Bromide (Br)		25	,	-
Chloride (CI)	*	(-	9	
Fluoride (F)	3	-	9	9
Nitrate (as N)	3			
Nitrite (as N)	2	72	-	257
Orthophosphate-Dissolved (as P)	<u>*</u>	19		3.00 E
Phosphorus (P)-Total	4	5	:4	3
Sulfate (SO4)		12	:4	49.1
Total Metals				
Aluminum (AI)-Total	-	-	90	
Antimony (Sb)-Total	· ·	-	9	
Arsenic (As)-Total		9	3<	(9)
Barium (Ba)-Total		-	2	120
Beryllium (Be)-Total	*	34	20	(*)
Bismuth (Bi)-Total			9	(#)
Boron (B)-Total	55	.4		(2)
Cadmium (Cd)-Total		•	:61	(4)
Calcium (Ca)-Total	=	200	255	120
Chromium (Cr)-Total		×.	342	
Cobalt (Co)-Total	15	3,		
Copper (Cu)-Total			3	(€ 126
Iron (Fe)-Total	3	-		
Lead (Pb)-Total		9 8 0		161
Lithium (Li)-Total		-47		19:
Magnesium (Mg)-Total	:* =	:81 :24	.e.	
Manganese (Mn)-Total	-		-	
Mercury (Hg)-Total	-	-37	(3)	120
Molybdenum (Mo)-Total Nickel (Ni)-Total	10	524		

Phosphorus (P)-Total				
Potassium (K)-Total	*		*	16
Selenium (Se)-Total		2	\$.	÷
Silicon (Si)-Total	91	*	·	
Silver (Ag)-Total	2	2	7	2
Sodium (Na)-Total	81	*		
Strontium (Sr)-Total	Ş.	2	*	*
Thallium (TI)-Total			*	
Tin (Sn)-Total	2	2	9	·
Titanium (Ti)-Total	ē:	-		-
Uranium (U)-Total	*	*		26
Vanadium (V)-Total	<u>\$</u>	€	9	<u> </u>
Zinc (Zn)-Total		*	3	*
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (AI)-Dissolved	5.00	5.85	3.74	3.04
Antimony (Sb)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved	<0.00050	0.00062	<0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0303	0.0301	0.0226	0.0205
Beryllium (Be)-Dissolved	<0.00050	<0.00050	< 0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.0025	<0.0025	<0.0025	< 0.0025
Boron (B)-Dissolved	<0.050	<0.050	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.000056	<0.000050	0.000070	0.000134
Calcium (Ca)-Dissolved	512	521	497	467
Chromium (Cr)-Dissolved	0.00163	0.00215	0.00331	0.00402
Cobalt (Co)-Dissolved	<0.00050	< 0.00050	< 0.00050	0.00074
Copper (Cu)-Dissolved	0.0012	0.0016	0.0015	0.0308
Iron (Fe)-Dissolved	< 0.050	< 0.050	< 0.050	0.334
Lead (Pb)-Dissolved	<0.00025	< 0.00025	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0079	0.0058	0.0069	0.0061
Magnesium (Mg)-Dissolved	0.85	2.49	1.63	2.26
Manganese (Mn)-Dissolved	0.00095	0.00114	0.00071	0.0198
Mercury (Hg)-Dissolved	<0.000010	< 0.000010	<0.00010	<0.000010
Molybdenum (Mo)-Dissolved	0.0901	0.0717	0.0785	0.0746
Nickel (Ni)-Dissolved	<0.0025	< 0.0025	<0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30	<0.30	<0.30
Potassium (K)-Dissolved	1,83	1.74	1.71	1.55
Selenium (Se)-Dissolved	0.0641	0.0675	0.0638	0.0566
Silicon (Si)-Dissolved	0.127	0.107	0.105	0.119
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0.000050	< 0.000050
Sodium (Na)-Dissolved	6.09	5.90	5.97	5.36
Strontium (Sr)-Dissolved	0.822	0.823	0.821	0.788
Thallium (TI)-Dissolved	<0.000050	0.000053	<0.000050	< 0.000050
Tin (Sn)-Dissolved	0.00097	0.00098	0.00093	0.00099
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	0.012
Uranium (U)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050
Vanadium (V)-Dissolved	<0.0050	<0.0050	< 0.0050	<0.0050
Zinc (Zn)-Dissolved	<0.0050	<0.0050	< 0.0050	0.0072

1298-028 OCT23A - REACTOR1 23-OCT-12 02:00 L1227707-3 Water	1298-032 OCT23B - REACTOR1 23-OCT-12 14:00 L1228195-3 Water	1298-035 OCT24A - REACTOR1 24-OCT-12 02:00 L1228156-3 Water	1298-039 OCT24 REACTOR1 24-OCT-12 14:00 L1228980-3 Water
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FIELD	FIELD	FIELD	FIELD
2.98	3.41	3.21	3.43
< 0.00050	< 0.00050	< 0.00050	< 0.00050
< 0.00050	< 0.00050	< 0.00050	< 0.00050
0.0193	0.0199	0.0202	0.0195
<0.00050	< 0.00050	<0.00050	< 0.00050
< 0.0025	<0.0025	<0.0025	< 0.0025
< 0.050	< 0.050	< 0.050	< 0.050
0.000059	0.000077	0.000062	0.000084
461	482	471	502
0.00405	0.00380	0.00372	0.00436
<0.00050	<0.00050	<0.00050	<0.00050
< 0.0010	<0.0010	0.0032	0.0019
<0.050	<0.050	< 0.050	< 0.050
<0.00025	<0.0005	<0.0005	<0.00025
0.0060	0.0079	0.0059	0.0057
1.42	1.80	2.76	4.90
0.00034	0.00072	0.00211	0.00137
<0.000010	<0.00072	< 0.00011	<0.000101
0.0797	0.0853	0.0767	0.0719
<0.0025	<0.0025	<0.0025	<0.0025
< 0.30	< 0.30	<0.30	< 0.30
1.71	1.71	1.69	1.64
0.0606	0.0630	0.0625	0.0615
0.0000	0.0030	0.093	0.091
<0.000050	<0.00050	<0.093	<0.000050
	6.49	6.24	5.83
5.83 0.854	0.871	0.814	0.831
<0.000050	<0.000050	<0.000050	<0.000050
0.00111	0.00102	0.00097	0.00092
<0.010	0.015	0.014	0.015
<0.000050	<0.000050	<0.000050	<0.000050
<0.0050	<0.0050	<0.0050	<0.0050
<0.0050	<0.0050	<0.0050	<0.0050

RESULTS OF ANALYSIS				
		1298-017 OCT21B		
Sample ID	- FEED	- FEED	- FEED	- FEED
Date Sampled	21-OCT-12	21-OCT-12	22-OCT-12	22-OCT-12
Time Sampled	14:00	14:00	02:00	14:00
ALS Sample ID	L1227084-2	L1227088-4	L1227087-4	L1227710-4
Matrix	Water	Water	Water	Water
Physical Tests				
Hardness (as CaCO3)	370	374	374	365
pH	2.63		*	=
Total Suspended Solids	37.3	20	2	
Total Dissolved Solids	1950	_		
Turbidity	68.6			9
raibidity	00.0			
Anions and Nutrients				
Acidity (as CaCO3)	984	20	2	2
Alkalinity, Bicarbonate (as CaCO3)	<1.0		*	*
Alkalinity, Carbonate (as CaCO3)	<1.0	*	¥-	¥
Alkalinity, Hydroxide (as CaCO3)	<1.0	5:	.5	*
Alkalinity, Total (as CaCO3)	<1.0	26	2:	*
Ammonia, Total (as N)	0.0085	e:	2	5
Bromide (Br)	<1.0	*	*	*
Chloride (CI)	<10		5	<u> </u>
Fluoride (F)	1.38	*1	*	*
Nitrate (as N)	0.81	2	2	2
Nitrite (as N)	0.030	**	<u>*</u>	*
Orthophosphate-Dissolved (as P)	0.0340	2	7	÷
Phosphorus (P)-Total	<0.20	8:	7.	*
Sulfate (SO4)	1350	*	¥	₩
Total Metals	20.0			
Aluminum (Al)-Total	33.6	2	•	<u>=</u>
Antimony (Sb)-Total	0.00207	*		*
Arsenic (As)-Total	0.138	•		
Barium (Ba)-Total	0.0870	*	*	; *
Beryllium (Be)-Total	0.00271		-	4
Bismuth (Bi)-Total	<0.0025	*		3
Boron (B)-Total	<0.050	*		*
Cadmium (Cd)-Total	0.0423	*	=	±
Calcium (Ca)-Total	101			
Chromium (Cr)-Total	0.0232		2	~
Cobalt (Co)-Total	0.470	*		*
Copper (Cu)-Total	20.3			3
Iron (Fe)-Total	233	*	8	36
Lead (Pb)-Total	0.0378	-		-
Lithium (Li)-Total	0.0117			7
Magnesium (Mg)-Total	22.2	*	<u>=</u>	2
Manganese (Mn)-Total	13.5	*	*	*
Mercury (Hg)-Total	0.000039	¥	*	
Molybdenum (Mo)-Total	0.124	2.		5
Nickel (Ni)-Total	0.185		*	9
Phosphorus (P)-Total	< 0.30	ž	Ξ	Š

Data anima (IC) Tatal	1.05			
Potassium (K)-Total	1.65 0.112	*		
Selenium (Se)-Total	6.37	•	-	
Silicon (Si)-Total	0.00382			5
Silver (Ag)-Total				
Sodium (Na)-Total	5.66	5	-	
Strontium (Sr)-Total	0.754	8 2	5	15 22
Thallium (TI)-Total	0.000122			-
Tin (Sn)-Total	0.00112			18
Titanium (Ti)-Total	0.832	*	*	=
Uranium (U)-Total	0.00194	2		3
Vanadium (V)-Total	0.0064	2	-	2
Zinc (Zn)-Total	3.64		5.	77
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (AI)-Dissolved	34.4	34.5	35.1	31.7
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050	< 0.00050	<0.00050
Arsenic (As)-Dissolved	0.129	0.138	0.132	0.118
Barium (Ba)-Dissolved	0.0835	0.0837	0.0870	0.0783
Beryllium (Be)-Dissolved	0.00257	0.00263	0.00255	0.00269
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.0422	0.0453	0.0455	0.0413
Calcium (Ca)-Dissolved	109	110	110	106
Chromium (Cr)-Dissolved	0.0242	0.0251	0,0245	0.0226
Cobalt (Co)-Dissolved	0.481	0.496	0.499	0.450
Copper (Cu)-Dissolved	20.7	21.9	21.7	20.5
Iron (Fe)-Dissolved	232	235	241	219
Lead (Pb)-Dissolved	0.0345	0.0429	0.0362	0.0366
Lithium (Li)-Dissolved	0.0104	0.0107	0.0107	0.0119
Magnesium (Mg)-Dissolved	23.7	24.1	24.0	24.3
Manganese (Mn)-Dissolved	13.8	14.1	14.2	13.4
Mercury (Hg)-Dissolved	< 0.000010	0.000015	0.000014	0.000017
Molybdenum (Mo)-Dissolved	0.0758	0.0871	0.0822	0.0809
Nickel (Ni)-Dissolved	0.186	0.194	0.193	0.185
Phosphorus (P)-Dissolved	< 0.30	< 0.30	< 0.30	< 0.30
Potassium (K)-Dissolved	1.75	1.74	1.74	1.60
Selenium (Se)-Dissolved	0.107	0.110	0.113	0.0994
Silicon (Si)-Dissolved	6.43	6.42	6.43	6.53
Silver (Ag)-Dissolved	0.00338	0.00377	0.00373	0.00360
Sodium (Na)-Dissolved	5.78	5.84	6.00	5.46
Strontium (Sr)-Dissolved	0.665	0.762	0.741	0.742
Thallium (TI)-Dissolved	0.000161	0.000271	0.000109	0.000108
Tin (Sn)-Dissolved	0.00101	0.00101	0.00109	0.00097
Titanium (Ti)-Dissolved	0.797	0.804	0.800	0.792
Uranium (U)-Dissolved	0.00179	0.00201	0.00195	0.00199
Vanadium (V)-Dissolved	<0.0050	< 0.0050	<0.0050	< 0.0050
Zinc (Zn)-Dissolved	3.75	3,88	3.90	3.59

		1298-040 OCT24B-	
- FEED	- FEED	FEED	
23-OCT-12	24-OCT-12	24-OCT-12	
02:00	02:00	14:00	
L1227707-4	L1228156-4	L1228980-4	
Water	Water	Water	
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FIELD	FIELD	FIELD	
34.7	35.3	34.2	34.3
<0.00050	<0.00050	<0.00050	
0.127	0.122	0.120	
0.0900	0.0827	0.0840	
0.00275	0.00295	0.00269	
<0.0025	<0.0025	<0.0025	
<0.050	<0.050	<0.050	
0.0453	0.0422	0.0442	
109	114	116	
0.0242	0.0227	0.0245	
0.495	0.507	0.492	
22.4	21.7	22.3	
221	231	231	
0.0369	0.0370	0.0389	
0.0123	0.0134	0.0116	
24.0	24.9	25.9	
14.7	14.8	14.4	
0.000020	0.000021	0.000015	
0.0805	0.0829	0.0850	0.082
0.199	0.191	0.194	
< 0.30	< 0.30	< 0.30	
1.81	1.77	1.68	
0.100	0.107	0.108	
6.39	6.48	6.64	
0.00372	0.00408	0.00363	
6.01	6,38	5.82	
0.742	0.785	0.788	
0.000124	0.000120	0.000124	
0.00128	0.00118	0.00122	
0.777	0.798	0.840	
0.00206	0.00208	0.00194	
< 0.0050	< 0.0050	< 0.0050	
3.98	3.64	3.79	

	1200 022 OCT24A	1298-037 OCT24B-	1208 041 OCT25A	1208-047 OCT25B.
Sample ID	- EFFLUENT	EFFLUENT	- EFFLUENT	EFFLUENT
Date Sampled	24-OCT-12	24-OCT-12	25-OCT-12	25-OCT-12
Time Sampled	02:00	14:00	02:00	14:00
ALS Sample ID	L1228156-1	L1228980-1	L1228971-1	L1229605-1
Matrix	Water	Water	Water	Water
Physical Tests				
Hardness (as CaCO3)	1230	1310	973	848
рН	8.75	9.14	8.79	9.37
Total Suspended Solids	24.0	9.3	22.0	15.4
Total Dissolved Solids	1630	1700	1250	1260
Turbidity	35.4	9.77	25.7	17.7
,				
Anions and Nutrients				
Acidity (as CaCO3)	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	15.3	13.9	10.1	11.8
Alkalinity, Carbonate (as CaCO3)	5.5	8.1	3.4	10.4
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	20.8	22.0	13.4	22.2
Ammonia, Total (as N)	0.0562	0.0579	0.0815	0.0833
Bromide (Br)	<1.0	<1.0	< 0.50	<1.0
Chloride (CI)	<10	<10	<5.0	<10
Fluoride (F)	< 0.40	< 0.40	< 0.20	<0.40
Nitrate (as N)	0.90	0.74	0.576	0.58
Nitrite (as N)	0.037	0.036	0.020	< 0.020
Orthophosphate-Dissolved (as P)	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Phosphorus (P)-Total	< 0.0020	< 0.0020	<0.0020	0.0025
Sulfate (SO4)	1150	1190	869	848
,				
Total Metals				
Aluminum (Al)-Total	4.06	3.47	2.58	3.03
Antimony (Sb)-Total	< 0.00050	< 0.00050	<0.00020	<0.00020
Arsenic (As)-Total	0.00398	0.00204	0.00262	0.00364
Barium (Ba)-Total	0.0236	0.0193	0.0131	0.0131
Beryllium (Be)-Total	< 0.00050	< 0.00050	<0.00020	<0.00020
Bismuth (Bi)-Total	< 0.0025	<0.0025	< 0.0010	<0.0010
Boron (B)-Total	< 0.050	< 0.050	< 0.020	<0.020
Cadmium (Cd)-Total	0.00137	0.000756	0.000885	0.00128
Calcium (Ca)-Total	493	496	362	331
Chromium (Cr)-Total	0.00553	0.00537	0.00500	0.00512
Cobalt (Co)-Total	0.0145	0.00785	0.0100	0.0146
Copper (Cu)-Total	0.607	0.334	0.403	0.609
Iron (Fe)-Total	7.02	3.76	4.38	6.11
Lead (Pb)-Total	0.00128	0.00064	0.00073	0.00104
Lithium (Li)-Total	0.0072	0.0054	0.0057	0.0057
Magnesium (Mg)-Total	2.50	3.52	1.69	2.15
Manganese (Mn)-Total	0.401	0.206	0.253	0.395
Mercury (Hg)-Total	0.000012	0.000013	< 0.000010	< 0.000010
Molybdenum (Mo)-Total	0.0825	0.0779	0.0658	0.0604
Nickel (Ni)-Total	0.0058	0.0031	0.0041	0.0061
• •				

Phosphorus (P)-Total	<0.30	< 0.30	< 0.30	< 0.30
Potassium (K)-Total	1,70	1.69	1.36	1.32
Selenium (Se)-Total	0.0646	0.0635	0.0487	0.0465
Silicon (Si)-Total	0.383	0.243	0.274	0.355
Silver (Ag)-Total	0.000162	0.000101	0.000110	0.000153
Sodium (Na)-Total	6.52	5.85	4.81	4.65
Strontium (Sr)-Total	0.835	0.853	0.655	0.622
Thallium (TI)-Total	< 0.000050	<0.000050	0.000028	0.000029
Tin (Sn)-Total	0.00101	0.00093	0.00092	0.00093
Titanium (Ti)-Total	0.040	0.029	0.030	0.036
Uranium (U)-Total	0.000112	0.000055	0.000063	0.000089
Vanadium (V)-Total	< 0.0050	<0.0050	<0.0020	< 0.0020
Zinc (Zn)-Total	0.111	0.061	0.0755	0.112
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	3.32	3.09	2.10	2.05
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050	< 0.00020	< 0.00020
Arsenic (As)-Dissolved	< 0.00050	<0.00050	<0.00020	<0.00020
Barium (Ba)-Dissolved	0.0198	0.0182	0.0126	0.0114
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050	< 0.00020	< 0.00020
Bismuth (Bi)-Dissolved	< 0.0025	<0.0025	< 0.0010	< 0.0010
Boron (B)-Dissolved	< 0.050	< 0.050	< 0.020	< 0.020
Cadmium (Cd)-Dissolved	0.000089	0.000088	0.000144	0.000112
Calcium (Ca)-Dissolved	491	520	388	337
Chromium (Cr)-Dissolved	0.00384	0.00477	0.00401	0.00402
Cobalt (Co)-Dissolved	< 0.00050	< 0.00050	0.00034	< 0.00020
Copper (Cu)-Dissolved	0.0075	0.0022	0.0106	0.00398
Iron (Fe)-Dissolved	< 0.050	< 0.050	0.119	< 0.020
Lead (Pb)-Dissolved	<0.00025	< 0.00025	< 0.00010	< 0.00010
Lithium (Li)-Dissolved	0.0056	0.0054	0.0057	0.0055
Magnesium (Mg)-Dissolved	1.76	3.28	1.23	1,23
Manganese (Mn)-Dissolved	0.00400	0.00136	0.00672	0.00230
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0783	0.0799	0.0670	0.0588
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025	< 0.0010	< 0.0010
Phosphorus (P)-Dissolved	< 0.30	< 0.30	< 0.30	< 0.30
Potassium (K)-Dissolved	1.66	1.71	1.41	1.33
Selenium (Se)-Dissolved	0.0621	0.0633	0.0503	0.0449
Silicon (Si)-Dissolved	0.105	0.095	0.125	0.100
Silver (Ag)-Dissolved	< 0.000050	< 0.000050	<0.000020	< 0.000020
Sodium (Na)-Dissolved	6.55	5.90	4.91	4.65
Strontium (Sr)-Dissolved	0.818	0.858	0.658	0.608
Thallium (TI)-Dissolved	< 0.000050	< 0.000050	0.000027	0.000027
Tin (Sn)-Dissolved	0.00110	0.00086	0.00112	0.00091
Titanium (Ti)-Dissolved	0.015	0.015	0.016	0.013
Uranium (U)-Dissolved	<0.000050	< 0.000050	< 0.000020	< 0.000020
Vanadium (V)-Dissolved	< 0.0050	< 0.0050	< 0.0020	< 0.0020
Zinc (Zn)-Dissolved	< 0.0050	<0.0050	0.0025	< 0.0020
• •				

EFFLUENT 26-OCT-12 02:00 L1229604-1 Water 857 8.89 24.5 1250 29.3 <1.0 15.3 5.2 <1.0 20.5 0.0906 <1.0 <10 <0.40 0.61 0.036 <0.0010 0.0020 848 2.96 <0.00020 0.00311 0.0162 <0.00020 < 0.0010 < 0.020 0.00119 338 0.00505 0.0130 0.506 5.35 0.00095 0.0062 1.90

0.341 0.000010 0.0576 0.0052

1298-050 OCT26A-

<0.30
1.33
0.0476
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0.000073
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FIELD 2,27 <0.00020 <0.00020 0.0118 < 0.00020 < 0.0010 < 0.020 0.000121 341 0.00422 0.00020 0.00412 0.029 <0.00010 0.0058 1.11 0.00167 <0.000010 0.0579 < 0.0010 <0.30 1.36 0.0463 0.112 <0.000020 4.73 0.615 0.000027 0.00092 0.014

<0.000020 <0.0020 <0.0020

		1298-038 OCT24B-		
Sample ID	- REACTOR2	REACTOR2	- REACTOR2	REACTOR 2
Date Sampled	24-OCT-12	24-OCT-12	25-OCT-12	25-OCT-12
Time Sampled	02:00	14:00	02:00	14:00
ALS Sample ID	L1228156-2	L1228980-2	L1228971-2	L1229605-2
Matrix	Water	Water	Water	Water
Physical Tests				
Hardness (as CaCO3)	1210	1310	995	806
pH	¥	*	·	(ŵ
Total Suspended Solids				
Total Dissolved Solids	2	*		19
Turbidity				
Turbialty	~	8		
Anions and Nutrients				
Acidity (as CaCO3)	*	*	8	22
Alkalinity, Bicarbonate (as CaCO3)		2	=	-
Alkalinity, Carbonate (as CaCO3)		8	95	
Alkalinity, Hydroxide (as CaCO3)	~	*	19	54
Alkalinity, Total (as CaCO3)		*	:	2
Ammonia, Total (as N)			-	
Bromide (Br)		~		
Chloride (CI)		€		
Fluoride (F)			9	5
Nitrate (as N)		16		
Nitrite (as N)		2		SV.
Orthophosphate-Dissolved (as P)	8			
Phosphorus (P)-Total	3		-	
Sulfate (SO4)				
Surface (SO4)				
Total Metals				
Aluminum (AI)-Total	2	94	•	
Antimony (Sb)-Total		2	3	2
Arsenic (As)-Total	€	· ·	(€)	390
Barium (Ba)-Total	3	9	2	127
Beryllium (Be)-Total			20	563
Bismuth (Bi)-Total	2		9	:=:
Boron (B)-Total	*	14	3	3.83 3.83
Cadmium (Cd)-Total	#	:4		(4)
Calcium (Ca)-Total	1.0	2	154	500
Chromium (Cr)-Total	1.	Gall Control	343	
Cobalt (Co)-Total				
Copper (Cu)-Total		3<		(8)
Iron (Fe)-Total	9	90	7:27	120
Lead (Pb)-Total	18	- 30	202	(40)
Lithium (Li)-Total	_	1427	41	l ≨:
Magnesium (Mg)-Total	24	(90.)		(to)
Manganese (Mn)-Total	4	ail	=	·
. ,	-	141		
Mercury (Hg)-Total	9	360	780	196
Molybdenum (Mo)-Total	-			Ž.
Nickel (Ni)-Total		150		15

Phosphorus (P)-Total	25	\$	÷	
Potassium (K)-Total	50	=	*	35
Selenium (Se)-Total	2	3	¥	12
Silicon (Si)-Total	*		7	
Silver (Ag)-Total	2.	*:	*	9.
Sodium (Na)-Total		€	8	¥
Strontium (Sr)-Total	*3	*	*	
Thallium (TI)-Total	2		2	2
Tin (Sn)-Total		*	*	(¥
Titanium (Ti)-Total	21	2	ž.	£
Uranium (U)-Total	**		*	22
Vanadium (V)-Total	÷	*	¥	/2
Zinc (Zn)-Total	*	•	-	27
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	2.86	3.12	2.13	2.15
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050	< 0.00020	< 0.00020
Arsenic (As)-Dissolved	< 0.00050	< 0.00050	< 0.00020	< 0.00020
Barium (Ba)-Dissolved	0.0188	0.0180	0.0125	0.0113
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050	< 0.00020	< 0.00020
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025	<0.0010	< 0.0010
Boron (B)-Dissolved	< 0.050	< 0.050	< 0.020	< 0.020
Cadmium (Cd)-Dissolved	0.000071	0.000072	< 0.00013	0.000100
Calcium (Ca)-Dissolved	482	520	396	321
Chromium (Cr)-Dissolved	0.00393	0.00429	0.00452	0.00421
Cobalt (Co)-Dissolved	< 0.00050	< 0.00050	<0.00020	<0.00020
Copper (Cu)-Dissolved	0.0046	< 0.0010	0.00214	0.00192
Iron (Fe)-Dissolved	<0.050	< 0.050	0:032	< 0.020
Lead (Pb)-Dissolved	<0.00025	< 0.00025	0.00015	< 0.00010
Lithium (Li)-Dissolved	0.0064	0.0054	0.0058	0.0054
Magnesium (Mg)-Dissolved	2.14	3.55	1.31	1.16
Manganese (Mn)-Dissolved	0.00277	0.00077	0.00159	0.00082
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010	< 0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0786	0.0763	0.175	0.0583
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025	< 0.0010	< 0.0010
Phosphorus (P)-Dissolved	< 0.30	< 0.30	<0.30	< 0.30
Potassium (K)-Dissolved	1.61	1.68	1,43	1.35
Selenium (Se)-Dissolved	0.0602	0.0639	0.0504	0.0446
Silicon (Si)-Dissolved	0.102	0.088	0.228	0.094
Silver (Ag)-Dissolved	< 0.000050	<0.000050	<0.000020	0.000043
Sodium (Na)-Dissolved	6.56	5.79	4.94	4.74
Strontium (Sr)-Dissolved	0.807	0.841	0.667	0.609
Thallium (TI)-Dissolved	< 0.000050	<0.000050	0.000038	0.000024
Tin (Sn)-Dissolved	0.00089	0.00095	0.00087	0.00086
Titanium (Ti)-Dissolved	0.014	0.016	0.019	0.013
Uranium (U)-Dissolved	<0.000050	<0.000050	<0.000020	<0.000020
Vanadium (V)-Dissolved	<0.0050	<0.0050	<0.0020	<0.0020
Zinc (Zn)-Dissolved	<0.0050	<0.0050	<0.0020	<0.0020

1298-051 OCT26A-REACTOR 2 26-OCT-12 02:00 L1229604-2 Water

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0.000029 0.00089

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		1298-039 OCT24B-		
Sample ID	- REACTOR1	REACTOR1	- REACTOR1	REACTOR1
Date Sampled	24-OCT-12	24-OCT-12	25-OCT-12	25-OCT-12
Time Sampled	02:00	14:00	02:00	14:00
ALS Sample ID	L1228156-3	L1228980-3	L1228971-3	L1229605-3
Matrix	Water	Water	Water	Water
Physical Tests				
Hardness (as CaCO3)	1190	1270	1000	801
pH	*	2		(96)
Total Suspended Solids	2	52		527
Total Dissolved Solids	.5	95	3	989
Turbidity	¥		:4	% 1
Anions and Nutrients				
Acidity (as CaCO3)			-	14.
Alkalinity, Bicarbonate (as CaCO3)		:- :-	9	
Alkalinity, Carbonate (as CaCO3)		-	á	
Alkalinity, Hydroxide (as CaCO3)	2		-	
Alkalinity, Total (as CaCO3)			-	387
Ammonia, Total (as N)		-		(*)
·			a a	150
Bromide (Br)				
Chloride (CI)		-	65 54	39) (8)
Fluoride (F)	•			
Nitrate (as N)			- A	(6)
Nitrite (as N)				
Orthophosphate-Dissolved (as P)	5	-		
Phosphorus (P)-Total			30	19)
Sulfate (SO4)		-	-	
Total Metals				
Aluminum (AI)-Total		: *	3	(#)
Antimony (Sb)-Total	(F	(A)	(a)	(30)
Arsenic (As)-Total			250	3.5%
Barium (Ba)-Total	- 4	54	140	(A)
Beryllium (Be)-Total	95		·	· ·
Bismuth (Bi)-Total		30	30	(⊕)
Boron (B)-Total	· ·	ź'	2	(2)
Cadmium (Cd)-Total	3*	29.1	983	989
Calcium (Ca)-Total	12	121	301	7.0
Chromium (Cr)-Total	25		3.50	(*:
Cobalt (Co)-Total	(¥	ia :	745	390
Copper (Cu)-Total		31	150	3.50
Iron (Fe)-Total	8	3#T	363	(40
Lead (Pb)-Total		-	-	-
Lithium (Li)-Total	19	(9)	⊕	:€:
Magnesium (Mg)-Total	3	e.	-	(-)
Manganese (Mn)-Total		(9)	(4)	(#)
Mercury (Hg)-Total	-	127	727	720
Molybdenum (Mo)-Total	-	0.00	(*)	(6)
Nickel (Ni)-Total	ia .	*	(∓)	i €:
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Phosphorus (P)-Total	ne:	-,		
Potassium (K)-Total	96	*		*
Selenium (Se)-Total	15.	-	×	8
Silicon (Si)-Total			*)	*
Silver (Ag)-Total	36		23	ä
Sodium (Na)-Total			*1	
Strontium (Sr)-Total	125	20	2	÷
Thallium (TI)-Total	E.	*:	8	*
Tin (Sn)-Total	Tie:	*	28	≅
Titanium (Ti)-Total		*:	*	
Uranium (U)-Total	E	41	*	=
Vanadium (V)-Total	.6:	7.	2	-
Zinc (Zn)-Total	36	*)	*	*
Dissolved Metals				
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	3.21	3.43	2.38	2.44
Antimony (Sb)-Dissolved	<0.00050	<0.00050	<0.00020	<0.00020
Arsenic (As)-Dissolved	<0.00050	<0.00050	<0.00020	<0.00020
Barium (Ba)-Dissolved	0.0202	0,0195	0.0132	0.0120
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00020	<0.00020
Bismuth (Bi)-Dissolved	<0.0025	<0.0025	<0.0010	<0.0010
Boron (B)-Dissolved	<0.050	<0.050	<0.020	<0.020
Cadmium (Cd)-Dissolved	0.000062	0.000084	<0.00017	0.000104
Calcium (Ca)-Dissolved	471	502	399	319
Chromium (Cr)-Dissolved	0.00372	0.00436	0.00421	0.00395
Cobalt (Co)-Dissolved	<0.00050	<0.00050	0.00032	<0.00020
Copper (Cu)-Dissolved	0.0032	0.0019	0.00920	0.00118
Iron (Fe)-Dissolved	<0.050	<0.050	0.068	<0.020
Lead (Pb)-Dissolved	<0.00025	<0.00025	<0.00010	<0.00010
Lithium (Li)-Dissolved	0.0059	0.0057	0.0055	0.0055
Magnesium (Mg)-Dissolved	2.76	4.90	1.38	1.28
Manganese (Mn)-Dissolved	0.00211	0.00137	0.00663	0.00035
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0767	0.0719	0.338	0.0597
Nickel (Ni)-Dissolved	<0.0025	<0.0025	<0.0010	<0.0010
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.69	1.64	1.42	1.25
Selenium (Se)-Dissolved	0.0625	0.0615	0.0509	0.0453
Silicon (Si)-Dissolved	0.093	0.091	0.129	0.113
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0.000020	<0.000020
Sodium (Na)-Dissolved	6.24	5.83	5.04	4.66
Strontium (Sr)-Dissolved	0.814	0,831	0.671	0.609
Thallium (TI)-Dissolved	<0.000050	<0.000050	0.000028	0.000025
Tin (Sn)-Dissolved	0.00097	0.00092	0.00087	0.00089
Titanium (Ti)-Dissolved	0.014	0.015	0.016	0.012
Uranium (U)-Dissolved	<0.000050	<0.000050	<0.000020	<0.000020
Vanadium (V)-Dissolved	<0.0050	<0.0050	<0.0020	<0.0020
Zinc (Zn)-Dissolved	<0.0050	<0.0050	0.0026	<0.0020

1298-052 OCT26A-REACTOR 1 26-OCT-12 02:00 L1229604-3 Water

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1.39

0.00233

<0.000010

0.0563

<0.0010

< 0.30

1.35

0.0470

0.106 <0.000020

4.68

0.635

0.000027

0.00092 0.013

<0.000020

<0,0020

<0.0020

	1298-036 OCT24A	1298-040 OCT24B-
Sample ID	- FEED	FEED
Date Sampled	24-OCT-12	24-OCT-12
Time Sampled	02:00	14:00
ALS Sample ID	L1228156-4	L1228980-4
Matrix	Water	Water
Dhysical Tests		
Physical Tests	007	395
Hardness (as CaCO3)	387	
pH	5	5
Total Suspended Solids		*
Total Dissolved Solids	*	
Turbidity	*	*
Anions and Nutrients		
Acidity (as CaCO3)	÷	2
Alkalinity, Bicarbonate (as CaCO3)		
Alkalinity, Carbonate (as CaCO3)		2
Alkalinity, Hydroxide (as CaCO3)		
Alkalinity, Total (as CaCO3)	-	in the second se
Ammonia, Total (as N)	î	9
Bromide (Br)		20
Chloride (CI)	-	a a
Fluoride (F)		
* ,	2	e e
Nitrate (as N)	-	-
Nitrite (as N)		
Orthophosphate-Dissolved (as P)		•
Phosphorus (P)-Total	*	:: :-
Sulfate (SO4)		*
Total Metals		
Aluminum (Al)-Total	<i>2</i>	3
Antimony (Sb)-Total	**	
Arsenic (As)-Total	22	32
Barium (Ba)-Total		
Beryllium (Be)-Total		7
Bismuth (Bi)-Total		
Boron (B)-Total	2	14
Cadmium (Cd)-Total		
Calcium (Ca)-Total		
Chromium (Cr)-Total	2	5
Cobalt (Co)-Total		
Copper (Cu)-Total	2	
Iron (Fe)-Total		
	: : : : : : : : : : : : : : : : : : :	12
Lead (Pb)-Total		
Lithium (Li)-Total		# G
Magnesium (Mg)-Total		
Manganese (Mn)-Total	27	
Mercury (Hg)-Total		
Molybdenum (Mo)-Total	3	3
Nickel (Ni)-Total		3
Phosphorus (P)-Total		

Potassium (K)-Total	2	-
Selenium (Se)-Total		
Silicon (Si)-Total	#	2
Silver (Ag)-Total	*	
Sodium (Na)-Total	2	
Strontium (Sr)-Total		
Thallium (TI)-Total		*
Tin (Sn)-Total		€
Titanium (Ti)-Total	*	*
Uranium (U)-Total	8	
Vanadium (V)-Total		
Zinc (Zn)-Total	-	-
Dissolved Metals		

Dissolved Metals

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Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (Al)-Dissolved	35.3	34.2
Antimony (Sb)-Dissolved	<0.00050	< 0.00050
Arsenic (As)-Dissolved	0.122	0.120
Barium (Ba)-Dissolved	0.0827	0.0840
Beryllium (Be)-Dissolved	0.00295	0.00269
Bismuth (Bi)-Dissolved	< 0.0025	<0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.0422	0.0442
Calcium (Ca)-Dissolved	114	116
Chromium (Cr)-Dissolved	0.0227	0.0245
Cobalt (Co)-Dissolved	0.507	0.492
Copper (Cu)-Dissolved	21.7	22.3
Iron (Fe)-Dissolved	231	231
Lead (Pb)-Dissolved	0.0370	0.0389
Lithium (Li)-Dissolved	0.0134	0.0116
Magnesium (Mg)-Dissolved	24.9	25.9
Manganese (Mn)-Dissolved	14.8	14.4
Mercury (Hg)-Dissolved	0.000021	0.000015
Molybdenum (Mo)-Dissolved	0.0829	0.0850
Nickel (Ni)-Dissolved	0.191	0.194
Phosphorus (P)-Dissolved	< 0.30	< 0.30
Potassium (K)-Dissolved	1.77	1,68
Selenium (Se)-Dissolved	0.107	0.108
Silicon (Si)-Dissolved	6.48	6.64
Silver (Ag)-Dissolved	0.00408	0.00363
Sodium (Na)-Dissolved	6.38	5.82
Strontium (Sr)-Dissolved	0.785	0.788
Thallium (TI)-Dissolved	0.000120	0.000124
Tin (Sn)-Dissolved	0.00118	0.00122
Titanium (Ti)-Dissolved	0.798	0.840
Uranium (U)-Dissolved	0.00208	0.00194
Vanadium (V)-Dissolved	< 0.0050	< 0.0050
Zinc (Zn)-Dissolved	3.64	3.79

	1298-054 OCT26B- 1298-064 OCT27A-	
Sample ID	EFFLUENT	EFFLUENT
Date Sampled	26-OCT-12	27-OCT-12
Time Sampled	14:00	02:00
ALS Sample ID	L1229937-1	L1229935-1
Matrix	Water	Water
William IV	174.0.	*******
Physical Tests		
Hardness (as CaCO3)	1600	1640
pH	8.03	8.36
Total Suspended Solids	7.1	8.2
Total Dissolved Solids	2290	2250
Turbidity	13.4	14.2
Anions and Nutrients Acidity (as CaCO3)	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	13.3	12.9
The state of the s	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	13.3	12.9
Alkalinity, Total (as CaCO3)	0.0602	0.0533
Ammonia, Total (as N)	0.0602 <1.0	<1.0
Bromide (Br)	<1.0 <10	<1.0
Chloride (CI)		1.25
Fluoride (F)	0.54 0.56	0.57
Nitrate (as N)		<0.020
Nitrite (as N)	<0.020	
Orthophosphate-Dissolved (as P)	<0.0010 <0.0020	<0.0010 <0.0020
Phosphorus (P)-Total		
Sulfate (SO4)	1610	1630
Total Metals		
Aluminum (AI)-Total	3.75	2.55
Antimony (Sb)-Total	<0.00050	<0.00050
Arsenic (As)-Total	0.00407	0.00157
Barium (Ba)-Total	0.0249	0.0244
Beryllium (Be)-Total	<0.00050	<0.00050
Bismuth (Bi)-Total	< 0.0025	<0.0025
Boron (B)-Total	< 0.050	< 0.050
Cadmium (Cd)-Total	0.00129	0.000474
Calcium (Ca)-Total	588	626
Chromium (Cr)-Total	0.00578	0.00445
Cobalt (Co)-Total	0.0154	0.00535
Copper (Cu)-Total	0.643	0.221
Iron (Fe)-Total	6.95	2.43
Lead (Pb)-Total	0.00128	0.00042
Lithium (Li)-Total	0.0076	0.0117
Magnesium (Mg)-Total	13.6	18.9
Manganese (Mn)-Total	0.445	0.263
Mercury (Hg)-Total	0.000018	0.000013
Molybdenum (Mo)-Total	0.0374	0.0249
Nickel (Ni)-Total	0.0060	< 0.0025

Phosphorus (P)-Total	< 0.30	< 0.30
Potassium (K)-Total	1.97	1.95
Selenium (Se)-Total	0.0747	0.0660
Silicon (Si)-Total	0.315	0.148
Silver (Ag)-Total	0.000186	0.000094
Sodium (Na)-Total	4.27	4.28
Strontium (Sr)-Total	0.917	0.912
Thallium (TI)-Total	0.000053	0.000078
Tin (Sn)-Total	< 0.00050	< 0.00050
Titanium (Ti)-Total	0.033	0.021
Uranium (U)-Total	0.000117	0.000061
Vanadium (V)-Total	< 0.0050	< 0.0050
Zinc (Zn)-Total	0.114	0.039
,		
Dissolved Metals		
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (Al)-Dissolved	2.58	2.13
Antimony (Sb)-Dissolved	< 0.00050	<0.00050
Arsenic (As)-Dissolved	< 0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0198	0.0236
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.000053	0.000065
Calcium (Ca)-Dissolved	619	626
Chromium (Cr)-Dissolved	0.00377	0.00418
Cobalt (Co)-Dissolved	< 0.00050	0.00064
Copper (Cu)-Dissolved	0.0018	0.0032
Iron (Fe)-Dissolved	< 0.050	< 0.050
Lead (Pb)-Dissolved	< 0.00025	<0.00025
Lithium (Li)-Dissolved	0.0088	0.0112
Magnesium (Mg)-Dissolved	13.7	18.2
Manganese (Mn)-Dissolved	0.0371	0.116
Mercury (Hg)-Dissolved	< 0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0332	0.0241
Nickel (Ni)-Dissolved	< 0.0025	<0.0025
Phosphorus (P)-Dissolved	<0.30	< 0.30
Potassium (K)-Dissolved	1.82	1.92
Selenium (Se)-Dissolved	0.0612	0.0628
Silicon (Si)-Dissolved	0.052	0.063
Silver (Ag)-Dissolved	<0.000050	<0.000050
Sodium (Na)-Dissolved	4.03	4.26
Strontium (Sr)-Dissolved	0.877	0.905
Thallium (TI)-Dissolved	<0.000050	0.000067
Tin (Sn)-Dissolved	<0.00050	< 0.00050
Titanium (Ti)-Dissolved	0.012	0.012
Uranium (U)-Dissolved	< 0.000050	<0.000050
Vanadium (V)-Dissolved	<0.0050	<0.0050
Zinc (Zn)-Dissolved	<0.0050	<0.0050

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix	1298-055 OCT26B- REACTOR 2 26-OCT-12 14:00 L1229937-2 Water	1298-065 OCT27A - REACTOR2 27-OCT-12 02:00 L1229935-2 Water
Physical Tests		
Hardness (as CaCO3)	1590	1680
pH	2	€:
Total Suspended Solids	: :	5\ æ
Total Dissolved Solids		
Turbidity	20	킾
Anions and Nutrients		
Acidity (as CaCO3)	50	*1
Alkalinity, Bicarbonate (as CaCO3)	21	¥2
Alkalinity, Carbonate (as CaCO3)	9	2
Alkalinity, Hydroxide (as CaCO3)	€.	3
Alkalinity, Total (as CaCO3)	#3	*
Ammonia, Total (as N)	Ω;	€
Bromide (Br)	50	2
Chloride (CI)	*	8
Fluoride (F)	ž	8
Nitrate (as N)	*	×
Nitrite (as N)	2	2
Orthophosphate-Dissolved (as P)	**	*
Phosphorus (P)-Total	2	×
Sulfate (SO4)		*
Tatal Matala		
Total Metals	**	8
Aluminum (Al)-Total	î	ê
Antimony (Sb)-Total Arsenic (As)-Total	8	8
Barium (Ba)-Total	ŝ	5
Beryllium (Be)-Total		
Bismuth (Bi)-Total		*
Boron (B)-Total		*
Cadmium (Cd)-Total		· ·
Calcium (Ca)-Total		
Chromium (Cr)-Total		·
Cobalt (Co)-Total		8
Copper (Cu)-Total	· ·	16
Iron (Fe)-Total		2
Lead (Pb)-Total	Ŷ	18
Lithium (Li)-Total	2	4
Magnesium (Mg)-Total	*	
Manganese (Mn)-Total	≆	¥
Mercury (Hg)-Total	*	:
Molybdenum (Mo)-Total	¥	34
Nickel (Ni)-Total	3.	17

Phosphorus (P)-Total	2	-
Potassium (K)-Total	8/	\equiv
Selenium (Se)-Total	₽.	\bar{z}
Silicon (Si)-Total	*	-
Silver (Ag)-Total	(a)	-
Sodium (Na)-Total	2	-
Strontium (Sr)-Total	(a)	$\bar{\boldsymbol{w}}$
Thallium (TI)-Total	£	
Tin (Sn)-Total	25	-
Titanium (Ti)-Total	2	-
Uranium (U)-Total	8	*
Vanadium (V)-Total	-	$\widetilde{\boldsymbol{z}}$
Zinc (Zn)-Total	*:	•
Dissolved Metals		

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Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (AI)-Dissolved	2.69	2.38
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050
Arsenic (As)-Dissolved	< 0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0211	0.0231
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	< 0.000050	0.000051
Calcium (Ca)-Dissolved	614	643
Chromium (Cr)-Dissolved	0.00424	0.00431
Cobalt (Co)-Dissolved	< 0.00050	0.00063
Copper (Cu)-Dissolved	0.0011	0.0028
Iron (Fe)-Dissolved	< 0.050	< 0.050
Lead (Pb)-Dissolved	<0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0082	0.0090
Magnesium (Mg)-Dissolved	13.7	18.3
Manganese (Mn)-Dissolved	0.0314	0.101
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0323	0.0258
Nickel (Ni)-Dissolved	< 0.0025	<0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30
Potassium (K)-Dissolved	1.85	1.94
Selenium (Se)-Dissolved	0.0638	0.0633
Silicon (Si)-Dissolved	0.055	0.060
Silver (Ag)-Dissolved	<0.000050	<0.000050
Sodium (Na)-Dissolved	4.22	4.23
Strontium (Sr)-Dissolved	0.847	0.903
Thallium (TI)-Dissolved	< 0.000050	0.000054
Tin (Sn)-Dissolved	< 0.00050	< 0.00050
Titanium (Ti)-Dissolved	0.012	0.012
Uranium (U)-Dissolved	< 0.000050	<0.000050
Vanadium (V)-Dissolved	< 0.0050	< 0.0050
Zinc (Zn)-Dissolved	<0.0050	<0.0050

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix	1298-056 OCT26B- REACTOR 1 26-OCT-12 14:00 L1229937-3 Water	1298-066 OCT27A - REACTOR1 27-OCT-12 02:00 L1229935-3 Water
Physical Tests		
Hardness (as CaCO3)	1710	1450
pН	2	2)
Total Suspended Solids		5:
Total Dissolved Solids		Æ
Turbidity	5:	≅.
Anions and Nutrients		
Acidity (as CaCO3)	•	w)
Alkalinity, Bicarbonate (as CaCO3)	2	2
Alkalinity, Carbonate (as CaCO3)	-	•0
Alkalinity, Hydroxide (as CaCO3)	-	9
Alkalinity, Total (as CaCO3)	•	
Ammonia, Total (as N)		
Bromide (Br)	-	
Chloride (CI)		*1
Fluoride (F)		7
Nitrate (as N)		÷
Nitrite (as N)	26	2
Orthophosphate-Dissolved (as P)		
Phosphorus (P)-Total		¥
Sulfate (SO4)		
,		
Total Metals		
Aluminum (Al)-Total	₹	*
Antimony (Sb)-Total	8	<u> </u>
Arsenic (As)-Total	*	*
Barium (Ba)-Total	2	2
Beryllium (Be)-Total	*	
Bismuth (Bi)-Total	2	-
Boron (B)-Total		*
Cadmium (Cd)-Total	2	-
Calcium (Ca)-Total	2	
Chromium (Cr)-Total	*	
Cobalt (Co)-Total	2.	<u></u>
Copper (Cu)-Total	*	*
Iron (Fe)-Total	8	-
Lead (Pb)-Total	± 	*
Lithium (Li)-Total	2.	-
Magnesium (Mg)-Total		ê
Manganese (Mn)-Total	*	
Mercury (Hg)-Total		*
Molybdenum (Mo)-Total	*	•
Nickel (Ni)-Total	5	Ø.

Phosphorus (P)-Total		2
Potassium (K)-Total	€	**
Selenium (Se)-Total	20	2
Silicon (Si)-Total		3:
Silver (Ag)-Total	-	*
Sodium (Na)-Total	±2	
Strontium (Sr)-Total	-	*
Thallium (TI)-Total	=	5
Tin (Sn)-Total	-	*
Titanium (Ti)-Total	<u> </u>	2
Uranium (U)-Total		*
Vanadium (V)-Total	25	2.
Zinc (Zn)-Total		50

Dissolved Metals

Dissolved Metals		
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (AI)-Dissolved	2.52	2.46
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050
Arsenic (As)-Dissolved	< 0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0236	0.0236
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	< 0.000050	0.000066
Calcium (Ca)-Dissolved	656	556
Chromium (Cr)-Dissolved	0.00371	0.00449
Cobalt (Co)-Dissolved	< 0.00050	0.00058
Copper (Cu)-Dissolved	0.0015	0.0045
Iron (Fe)-Dissolved	< 0.050	< 0.050
Lead (Pb)-Dissolved	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0087	0.0079
Magnesium (Mg)-Dissolved	17.1	15.5
Manganese (Mn)-Dissolved	0.0736	0.0923
Mercury (Hg)-Dissolved	< 0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0270	0.0259
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30
Potassium (K)-Dissolved	1.91	1.94
Selenium (Se)-Dissolved	0.0711	0.0629
Silicon (Si)-Dissolved	0.055	0.050
Silver (Ag)-Dissolved	< 0.000050	< 0.000050
Sodium (Na)-Dissolved	4.24	4.23
Strontium (Sr)-Dissolved	0.853	0.891
Thallium (TI)-Dissolved	< 0.000050	< 0.000050
Tin (Sn)-Dissolved	< 0.00050	< 0.00050
Titanium (Ti)-Dissolved	0.012	0.013
Uranium (U)-Dissolved	< 0.000050	< 0.000050
Vanadium (V)-Dissolved	< 0.0050	< 0.0050
Zinc (Zn)-Dissolved	< 0.0050	< 0.0050

RESULTS OF ANALYSIS	
0 1 10	1298-057 OCT26B-
Sample ID	FEED
Date Sampled	26-OCT-12 14:00
Time Sampled	L1229937-4
ALS Sample ID Matrix	Water
Watrix	water
Physical Tests	
Hardness (as CaCO3)	506
pH	2.69
Total Suspended Solids	70.6
Total Dissolved Solids	2000
Turbidity	125
Anions and Nutrients	
Acidity (as CaCO3)	1020
Alkalinity, Bicarbonate (as CaCO3)	<1.0
Alkalinity, Carbonate (as CaCO3)	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0
Alkalinity, Total (as CaCO3)	<1.0
Ammonia, Total (as N)	0.0086
Bromide (Br)	< 0.50
Chloride (CI)	<5.0
Fluoride (F)	0.65
Nitrate (as N)	0.267
Nitrite (as N)	<0.010
Orthophosphate-Dissolved (as P)	0.0340
Phosphorus (P)-Total	<0.20
Sulfate (SO4)	762
Gunate (GO+)	102
Total Metals	
Aluminum (Al)-Total	35.1
Antimony (Sb)-Total	0.00650
Arsenic (As)-Total	0.176
Barium (Ba)-Total	0.137
Beryllium (Be)-Total	0.0193
Bismuth (Bi)-Total	<0.0025
Boron (B)-Total	<0.050
Cadmium (Cd)-Total	0.0432
Calcium (Ca)-Total	164
Chromium (Cr)-Total	0.0242
Cobalt (Co)-Total	0.536
Copper (Cu)-Total	25.9
Iron (Fe)-Total	271
Lead (Pb)-Total	0.0424
Lithium (Li)-Total	0.0136
Magnesium (Mg)-Total	25.7
Manganese (Mn)-Total	17.0
Mercury (Hg)-Total	0.000141
Molybdenum (Mo)-Total	0.0740
Nickel (Ni)-Total	0.205
Phosphorus (P)-Total	<0.30

Potassium (K)-Total	2.28
Selenium (Se)-Total	0.144
Silicon (Si)-Total	10.1
Silver (Ag)-Total	0.00547
Sodium (Na)-Total	4.34
Strontium (Sr)-Total	0.908
Thallium (TI)-Total	0.000157
Tin (Sn)-Total	< 0.00050
Titanium (Ti)-Total	1.22
Uranium (U)-Total	0.00227
Vanadium (V)-Total	0.0155
Zinc (Zn)-Total	3.70

Discolus d Models	
Dissolved Metals Dissolved Metals Filtration Location	FIELD
	31.3
Aluminum (Al)-Dissolved	0.00077
Antimony (Sb)-Dissolved	0.00077
Arsenic (As)-Dissolved	0.130
Barium (Ba)-Dissolved	
Beryllium (Be)-Dissolved	0.0193
Bismuth (Bi)-Dissolved	<0.0025
Boron (B)-Dissolved	<0.050
Cadmium (Cd)-Dissolved	0.0402
Calcium (Ca)-Dissolved	162
Chromium (Cr)-Dissolved	0.0209
Cobalt (Co)-Dissolved	0.496
Copper (Cu)-Dissolved	23.6
Iron (Fe)-Dissolved	235
Lead (Pb)-Dissolved	0.0391
Lithium (Li)-Dissolved	0.0133
Magnesium (Mg)-Dissolved	24.9
Manganese (Mn)-Dissolved	15.6
Mercury (Hg)-Dissolved	0.000042
Molybdenum (Mo)-Dissolved	0.0146
Nickel (Ni)-Dissolved	0.189
Phosphorus (P)-Dissolved	<0.30
Potassium (K)-Dissolved	1.88
Selenium (Se)-Dissolved	0.119
Silicon (Si)-Dissolved	6.73
Silver (Ag)-Dissolved	0.00523
Sodium (Na)-Dissolved	3.96
Strontium (Sr)-Dissolved	0.894
Thallium (TI)-Dissolved	0.000149
Tin (Sn)-Dissolved	<0.00050
Titanium (Ti)-Dissolved	0.964
Uranium (U)-Dissolved	0.00236
Vanadium (V)-Dissolved	0.0072
Zinc (Zn)-Dissolved	3.42

	1000 007 OOT07D	1000 070 OCT00A
Comple ID	EFFLUENT	1298-070 OCT28A- EFFLUENT
Sample ID Date Sampled	27-OCT-12	28-OCT-12
Time Sampled	14:00	02:00
ALS Sample ID	L1230279-1	L1230280-1
Matrix	Water	Water
Manix	water	AA OTG1
Physical Tests		
Hardness (as CaCO3)	1210	1210
pH	8.74	9.84
Total Suspended Solids	16.5	11.6
Total Dissolved Solids	1740	1690
Turbidity	18.4	16.8
raibiany		
Anions and Nutrients		
Acidity (as CaCO3)	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	10.9	8.1
Alkalinity, Carbonate (as CaCO3)	3.2	16.9
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0
Alkalinity, Total (as CaCO3)	14.2	25.0
Ammonia, Total (as N)	0.0760	0.0793
Bromide (Br)	<1.0	<1.0
Chloride (CI)	<10	<10
Fluoride (F)	<0.40	< 0.40
Nitrate (as N)	0.48	0.44
Nitrite (as N)	<0.020	<0.020
Orthophosphate-Dissolved (as P)	< 0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020
Sulfate (SO4)	1150	1130
Total Metals		
Aluminum (AI)-Total	2.94	2.49
Antimony (Sb)-Total	< 0.00050	< 0.00050
Arsenic (As)-Total	0.00178	0.00180
Barium (Ba)-Total	0.0194	0.0189
Beryllium (Be)-Total	< 0.00050	< 0.00050
Bismuth (Bi)-Total	< 0.0025	<0.0025
Boron (B)-Total	< 0.050	< 0.050
Cadmium (Cd)-Total	0.000520	0.000549
Calcium (Ca)-Total	465	463
Chromium (Cr)-Total	0.00651	0.00576
Cobalt (Co)-Total	0.00581	0.00579
Copper (Cu)-Total	0.251	0.255
Iron (Fe)-Total	3.69	2.79
Lead (Pb)-Total	0.00045	0.00047
Lithium (Li)-Total	0.0047	0.0052
Magnesium (Mg)-Total	3.39	1.30
Manganese (Mn)-Total	0.167	0.156
Mercury (Hg)-Total	0.000011	0.000011
Molybdenum (Mo)-Total	0.0321	0.0240
Nickel (Ni)-Total	0.0044	< 0.0025
· ·		

Phosphorus (P)-Total	< 0.30	< 0.30
Potassium (K)-Total	1.91	1.96
Selenium (Se)-Total	0.0637	0.0654
Silicon (Si)-Total	0.203	0.253
Silver (Ag)-Total	0.000060	0.000081
Sodium (Na)-Total	4.22	4.33
Strontium (Sr)-Total	0.829	0.819
Thallium (TI)-Total	< 0.000050	< 0.000050
Tin (Sn)-Total	< 0.00050	< 0.00050
Titanium (Ti)-Total	0.020	0.020
Uranium (U)-Total	< 0.000050	< 0.000050
Vanadium (V)-Total	< 0.0050	< 0.0050
Zinc (Zn)-Total	0.042	0.044
Dissolved Metals	5151.5	EIEL D
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (Al)-Dissolved	2.45	2.13
Antimony (Sb)-Dissolved	<0.00050	<0.00050
Arsenic (As)-Dissolved	<0.00050	<0.00050
Barium (Ba)-Dissolved	0.0171	0.0173
Beryllium (Be)-Dissolved	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.0025	<0.0025
Boron (B)-Dissolved	<0.050	<0.050
Cadmium (Cd)-Dissolved	0.000058	0.000085
Calcium (Ca)-Dissolved	478	482
Chromium (Cr)-Dissolved	0.00623	0.00517
Cobalt (Co)-Dissolved	<0.00050	<0.00050
Copper (Cu)-Dissolved	0.0016	0.0042
Iron (Fe)-Dissolved	<0.050	0.051
Lead (Pb)-Dissolved	<0.00025	<0.00025
Lithium (Li)-Dissolved	0.0043	0.0047
Magnesium (Mg)-Dissolved	3.20	1,11
Manganese (Mn)-Dissolved	0.00150	0.00261
Mercury (Hg)-Dissolved	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0294	0.0234
Nickel (Ni)-Dissolved	<0.0025	<0.0025
Phosphorus (P)-Dissolved	<0.30	<0.30
Potassium (K)-Dissolved	1.62	1.87
Selenium (Se)-Dissolved	0.0578	0.0635
Silicon (Si)-Dissolved	0.100	0.149
Silver (Ag)-Dissolved	<0.000050	<0.000050
Sodium (Na)-Dissolved	3.91	4.18
Strontium (Sr)-Dissolved	0.778	0.801
Thallium (TI)-Dissolved	<0.000050	<0.000050
Tin (Sn)-Dissolved	<0.00050	<0.00050
Titanium (Ti)-Dissolved	<0.010	<0.010 <0.000050
Uranium (U)-Dissolved	<0.00050	<0.00050
Vanadium (V)-Dissolved	<0.0050	
Zinc (Zn)-Dissolved	<0.0050	<0.0050

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix	1298-068 OCT27B- REACTOR2 27-OCT-12 14:00 L1230279-2 Water	1298-071 OCT28A REACTOR2 28-OCT-12 02:00 L1230280-2 Water
Physical Tests		
Hardness (as CaCO3)	1210	1250
pH	*	*
Total Suspended Solids	€.	8
Total Dissolved Solids	× 2	*
Turbidity		4
Anions and Nutrients		
Acidity (as CaCO3)		
Alkalinity, Bicarbonate (as CaCO3)	2	*
Alkalinity, Carbonate (as CaCO3)		
Alkalinity, Hydroxide (as CaCO3)	£	*
Alkalinity, Total (as CaCO3)		3
Ammonia, Total (as N)	*	*
Bromide (Br)	2	9
Chloride (CI)		*
Fluoride (F)	*	4
Nitrate (as N)	2.	
Nitrite (as N)	Ü	×
Orthophosphate-Dissolved (as P)	*	
Phosphorus (P)-Total	*	*
Sulfate (SO4)	5.	3
Total Metals		
Aluminum (Al)-Total	*	-
Antimony (Sb)-Total	2	G.
Arsenic (As)-Total		
Barium (Ba)-Total	*	32
Beryllium (Be)-Total		
Bismuth (Bi)-Total		G.
Boron (B)-Total		5
Cadmium (Cd)-Total	*	16
Calcium (Ca)-Total		ia E
Chromium (Cr)-Total	×	98
Cobalt (Co)-Total	-	12
Copper (Cu)-Total	*	25
Iron (Fe)-Total	*	æ
Lead (Pb)-Total	*	:* :-
Lithium (Li)-Total		16
Magnesium (Mg)-Total		72
Manganese (Mn)-Total	*	±* ₽
Mercury (Hg)-Total		5
Molybdenum (Mo)-Total Nickel (Ni)-Total	*	·*
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*	*
20	27
E2	51

Dissolved Metals

Dissolved Metals		
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (Al)-Dissolved	2.63	2.47
Antimony (Sb)-Dissolved	<0.00050	<0.00050
Arsenic (As)-Dissolved	< 0.00050	0.00056
Barium (Ba)-Dissolved	0.0182	0.0185
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	<0.050
Cadmium (Cd)-Dissolved	0.000061	0.000224
Calcium (Ca)-Dissolved	479	498
Chromium (Cr)-Dissolved	0.00633	0.00524
Cobalt (Co)-Dissolved	< 0.00050	0.00179
Copper (Cu)-Dissolved	0.0022	0.0796
Iron (Fe)-Dissolved	< 0.050	0.778
Lead (Pb)-Dissolved	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0046	0.0052
Magnesium (Mg)-Dissolved	3.14	1.37
Manganese (Mn)-Dissolved	0.00478	0.0513
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0303	0.0221
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30
Potassium (K)-Dissolved	1.92	1.90
Selenium (Se)-Dissolved	0.0627	0.0623
Silicon (Si)-Dissolved	0.101	0.162
Silver (Ag)-Dissolved	< 0.000050	< 0.000050
Sodium (Na)-Dissolved	4.30	4.22
Strontium (Sr)-Dissolved	0.819	0.792
Thallium (TI)-Dissolved	< 0.000050	< 0.000050
Tin (Sn)-Dissolved	< 0.00050	< 0.00050
Titanium (Ti)-Dissolved	< 0.010	0.012
Uranium (U)-Dissolved	< 0.000050	< 0.000050
Vanadium (V)-Dissolved	< 0.0050	< 0.0050
Zinc (Zn)-Dissolved	< 0.0050	0.0126

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix	1298-069 OCT27B- REACTOR1 27-OCT-12 14:00 L1230279-3 Water	1298-072 OCT28A REACTOR1 28-OCT-12 02:00 L1230280-3 Water
Physical Tests		
Hardness (as CaCO3)	1210	1520
pH Total Suspended Solids		
Total Dissolved Solids	÷	2
Turbidity		÷
Anions and Nutrients		
Acidity (as CaCO3)	*	.9
Alkalinity, Bicarbonate (as CaCO3)	2	÷
Alkalinity, Carbonate (as CaCO3)	*	
Alkalinity, Hydroxide (as CaCO3)	*	8
Alkalinity, Total (as CaCO3)	<u>=</u>	:: :=
Ammonia, Total (as N)		
Bromide (Br) Chloride (Cl)	8	20
Fluoride (F)	-	ě
Nitrate (as N)	*	** **
Nitrite (as N)	8	2
Orthophosphate-Dissolved (as P)		25
Phosphorus (P)-Total	\$	8
Sulfate (SO4)	*	*
Total Metals		
Aluminum (Al)-Total		.e. ≃
Antimony (Sb)-Total Arsenic (As)-Total		5
Barium (Ba)-Total	8	2
Beryllium (Be)-Total		
Bismuth (Bi)-Total		÷
Boron (B)-Total		:=
Cadmium (Cd)-Total		(2
Calcium (Ca)-Total		137
Chromium (Cr)-Total	1 in	÷
Cobalt (Co)-Total	25	ĕ
Copper (Cu)-Total	*	Œ
Iron (Fe)-Total	<u> </u>	-
Lead (Pb)-Total	₩	1.00 See
Lithium (Li)-Total	75	R .
Magnesium (Mg)-Total	2 2	i .
Manganese (Mn)-Total Mercury (Hg)-Total	-	-
Molybdenum (Mo)-Totał		9
Nickel (Ni)-Total		
Thomas (m) Total		

Phosphorus (P)-Total	120	
Potassium (K)-Total	553	*
Selenium (Se)-Total		-
Silicon (Si)-Total	163	7.0
Silver (Ag)-Total	340	¥2
Sodium (Na)-Total	151	5.0
Strontium (Sr)-Total	(€)	*)
Thallium (TI)-Total	(6)	- 2
Tin (Sn)-Total	163	*
Titanium (Ti)-Total	15	25
Uranium (U)-Total	(5)	7.0
Vanadium (V)-Total	l €:	₩1
Zinc (Zn)-Total	161	*:

Dissolved Metals		
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (Al)-Dissolved	2.93	0.534
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050
Arsenic (As)-Dissolved	< 0.00050	0.00061
Barium (Ba)-Dissolved	0.0184	0.0376
Beryllium (Be)-Dissolved	< 0.00050	<0,00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.000051	< 0.000050
Calcium (Ca)-Dissolved	478	609
Chromium (Cr)-Dissolved	0.00684	0.00532
Cobalt (Co)-Dissolved	< 0.00050	< 0.00050
Copper (Cu)-Dissolved	0.0017	0.0078
Iron (Fe)-Dissolved	< 0.050	< 0.050
Lead (Pb)-Dissolved	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0048	0.0052
Magnesium (Mg)-Dissolved	2.99	< 0.10
Manganese (Mn)-Dissolved	0.00170	0.00163
Mercury (Hg)-Dissolved	<0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0295	0.0163
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	<0.30
Potassium (K)-Dissolved	1.83	1.86
Selenium (Se)-Dissolved	0.0628	0.0665
Silicon (Si)-Dissolved	0.118	0.243
Silver (Ag)-Dissolved	< 0.000050	<0.000050
Sodium (Na)-Dissolved	4.34	4.47
Strontium (Sr)-Dissolved	0.809	0.957
Thallium (TI)-Dissolved	<0.000050	<0.000050
Tin (Sn)-Dissolved	< 0.00050	< 0.00050
Titanium (Ti)-Dissolved	< 0.010	< 0.010
Uranium (U)-Dissolved	< 0.000050	< 0.000050
Vanadium (V)-Dissolved	< 0.0050	< 0.0050
Zinc (Zn)-Dissolved	< 0.0050	0.0082

1298-073 OCT28A-
FEED
28-OCT-12
02:00
L1230280-4
Water

Physical Tests

Hardness (as CaCO3)	520
pH	
Total Suspended Solids	*
Total Dissolved Solids	
Turbidity	₹

Anions and Nutrients

Acidity (as CaCO3)

Alkalinity, Bicarbonate (as CaCO3)

Alkalinity, Carbonate (as CaCO3)

Alkalinity, Hydroxide (as CaCO3)

Alkalinity, Total (as CaCO3)

Ammonia, Total (as N)

Bromide (Br)

Chloride (Cl)

Fluoride (F)

Nitrate (as N)

Nitrite (as N)

Orthophosphate-Dissolved (as P)

Phosphorus (P)-Total

Sulfate (SO4)

Total Metals

Aluminum (Al)-Total Antimony (Sb)-Total Arsenic (As)-Total Barium (Ba)-Total Beryllium (Be)-Total Bismuth (Bi)-Total Boron (B)-Total Cadmium (Cd)-Total Calcium (Ca)-Total Chromium (Cr)-Total Cobalt (Co)-Total Copper (Cu)-Total Iron (Fe)-Total Lead (Pb)-Total Lithium (Li)-Total Magnesium (Mg)-Total Manganese (Mn)-Total Mercury (Hg)-Total Molybdenum (Mo)-Total Nickel (Ni)-Total Phosphorus (P)-Total

Potassium (K)-Total	2
Selenium (Se)-Total	90
Silicon (Si)-Total	0
Silver (Ag)-Total	5
Sodium (Na)-Total	20
Strontium (Sr)-Total	20
Thallium (TI)-Total	×1
Tin (Sn)-Total	5
Titanium (Ti)-Total	
Uranium (U)-Total	
Vanadium (V)-Total	*
Zinc (Zn)-Total	2

Dissolved Metals

Dissolved Metals	
Dissolved Metals Filtration Location	FIELD
Aluminum (Al)-Dissolved	35.2
Antimony (Sb)-Dissolved	0.00051
Arsenic (As)-Dissolved	0.135
Barium (Ba)-Dissolved	0.0935
Beryllium (Be)-Dissolved	0.0186
Bismuth (Bi)-Dissolved	< 0.0025
Boron (B)-Dissolved	< 0.050
Cadmium (Cd)-Dissolved	0.0430
Calcium (Ca)-Dissolved	167
Chromium (Cr)-Dissolved	0.0242
Cobalt (Co)-Dissolved	0.525
Copper (Cu)-Dissolved	24.2
Iron (Fe)-Dissolved	247
Lead (Pb)-Dissolved	0.0336
Lithium (Li)-Dissolved	0.0128
Magnesium (Mg)-Dissolved	25.1
Manganese (Mn)-Dissolved	15.5
Mercury (Hg)-Dissolved	0.000030
Molybdenum (Mo)-Dissolved	0.0116
Nickel (Ni)-Dissolved	0.203
Phosphorus (P)-Dissolved	< 0.30
Potassium (K)-Dissolved	1.97
Selenium (Se)-Dissolved	0.131
Silicon (Si)-Dissolved	6.68
Silver (Ag)-Dissolved	0.00457
Sodium (Na)-Dissolved	4.42
Strontium (Sr)-Dissolved	0.792
Thallium (TI)-Dissolved	0.000120
Tin (Sn)-Dissolved	0.00182
Titanium (Ti)-Dissolved	0.954
Uranium (U)-Dissolved	0.00199
Vanadium (V)-Dissolved	0.0070
Zinc (Zn)-Dissolved	3.62

	1298-074 OCT28B	1298-079 OCT29A-
Sample ID	- EFFLUENT	EFFLUENT
Date Sampled	28-OCT-12	29-OCT-12
Time Sampled	14:00	02:00
ALS Sample ID	L1230283-1	L1230285-1
Matrix	Water	Water
Physical Tests		
Hardness (as CaCO3)	1240	1320
pH	9.88	10.64
Total Suspended Solids	11.2	21.9
Total Dissolved Solids	1850	1930
Turbidity	11.4	20.4
Taibiaity		20.1
Anions and Nutrients		
Acidity (as CaCO3)	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	10.1	<1.0
Alkalinity, Carbonate (as CaCO3)	18.5	44.6
Alkalinity, Hydroxide (as CaCO3)	<1.0	10.8
Alkalinity, Total (as CaCO3)	28.6	55.3
Ammonia, Total (as N)	0.0663	0.0653
Bromide (Br)	<1.0	<1.0
Chloride (CI)	<10	<10
Fluoride (F)	<0.40	0.45
Nitrate (as N)	0.47	0.49
Nitrite (as N)	<0.020	0.023
Orthophosphate-Dissolved (as P)	<0.0010	< 0.0010
Phosphorus (P)-Total	<0.0020	<0.0020
Sulfate (SO4)	1200	1260
Total Metals		
Aluminum (Al)-Total	3.93	3.72
Antimony (Sb)-Total	< 0.00050	< 0.00050
Arsenic (As)-Total	0.00396	0.00155
Barium (Ba)-Total	0.0234	0.0242
Beryllium (Be)-Total	< 0.00050	< 0.00050
Bismuth (Bi)-Total	< 0.0025	< 0.0025
Boron (B)-Total	< 0.050	< 0.050
Cadmium (Cd)-Total	0.00126	0.000487
Calcium (Ca)-Total	498	522
Chromium (Cr)-Total	0.00551	0.00457
Cobalt (Co)-Total	0.0141	0.00517
Copper (Cu)-Total	0.609	0.229
Iron (Fe)-Total	6.82	2.48
Lead (Pb)-Total	0.00110	0.00040
Lithium (Li)-Total	0.0048	0.0059
Magnesium (Mg)-Total	2.48	1.76
Manganese (Mn)-Total	0.380	0.146
Mercury (Hg)-Total	0.000012	0.000021
Molybdenum (Mo)-Total	0.0163	0.0185
Nickel (Ni)-Total	0.0059	< 0.0025

Phosphorus (P)-Total	< 0.30	< 0.30
Potassium (K)-Total	1.88	1.94
Selenium (Se)-Total	0.0655	0.0707
Silicon (Si)-Total	0.375	0.244
Silver (Ag)-Total	0.000193	0.000088
Sodium (Na)-Total	4.11	4.35
Strontium (Sr)-Total	0.813	0.880
Thallium (TI)-Total	< 0.000050	<0.000050
Tin (Sn)-Total	<0.00050	< 0.00050
Titanium (Ti)-Total	0.037	0.019
Uranium (U)-Total	0.000107	<0.000050
Vanadium (V)-Total	<0.0050	< 0.0050
Zinc (Zn)-Total	0.100	0.040
Zillo (Zil) Fotal	0.700	0.0.0
Dissolved Metals		
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (Al)-Dissolved	3.32	3.22
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050
Arsenic (As)-Dissolved	< 0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0201	0.0225
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	< 0.000050	0.000054
Calcium (Ca)-Dissolved	494	526
Chromium (Cr)-Dissolved	0.00391	0.00417
Cobalt (Co)-Dissolved	< 0.00050	< 0.00050
Copper (Cu)-Dissolved	0.0015	0.0082
Iron (Fe)-Dissolved	< 0.050	0.074
Lead (Pb)-Dissolved	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0047	0.0054
Magnesium (Mg)-Dissolved	1.78	1.30
Manganese (Mn)-Dissolved	0.00047	0.00461
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0166	0.0178
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30
Potassium (K)-Dissolved	1.89	1.90
Selenium (Se)-Dissolved	0.0651	0.0660
Silicon (Si)-Dissolved	0.107	0.152
Silver (Ag)-Dissolved	< 0.000050	< 0.000050
Sodium (Na)-Dissolved	4.09	4.26
Strontium (Sr)-Dissolved	0.815	0.839
Thallium (TI)-Dissolved	< 0.000050	< 0.000050
Tin (Sn)-Dissolved	< 0.00050	< 0.00050
Titanium (Ti)-Dissolved	< 0.010	< 0.010
Uranium (U)-Dissolved	< 0.000050	< 0.000050
Vanadium (V)-Dissolved	< 0.0050	< 0.0050
	0.0050	0.0050

< 0.0050

< 0.0050

Zinc (Zn)-Dissolved

RESULTS OF ANALYSIS

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix Physical Tests Hardness (as CaCO3)	1298-075 OCT28B- REACTOR2 28-OCT-12 14:00 L1230283-2 Water	1298-080 OCT29A- REACTOR2 29-OCT-12 02:00 L1230285-2 Water
рН	¥2	*
Total Suspended Solids	21	<u>~</u>
Total Dissolved Solids		*
Turbidity	¥3	2
· s.c.a.i.y		
Anions and Nutrients		
Acidity (as CaCO3)		8
Alkalinity, Bicarbonate (as CaCO3)		×
Alkalinity, Carbonate (as CaCO3)	£	8
Alkalinity, Hydroxide (as CaCO3)	*	**
Alkalinity, Total (as CaCO3)	2	2
Ammonia, Total (as N)	55	5
Bromide (Br)	2	ź:
Chloride (CI)	5	ž.
Fluoride (F)	2:	¥
Nitrate (as N)	2	
Nitrite (as N)	*	×
Orthophosphate-Dissolved (as P)	2	€
Phosphorus (P)-Total	30	¥
Sulfate (SO4)	20	2
Total Metals		
Aluminum (AI)-Total	*	5.
Antimony (Sb)-Total	¥	2
Arsenic (As)-Total	±	5
Barium (Ba)-Total		*
Beryllium (Be)-Total	5	8
Bismuth (Bi)-Total	8	*
Boron (B)-Total		-
Cadmium (Cd)-Total	*	
Calcium (Ca)-Total	2	-
Chromium (Cr)-Total	*	2
Cobalt (Co)-Total	*	×
Copper (Cu)-Total	5	-
Iron (Fe)-Total		*
Lead (Pb)-Total	2	5
Lithium (Li)-Total		*
Magnesium (Mg)-Total		2
Manganese (Mn)-Total	*	*
Mercury (Hg)-Total	•	
Molybdenum (Mo)-Total		8
Nickel (Ni)-Total	Ŧ	34

Phosphorus (P)-Total	120	100
Potassium (K)-Total	598	[B]
Selenium (Se)-Total	3#1	
Silicon (Si)-Total	7,61	
Silver (Ag)-Total	390	186
Sodium (Na)-Total	150	
Strontium (Sr)-Total	5 6 3	E
Thallium (TI)-Total		- 6
Tin (Sn)-Total	(€)	
Titanium (Ti)-Total	(2)	143
Uranium (U)-Total	(*)	
Vanadium (V)-Total	TE:	
Zinc (Zn)-Total	E#.	1.0

Dissolved Metals		
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (AI)-Dissolved	3.11	3.35
Antimony (Sb)-Dissolved	< 0.00050	<0.00050
Arsenic (As)-Dissolved	< 0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0194	0.0274
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	< 0.000050	0.000083
Calcium (Ca)-Dissolved	493	559
Chromium (Cr)-Dissolved	0.00542	0.00492
Cobalt (Co)-Dissolved	< 0.00050	< 0.00050
Copper (Cu)-Dissolved	0.0016	0.0077
Iron (Fe)-Dissolved	< 0.050	< 0.050
Lead (Pb)-Dissolved	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0046	0.0066
Magnesium (Mg)-Dissolved	1.42	5.63
Manganese (Mn)-Dissolved	0.00065	0.00573
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0164	0.0141
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30
Potassium (K)-Dissolved	1.79	2.16
Selenium (Se)-Dissolved	0.0636	0.0666
Silicon (Si)-Dissolved	0.119	0.081
Silver (Ag)-Dissolved	< 0.000050	< 0.000050
Sodium (Na)-Dissolved	4.09	4.88
Strontium (Sr)-Dissolved	0.817	0.870
Thallium (Ti)-Dissolved	< 0.000050	< 0.000050
Tin (Sn)-Dissolved	<0.00050	< 0.00050
Titanium (Ti)-Dissolved	< 0.010	< 0.010
Uranium (U)-Dissolved	< 0.000050	< 0.000050
Vanadium (V)-Dissolved	< 0.0050	< 0.0050
Zinc (Zn)-Dissolved	<0.0050	<0.0050

RESULTS OF ANALYSIS

Sample ID Date Sampled Time Sampled	1298-076 OCT28B- REACTOR1 28-OCT-12 14:00	1298-081 OCT29A- REACTOR1 29-OCT-12 02:00
ALS Sample ID	L1230283-3	L1230285-3
Matrix	Water	Water
Physical Tests		
Hardness (as CaCO3)	1210	1370
pH	×.	100
Total Suspended Solids	3	9
Total Dissolved Solids	8	÷
Turbidity	٥	2
Anions and Nutrients		
Acidity (as CaCO3)		#
Alkalinity, Bicarbonate (as CaCO3)	•	
Alkalinity, Carbonate (as CaCO3)		.5
Alkalinity, Hydroxide (as CaCO3)	*	
Alkalinity, Total (as CaCO3)	=	*
Ammonia, Total (as N)	*	œ
Bromide (Br)		~
Chloride (CI)	*	25
Fluoride (F)	-	
Nitrate (as N)	7	<u>:</u>
Nitrite (as N)		-
Orthophosphate-Dissolved (as P)		
Phosphorus (P)-Total	9	-
Sulfate (SO4)		12
Total Metals		
Aluminum (Al)-Total		
Antimony (Sb)-Total	2	4
Arsenic (As)-Total		4
Barium (Ba)-Total	-	
Beryllium (Be)-Total		
Bismuth (Bi)-Total	9	
Boron (B)-Total		
Cadmium (Cd)-Total		
Calcium (Ca)-Total	2	57
Chromium (Cr)-Total	~	
Cobalt (Co)-Total	12	· 2
Copper (Cu)-Total		1,41
Iron (Fe)-Total		-
Lead (Pb)-Total		:41
Lithium (Li)-Total		363
Magnesium (Mg)-Total		1,007
Manganese (Mn)-Total		582
Mercury (Hg)-Total		(4)
Molybdenum (Mo)-Total	· ·	.~ :::
Nickel (Ni)-Total	9	-

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Dissolved Metals

DISSOIVED METAIS		
Dissolved Metals Filtration Location	FIELD	FIELD
Aluminum (AI)-Dissolved	3.17	3.96
Antimony (Sb)-Dissolved	< 0.00050	< 0.00050
Arsenic (As)-Dissolved	<0.00050	< 0.00050
Barium (Ba)-Dissolved	0.0220	0.0277
Beryllium (Be)-Dissolved	< 0.00050	< 0.00050
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	< 0.000050	0.000058
Calcium (Ca)-Dissolved	481	541
Chromium (Cr)-Dissolved	0.00401	0.00380
Cobalt (Co)-Dissolved	< 0.00050	< 0.00050
Copper (Cu)-Dissolved	0.0026	0.0109
Iron (Fe)-Dissolved	< 0.050	0.107
Lead (Pb)-Dissolved	< 0.00025	< 0.00025
Lithium (Li)-Dissolved	0.0048	0.0067
Magnesium (Mg)-Dissolved	2.61	4.85
Manganese (Mn)-Dissolved	0.00168	0.00689
Mercury (Hg)-Dissolved	< 0.000010	< 0.000010
Molybdenum (Mo)-Dissolved	0.0147	0.0139
Nickel (Ni)-Dissolved	< 0.0025	< 0.0025
Phosphorus (P)-Dissolved	< 0.30	< 0.30
Potassium (K)-Dissolved	1.83	1.98
Selenium (Se)-Dissolved	0.0626	0.0660
Silicon (Si)-Dissolved	0.095	0.092
Silver (Ag)-Dissolved	<0.000050	< 0.000050
Sodium (Na)-Dissolved	4.13	4.56
Strontium (Sr)-Dissolved	0.792	0.884
Thallium (TI)-Dissolved	< 0.000050	< 0.000050
Tin (Sn)-Dissolved	< 0.00050	< 0.00050
Titanium (Ti)-Dissolved	< 0.010	< 0.010
Uranium (U)-Dissolved	< 0.000050	< 0.000050
Vanadium (V)-Dissolved	<0.0050	< 0.0050
Zinc (Zn)-Dissolved	< 0.0050	< 0.0050

RESULTS OF ANALYSIS

RESULTS OF ANALTSIS	
	1298-082 OCT29A-
Sample ID	FEED
Date Sampled	29-OCT-12
Time Sampled	02:00
ALS Sample ID	L1230285-4
Matrix	Water

Physical Tests

Hardness (as CaCO3)	518
pH	*
Total Suspended Solids	*
Total Dissolved Solids	2
Turbidity	

Anions and Nutrients

Acidity (as CaCO3)

Alkalinity, Bicarbonate (as CaCO3)

Alkalinity, Carbonate (as CaCO3)

Alkalinity, Hydroxide (as CaCO3)

Alkalinity, Total (as CaCO3)

Ammonia, Total (as N)

Bromide (Br)

Chloride (Cl)

Fluoride (F)

Nitrate (as N)

Orthophosphate-Dissolved (as P)

Phosphorus (P)-Total

Sulfate (SO4)

Total Metals

Aluminum (AI)-Total Antimony (Sb)-Total Arsenic (As)-Total Barium (Ba)-Total Beryllium (Be)-Total Bismuth (Bi)-Total Boron (B)-Total Cadmium (Cd)-Total Calcium (Ca)-Total Chromium (Cr)-Total Cobalt (Co)-Total Copper (Cu)-Total Iron (Fe)-Total Lead (Pb)-Total Lithium (Li)-Total Magnesium (Mg)-Total Manganese (Mn)-Total Mercury (Hg)-Total Molybdenum (Mo)-Total Nickel (Ni)-Total Phosphorus (P)-Total

Potassium (K)-Total
Selenium (Se)-Total
Silicon (Si)-Total
Silver (Ag)-Total
Sodium (Na)-Total
Strontium (Sr)-Total
Thallium (Tl)-Total
Tin (Sn)-Total
Titanium (Ti)-Total
Uranium (U)-Total
Vanadium (V)-Total
Zinc (Zn)-Total

Dissolved Metals

FIELD Dissolved Metals Filtration Location Aluminum (AI)-Dissolved 34.8 Antimony (Sb)-Dissolved < 0.00050 Arsenic (As)-Dissolved 0.129 Barium (Ba)-Dissolved 0.0935 Beryllium (Be)-Dissolved 0.0187 Bismuth (Bi)-Dissolved < 0.0025 Boron (B)-Dissolved < 0.050 Cadmium (Cd)-Dissolved 0.0425 Calcium (Ca)-Dissolved 166 Chromium (Cr)-Dissolved 0.0242 Cobalt (Co)-Dissolved 0.522 Copper (Cu)-Dissolved 24.2 Iron (Fe)-Dissolved 249 Lead (Pb)-Dissolved 0.0333 Lithium (Li)-Dissolved 0.0128 Magnesium (Mg)-Dissolved 25.1 Manganese (Mn)-Dissolved 15.7 Mercury (Hg)-Dissolved 0.000050 Molybdenum (Mo)-Dissolved 0.0117 Nickel (Ni)-Dissolved 0.201 Phosphorus (P)-Dissolved < 0.30 Potassium (K)-Dissolved 1.96 Selenium (Se)-Dissolved 0.130 Silicon (Si)-Dissolved 6.68 Silver (Ag)-Dissolved 0.00468 Sodium (Na)-Dissolved 4.43 Strontium (Sr)-Dissolved 0.812 Thallium (TI)-Dissolved 0.000121 Tin (Sn)-Dissolved <0.00050 Titanium (Ti)-Dissolved 0.944 Uranium (U)-Dissolved 0.00196 0.0067 Vanadium (V)-Dissolved Zinc (Zn)-Dissolved 3.53

Appendix C – Sludge Generation Data & Percent Solids

Date (2012)	Time	Sample Description	Vol.	Slurry Wt. (g)	S.G.	Dry Cake Wt. (g)	% Solids
21-Oct	18:00	Clarifier U/F	250	251.98	1.008	0.86	0.34%
21-Oct	22:00	Clarifier U/F	250	253.70	1.015	8.87	3.50%
22-Oct	2:00	Clarifier U/F	250	255.65	1.023	9.45	3.70%
22-Oct	6:00	Clarifier U/F	250	257.31	1.029	11.59	4.50%
22-Oct	10:00	Clarifier U/F	250	261.57	1.046	13.70	5.24%
22-Oct	16:00	Clarifier U/F	250	260.33	1.041	15.32	5.88%
22-Oct	18:00	Clarifier U/F	250	260.69	1.043	14.56	5.59%
22-Oct	22:00	Clarifier U/F	250	262.57	1.050	22.95	8.74%
23-Oct	2:00	Clarifier U/F	250	262.67	1.051	23.90	9.10%
23-Oct	6:00	Clarifier U/F	250	263.16	1.053	26.70	10.15%
23-Oct	16:00	Clarifier U/F	250	262.83	1.051	16.53	6.29%
23-Oct	18:00	Clarifier U/F	250	266.19	1.065	25.47	9.57%
23-Oct	22:00	Clarifier U/F	250	269.41	1.078	26.57	9.86%
24-Oct	2:00	Clarifier U/F	250	271.71	1.087	29.65	10.91%
24-Oct	6:00	Clarifier U/F	250	272.27	1.089	35.88	13.18%
27-Oct	8:00	Clarifier U/F	106	117.34	1.107	16.06	13.69%
28-Oct	14:00	Clarifier U/F	100	111.16	1.112	17.00	15.29%
31-Oct	3:30	Clarifier U/F	250	284.30	1.137	54.41	19.14%
	16.00% y = 1.3072x - 1.3 R ² = 0.9396						
	0.00	1.00 1.02 1.04 1.0		3 1.10 1.1	2 1.14	1.16 1.	18

Appendix D – Settling Test Results

SETTLING TEST DATA AND CALCULATIONS

CLIENT

Seabridge KSM HDS Process Test Date: 23-Oct-12 Tested By: PS

Test I.D.: 1298-S1A-23

1. INITIAL CONDITIONS

SAMPLE Reactor #2 O/F

2. TEST CONDITIONS

FLOCCULANT

Type: Magnafloc 10
Concentration: 0.25 g/L
Addition (mL): 3.0

Settling vessel size (mL/cm): 29 Undecanted slurry vol. (mL): 1000.0 Slurry weight (g): 1003 Dry Solids weight (g): 14.5

Final interface Height (mL): 100

3. COMMENTS

Clear interface seen after 2 minutes

4. SETTLING DATA AND CALCULATIONS

Time (min)	Volume (mL)	Height (mm)	Pulp Density
0	1000	345	1.4
0.2	980	338	1.5
0.5	870	300	1.7
1	630	217	2.3
2	320	110	4.5
5	215	74	6.7
10	165	57	8.6
15	140	48	10.1
20	130	45	10.9
30	120	41	11.8
40	110	38	12.8
50	100	34	14.1
60	100	34	14.1
65	100	34	14.1
70	100	34	14.1

SETTLING TEST DATA AND CALCULATIONS

CLIENT

Seabridge KSM HDS Process Test Date: 27-Oct-12 Tested By: PS

Test I.D.: 1298-S2A-27

1. INITIAL CONDITIONS

SAMPLE

Reactor #2 O/F

2. TEST CONDITIONS

FLOCCULANT

Type: Magnafloc 10 Concentration: 0.25 g/L

Addition (mL): 2

Settling vessel size (mL/cm): 29

Undecanted slurry vol. (mL): 1000.0 Slurry weight (g): 1010.72 Dry Solids weight (g): 18.7

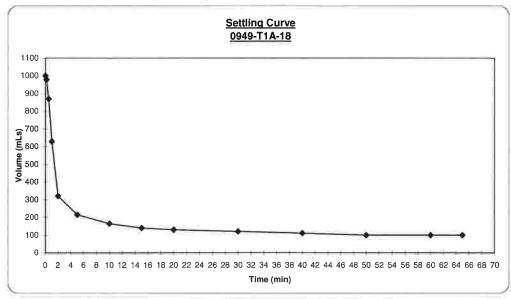
Final interface Height (mL): 90

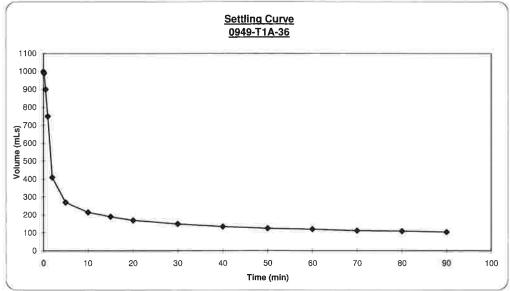
3. COMMENTS

Very clear overflow

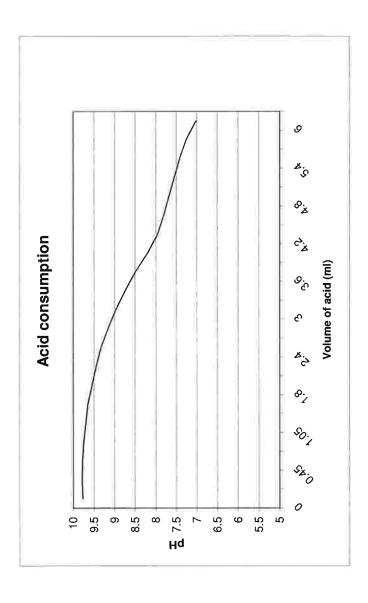
4. SETTLING DATA AND CALCULATIONS

Time (min)	Volume (mL)	Height (mm)	Pulp Density
0	1000	345	1.9
0.2	990	341	1.9
0.5	900	310	2.1
1	750	259	2.5
2	410	141	4.4
5	270	93	6.7
10	215	74	8.3
15	190	66	9.3
20	170	59	10.3
30	150	52	11.6
40	135	47	12.8
50	125	43	13.8
60	120	41	14.3
70	112	39	15.2
80	110	38	15.5
90	105	36	16.2
100	100	34	16.9
120	100	34	16.9
130	99	34	17.0
145	90	31	18.6





Appendix E – Acid Consumption Results



Air neutralization

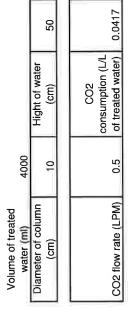
Volume of treated water (ml) 4000

Diameter of column (cm) 10 (cm)

Air Neutralization	4 4 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3	٥ ٩ ١ ٢ ٢ ١ ٩ ١ ٩ ١ ١ ٩ ١ ١ ١ ١ ١ ١ ١ ١ ١
	Hq 6 6 4 9	o *

Ha	10.7	10.69	10.68	10.67	10.66	10.64	10.63	10.62	10.6	10.59	10.58	10,57	10.56	10.54	10.53	10.52	10.5	10.49	10.48	10,4	10.31	10.08	9.92	9.78	9.65	9.52	9.39	9.27	9.14	9.02	8.89	8.75	8.6	8.45	8.27	8.1	α
Time (min)	0	2	m	47	7	50	11	13	15	17	13	21	23	25	27	58	31	83	35	45	22	75	85	92	105	115	125	135	145	155	165	175	185	185	205	215	225

CO₂ neutralization



	_		_	_
Hd	10.7	8.65	7.55	66.9
Time (sec)	0	9	10	20

		20
zation		10 Sec) utralization
CO2 Neutralization		fime (Sec) ——CO2 neutralization
		0
	Hq 5	0

Appendix F – Sulphidization and High Iron Testing

Sulphide Tests Results

	Test #1	Test #2	Test #3	Test #4
Test Condition				
Initial pH (adjusted)	4	4	5.5	
Sulphide concentration (mg/l)	100	100	100	
Reaction time after adding				
sulphide (min)	20	20	20	***************************************
Adjusted pH by lime		10.5	10.5	10.5
Retention time after lime				
neutralization		40	40	40
Test Results				
Dissolved Metals (in mg/L)				
Aluminum (Al)-Dissolved	29.4	3.92	2.59	2.39
Antimony (Sb)-Dissolved	<0.00050	<0.00050	<0.00020	<0.00050
Arsenic (As)-Dissolved	0.0785	< 0.00050	0.00034	< 0.00050
Barium (Ba)-Dissolved	0.0822	0.0355	0.0397	0.0237
Beryllium (Be)-Dissolved	0.0170	< 0.00050	<0.00020	<0.00050
Bismuth (Bi)-Dissolved	<0.0025	<0.0025	<0.0010	<0.0025
Boron (B)-Dissolved	< 0.050	< 0.050	< 0.020	<0.050
Cadmium (Cd)-Dissolved	0.0364	<0.000050	0.000116	0.000054
Calcium (Ca)-Dissolved	144	473	402	516
Chromium (Cr)-Dissolved	0.0196	0.00100	<0.00020	0.00649
Cobalt (Co)-Dissolved	0.434	< 0.00050	0.00024	<0.00050
Copper (Cu)-Dissolved	16.3	0.0034	0.00681	0.0041
Iron (Fe)-Dissolved	203	<0.050	0.060	<0.050
Lead (Pb)-Dissolved	0.0354	<0.00025	0.00058	<0.00025
Lithium (Li)-Dissolved	0.0095	0.0114	0.0091	0.0066
Magnesium (Mg)-Dissolved	21.4	2.26	3.52	11.6
Manganese (Mn)-Dissolved	14.2	0.00767	0.0576	0.0182
Mercury (Hg)-Dissolved	0.000037	<0.000010	<0.000010	0.000012
Molybdenum (Mo)-Dissolved	0.00505	0.00483	0.00292	0.0104
Nickel (Ni)-Dissolved	0.170	<0.0025	< 0.0010	<0.0025
Phosphorus (P)-Dissolved	0.66	< 0.30	<0.30	<0.30
Potassium (K)-Dissolved	2.76	2.76	3.74	1.92
Selenium (Se)-Dissolved	0.0979	0.0663	0.0565	0.0615
Silicon (Si)-Dissolved	6.00	0.105	0.229	0.067
Silver (Ag)-Dissolved	<0.000050	<0.000050	<0.000020	<0.000050
Sodium (Na)-Dissolved	66.1	70.9	163	4.45
Strontium (Sr)-Dissolved	0.702	0.802	0.803	0.822
Thallium (Tl)-Dissolved	0.000080	<0.000050	< 0.000020	<0.000050
Tin (Sn)-Dissolved	<0.00050	<0.00050	0.00038	<0.00050
Titanium (Ti)-Dissolved	0.641	<0.010	<0.010	0.021
Uranium (U)-Dissolved	0.00181	<0.000050	0.000047	<0.000050
Vanadium (V)-Dissolved	<0.0050	<0.0050	<0.0020	<0.0050
Zinc (Zn)-Dissolved	3.14	<0.0050	0.0042	<0.0050

Appendix G – Delkor Filtration Test



FILTER PRESSES

2

Filtration Equipment

www.delkorglobal.com

The Delkor Filter Press is a robust and reliable pressure filter designed for optimum solution recovery and maximum solids dryness. The filters are available from 1m² to 350m² filtration area at operating pressures up to 25 bar.

The Delkor Manual Filter press is a low cost filtration option suitable for small tonnages and long filtration cycle times where manual labour is available to open the press and discharge the solids.

The Delkor Automatic Filter press is specified for larger tonnages or hazardous applications where the full operating cycle is automated, including press opening and solids discharge.

Delkor Filter presses are designed for:

- 98% availability
- Simple operation
- · Low maintenance requirements due to:
 - Minimum number of moving parts
 - Conservative sizing parameters
 - Low internal velocities

Options include

- Simple dewatering
- Process Washing
- Membrane Compression
- Standard, Recessed and Membrane Press Plates in PP, PVDF, Cast Iron
- Automatic Discharge





PAYS TO TALK TO A SPECIALIST

Method of Operation

The Delkor Filter press comprises a steel framework with a hydraulic closing cylinder that locks a pack of filter plates in place. The filter plates have an internal recess with a feed inlet and a filtrate drainage grid.

A filter cloth overlays the drainage grid and forms a chamber into which feed slurry is introduced under pressure.

As the chamber fills under pressure, filtrate moves through the filter cloth and exits via the plate drainage grid. The solids are trapped in the chamber and formed into a solid cake.

At this point the feed is stopped and the cake may be washed by forcing water from one side of the cake to the other. The cake can also be air-dried after this stage in a similar fashion.

When solids discharge is required, the closing cylinder is retracted and each filter plate is moved to allow gravity discharge of the cake.



FILTER PRESSES

www.delkorglobal.com

Filtration Equipment

Applications

- · Solution Recovery
 - Metals in solution
 - Sodium from lime mud and dregs
 - Any duty requiring cake washing
- · Solids Drying
- · Mineral concentrates
 - Cu, Zn, Pb, Fe, Ti, Zr and PGMs
- Fine Coal
- Underground Mud
- · Clays and Kaolin
- · Precipitates incl. Gypsum
- Hydroxides, Cement Copper
- Lime Mud
- Phosphate Rock
- Effluent Treatment

Safety devices (Optional)

- Trip/pull-wire switches
- · Light curtain
- Guarding
- · Bomb-bay doors

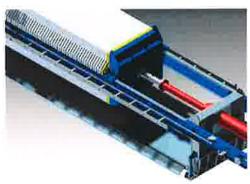
Test Apparatus

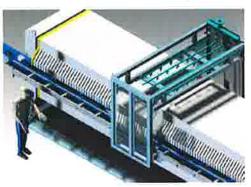
- Laboratory test work
- · Pilot plants

Research & Development

- Ongoing process to improve current and future installations
- Develop more efficient control philosophies
- Provide superior performance of each item of equipment.











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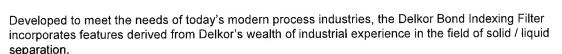
- Delkor Belt Filters
- Ceramic Disc Filters (CDF)
- Automated Filter Presses
- Bond Indexing Filters
- Tipping Pan FiltersGravity Sand Filters
- · Polishing Ceramic Filters



BOND INDEXING FILTERS

www.delkorglobal.com





The Delkor Bond Indexing Filter offers a reliable, cost effective and versatile solution for solids extraction and cake washing applications.

Using the principles of horizontal vacuum filtration, the microprocessor controlled Bond Indexing Filter allows true process optimisation under all conditions to ensure filtration and washing parameters are achieved. The microprocessor sequence controls not only provide flexibility to quickly adjust the filtration parameters, they also allow process integration within the site operating system.

Filtration takes place through a filter cloth supported on a stationary vacuum tray. The filter cloth is moved in increments along the vacuum tray by an electric drive.

When the filter cloth is stationary, vacuum is applied for a set time interval and then released. The process of cloth movement and vacuum application is repeated a number of times along the length of the vacuum filter to give an incremental movement of the filter cloth. During the cycle of movement the filter feed and required wash are applied to specific zones of the filter. Being microprocessor controlled, precise synchronisation of all movement, vacuum times, feed times and wash times is simply and quickly achieved.

Benefits

- · Low capital cost
- · Low maintenance requirements
- · Low power consumption
- · Easy to adjust microprocessor controls which can be linked to the main process computer
- · Controlled cloth acceleration to prolong cloth life
- · Variable stroke operation to eliminate filtrate carry over
- · Accurate separation of primary and wash filtrates
- Single or multistage cake washing
- Co-Current or Counter Current washing
- · Filter cloth washed on both sides
- Feed is applied above the filter cloth so that's sedimentation aids filtration
- · Filter can be partially or completely hooded
- Cake compression modules available to produce drier cakes

Applications

- · Pigment dewatering and washing
- Fine Chemical production
- Pharmaceuticals
- · Gypsum Dewatering
- Fluorosilic acid

- Uranium Yellow Cake
- General Chemical Process
- · Process effluent dewatering
- · Chemical Intermediates
- · Salt dewatering and washing
- General solid / liquid separation



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- Delkor Belt Filters
- · Ceramic Disc Filters (CDF)
- Automated Filter Presses
- · Bond Indexing Filters
- Tipping Pan Filters
- · Gravity Sand Filters
- Polishing Ceramic Filters



Filter Press Testwork Results Summary

Handled by	Christian Kyle	Date	November 2nd, 2012
Customer	SBS	Project	
Attention	Prab Bhatai	Test Nº	

Sample Data	Data	_		Test 1	
Slurry R.D.	1,15		Nº of Plates	~	
Solids S.G.	3.30	assumed	Thickness of Plates	20	шш
Liquid S.G.	1,00		Surface Area (1)	0.007854	m ²
% Solids	18.7%	_	Filter Area	0.015708	m2
Slurry Tmp.	Amb		Drying Area	0.007854	т2
Slurry pH	10.50		Operating Pressure	672	Bar
		_	Cloth Type	Needlefelt	AMP412202G1 (15-25cfm)
Wash pH		_			
Wash Temp			Comments	Very clear filtr	Very clear filtrate, very firm cake.
Wash Solution		_			

	Test 2	
	,	
Nº of Plates Thickness of Plates	- 07	um.
Surface Area (1)	0,007854	₂ E
Fifter Area	0.015708	тп2
Drying Area	0.007854	m2
Operating Pressure	7.0	Bar
Cloth Type	Meedlefelt	AMP412202G1 (15-25cfm)
Comments	Very clear filtrate, ve breaker tripped mul (once/min)	Very clear filtrate, very firm cake. During test breaker tripped multiple times during form (once/min) and dry (once).

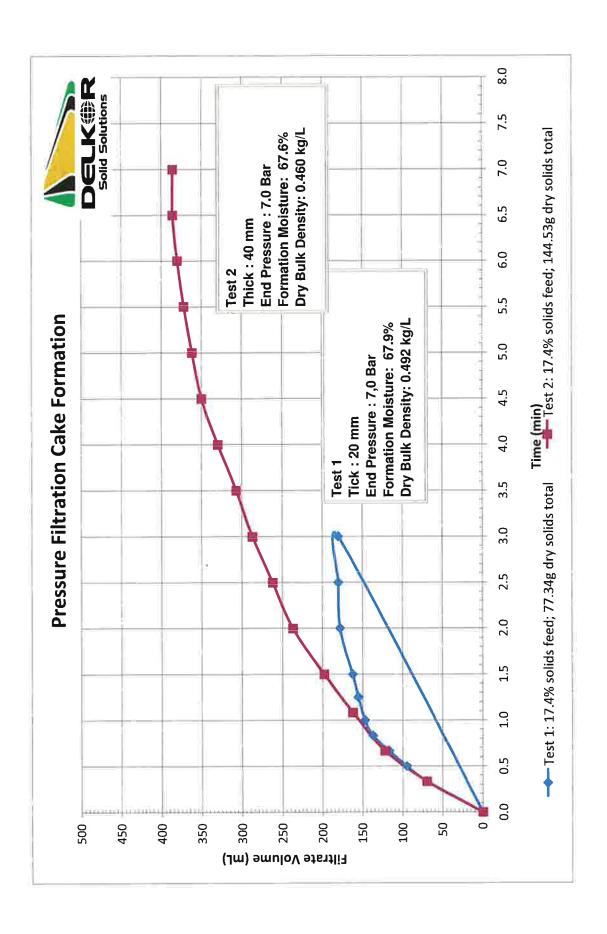
Solids S.G. 3.30 assumed Solids S.G. 1.00 K. Solids 18.7% Slurry Trap. Amb. Slurry PH 10.50
Wash pH Wash Temp

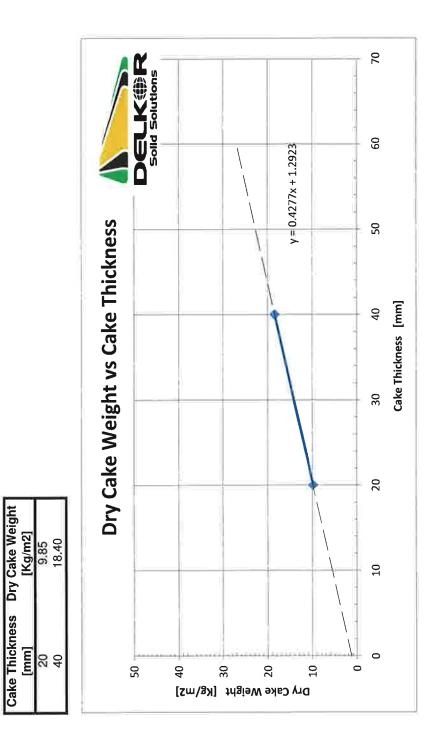


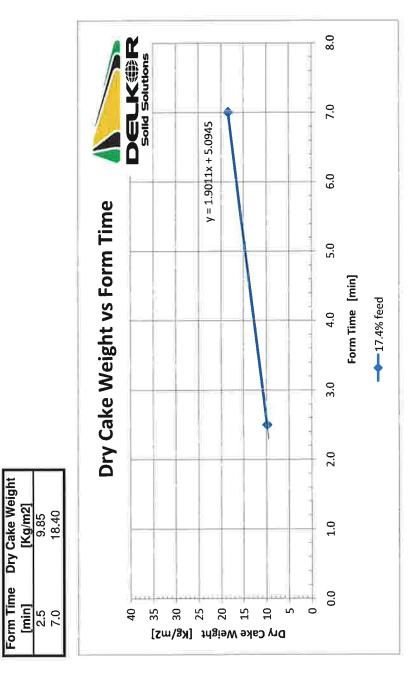
	(B)/(A)		85.9
	(B) Dry Bulk Density	[Kg/lt]	0.423
Calculated	Slurry Density Before Blowing	[Kg/lt]	1,317
	% Solid Before Blowing	[%]	32.098
lest Data	(A) Dry Bulk Density	[Kg/lt]	0.492
lest	Slurry Density Before Blowing	[Kg/lt]	1.534
	Dry Cake I	[Kg/m2]	9.847
	Dry Time Factor	[min/(Kg/m2)] [Kg/m2]	0.102 0.051 0.034 0.017 0.000
	Moisture	[%]	64.997 65.311 66.072 66.942 67.902
	Blowing time	[min]	1 0.5 0.33 0.165
	Cake Dry Weight	[gr]	77.34
	Cake Wet Weight	[gr]	220.95
	Plate Thickness	[mm]	20
	Pressure Time	[min]	2.5
	Dry (Air Blow) Pressure	[kPa]	700
	Form	[kba]	700
	Test Nº		

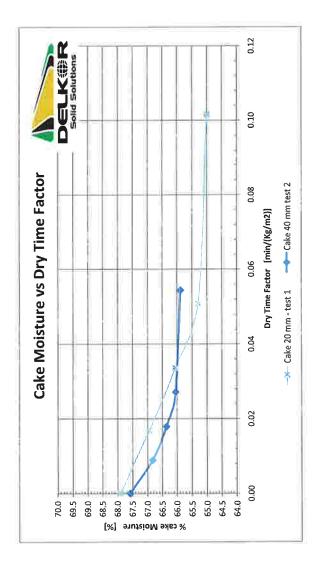
	- 1		_	
		(B)/(A)		93.1
		(B) Dry Bulk Density	[Kg/lt]	0.429
	Calculated	Slurry Density Before Blowing	[Kg/lt]	1.321
		% Solid Before Blowing	[%]	32.428
Ì	Test Data	(A) Dry Bulk Density	[Kg/lt]	0.450
	Test	Slurry Density Before Blowing	[Kg/lt]	1.419
		Dry Cake Weight	[Kg/m2]	18.402
		Dry Time Factor	min/(Kg/m2)	0.054 0.027 0.018 0.009 0.000
		Moisture	[%]	65.888 66.048 66.364 66.827 67.572
		Blowing	[min]	0.5 0.33 0.165 0
		Cake Dry Weight	[gr]	144.53
		Cake Wet Weight	[Er]	423.69
		Plate Thickness	[mm]	40
		Pressure Time	[min]	_
		Dry (Air Blow) Pressure	[kPa]	700
		Form	[kba]	700
		Test		2

	(B)/(A)		93.1
	(B) Dry Bulk Density	[Kg/lt]	0.429
Calculated	Slurry Density Before Blowing	[Kg/lt]	1.321
	% Solid Before Blowing	[%]	32.428
Data	(A) Dry Bulk Density	[Kg/lt]	0.460
Test Data	Slurry Density Before Blowing	[Kg/lt]	1.419
	Dry Cake Weight	[Kg/m2]	18.402
	Dry Time Dry Cake Factor Weight	min/(Kg/m2)	0.054 0.027 0.018 0.009 0.000
	Moisture	[%]	65.888 66.048 66.364 66.827 67.572
	Blowing time	[min]	0.5 0.33 0.165 0
	Cake Dry Weight	[Er]	144.53
	Cake Wet Weight	[ra]	423.69
	Plate Thickness	[mm]	40
	Pressure Time	[min]	4
	Dry (Air Blow) Pressure	[kPa]	700
	Form	[kba]	700
	Ze zt		2









20mm (1 m	in total dry time)
Moisture	Dry Time Factor
[%]	[min/(Kg/m2)]
67.902	0.000
66.942	0.017
66.072	0.034
65.311	0.051
62.997	0.102

40mm (1 n	nin total dry time)
Moisture	Dry Time Factor
[%]	[min/(Kg/m2)]
67.572	0.000
66.827	0.00
66.364	0.018
66.048	0.027
63.888	0.054

868-021-01

Rebecca Burton, RESCAN ENVIRONMENTAL SERVICES

Project Report To ALS File No. 05-Nov-12 11:15 **Date Received** Date 06-Nov-12

RESULTS OF ANALYSIS	
Sample ID	SOLIDS
Date Sampled	05-NOV-12
Time Sampled	10:00
ALS Sample ID	L1233267-1
Matrix	Soil
Physical Tests	
Moisture	8.50
pH (1:2 soil:water)	9.48
Metals	
Aluminum (Al)	24900
Antimony (Sb)	1.80
Arsenic (As)	112
Barium (Ba)	68.4
Beryllium (Be)	9.81
Bismuth (Bi)	<0.20
Cadmium (Cd)	34.2
Calcium (Ca)	127000
Chromium (Cr)	30.7
Cobalt (Co)	380
Copper (Cu)	17500
Iron (Fe)	195000
Lead (Pb)	29.9
Lithium (Li)	5.5
Magnesium (Mg)	17300
Manganese (Mn)	12000
Mercury (Hg)	0.0365
Molybdenum (Mo)	13.3
Nickel (Ni)	154
Phosphorus (P)	<50
Potassium (K)	<100
Selenium (Se)	43.8
Silver (Ag)	3.77
Sodium (Na)	<100
Strontium (Sr)	117
Thallium (TI)	0.065
Tin (Sn)	<2.0
Titanium (Ti)	683
Uranium (U)	2.83
Vanadium (V)	51.9
Zinc (Zn)	2830
TCLP Metals	
1st Preliminary PH	9.46
2nd Preliminary PH	5.71
Final pH	7.12
Extraction Solution Initial pH	2.89
Antimony (Sb)-Leachable	<1.0
Arsenic (As)-Leachable	<1.0
Barium (Ba)-Leachable	<2.5
Beryllium (Be)-Leachable	< 0.025

Boron (B)-Leachable	<0.50
Cadmium (Cd)-Leachable	< 0.050
Calcium (Ca)-Leachable	2260
Chromium (Cr)-Leachable	<0.25
Cobalt (Co)-Leachable	0.068
Copper (Cu)-Leachable	0.124
Iron (Fe)-Leachable	<0.15
Lead (Pb)-Leachable	<0.25
Magnesium (Mg)-Leachable	179
Mercury (Hg)-Leachable	<0.0010
Nickel (Ni)-Leachable	<0.25
Selenium (Se)-Leachable	<1.0
Silver (Ag)-Leachable	<0.25
Thallium (TI)-Leachable	<1.0
Vanadium (V)-Leachable	<0.15
Zinc (Zn)-Leachable	<0.50
BC MLEP Extractables	
Final pH	8.75
BC MLEP Metals	
Arsenic (As)-Leachable	<0.20
Barium (Ba)-Leachable	< 0.050
Boron (B)-Leachable	<0.10
Cadmium (Cd)-Leachable	<0.010
Chromium (Cr)-Leachable	0.029
Copper (Cu)-Leachable	<0.010
Lead (Pb)-Leachable	<0.050
Mercury (Hg)-Leachable	<0.0010
Selenium (Se)-Leachable	<0.20
Silver (Ag)-Leachable	< 0.010
Uranium (U)-Leachable	<2.0
Zinc (Zn)-Leachable	<0.050

Appendix H – Synthetic Feed Analysis

Project Report To ALS File No. Date Received Date 868-021-01 Rebecca Burton, RESCAN ENVIRONMENTAL SERVICES L1225725 18-Oct-12 11:15 19-Oct-12

RESULTS OF ANALYSIS

RESULTS OF ANALYSIS			
Sample ID	FEED-BOTTOM	FEED-MID	FEED-TOP
Date Sampled	18-OCT-12	18-OCT-12	18-OCT-12
Time Sampled	09:00	09:00	09:00
ALS Sample ID	L1225725-1	L1225725-2	L1225725-3
Matrix	Water	Water	Water
Physical Tests			
Hardness (as CaCO3)	235	234	234
pН	2.78	2.81	2.79
Total Suspended Solids	58.1	59.9	52.5
Total Dissolved Solids	1930	1990	1890
Turbidity	86.2	84.1	80.2
Aning and Material			
Anions and Nutrients Acidity (as CaCO3)	915	937	935
* ` '	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3) Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0
	<1.0 <1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)		<1.0	<1.0
Alkalinity, Total (as CaCO3)	<1.0 0.0051	0.0055	0.0070
Ammonia, Total (as N)	<1.0	<1.0	<1.0
Bromide (Br)	<1.0	<1.0 <10	<10
Chloride (Cl)	1.35	1.35	1.37
Fluoride (F)			
Nitrate (as N)	0.68	0.71	0.70
Nitrite (as N)	0.047	0.045	0.045
Orthophosphate-Dissolved (as P)	0.0122	0.0101	0.0123
Phosphorus (P)-Total	<0.020	<0.020	<0.020
Sulfate (SO4)	1170	1160	1170
Total Metals			
Aluminum (Al)-Total	23.0	20.8	21.3
Antimony (Sb)-Total	0.00574	0.00698	0.00638
Arsenic (As)-Total	0.0225	0.0220	0.0212
Barium (Ba)-Total	0.124	0.118	0.114
Beryllium (Be)-Total	0.00280	0.00279	0.00273
Bismuth (Bi)-Total	< 0.0010	< 0.0010	< 0.0010
Boron (B)-Total	< 0.020	< 0.020	< 0.020
Cadmium (Cd)-Total	0.0484	0.0438	0.0433
Calcium (Ca)-Total	53.4	52.2	51.0
Chromium (Cr)-Total	0.0262	0.0236	0.0238
Cobalt (Co)-Total	0.528	0.482	0.475
Copper (Cu)-Total	23.1	21.0	20.5
Iron (Fe)-Total	258	244	246
Lead (Pb)-Total	0.0407	0.0404	0.0403
Lithium (Li)-Total	0.0125	0.0120	0.0123
Magnesium (Mg)-Total	24.0	23.6	23.1
Manganese (Mn)-Total	15.2	13.7	13.7
Mercury (Hg)-Total	0.000052	0.000054	0.000057
Molybdenum (Mo)-Total	0.200	0.200	0.186
Nickel (Ni)-Total	0.211	0.191	0.185
Phosphorus (P)-Total	< 0.30	< 0.30	< 0.30
Potassium (K)-Total	2.22	1.99	1.95

Selenium (Se)-Total	0.139	0.138	0.137
Silicon (Si)-Total	8.15	8.14	7.74
Silver (Ag)-Total	0.00483	0.00481	0.00461
Sodium (Na)-Total	6.46	5.86	5.83
Strontium (Sr)-Total	0.744	0.735	0.710
Thallium (TI)-Total	0.000136	0.000134	0.000137
Tin (Sn)-Total	0.00150	0.00103	0.00097
Titanium (Ti)-Total	1.03	1.04	1.01
Uranium (U)-Total	0.00201	0.00193	0.00196
Vanadium (V)-Total	0.0127	0.0127	0.0121
Zinc (Zn)-Total	3.98	3.63	3.57
Dissolved Metals			
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	20.3	20.4	20.8
Antimony (Sb)-Dissolved	0.00094	0.00094	0.00091
Arsenic (As)-Dissolved	0.0155	0.0157	0.0160
Barium (Ba)-Dissolved	0.0883	0.0889	0.0910
Beryllium (Be)-Dissolved	0.00282	0.00273	0.00277
Bismuth (Bi)-Dissolved	< 0.0010	<0.0010	<0.0010
Boron (B)-Dissolved	< 0.020	< 0.020	<0.020
Cadmium (Cd)-Dissolved	0.0450	0.0452	0.0446
Calcium (Ca)-Dissolved	54.7	54.3	54.3
Chromium (Cr)-Dissolved	0.0241	0.0241	0.0242
Cobalt (Co)-Dissolved	0.489	0.487	0.487
Copper (Cu)-Dissolved	21.2	21.0	20.6
Iron (Fe)-Dissolved	235	235	234
Lead (Pb)-Dissolved	0.0396	0.0389	0.0380
Lithium (Li)-Dissolved	0.0122	0.0120	0.0120
Magnesium (Mg)-Dissolved	23.9	23.8	24.0
Manganese (Mn)-Dissolved	13.7	13.9	13.8
Mercury (Hg)-Dissolved	0.000021	0.000021	0.000025
Molybdenum (Mo)-Dissolved	0.152	0.150	0.151
Nickel (Ni)-Dissolved	0.195	0.194	0.188
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.80	1.77	1.76
Selenium (Se)-Dissolved	0.127	0.128	0.132
Silicon (Si)-Dissolved	6.38	6.35	6.35
Silver (Ag)-Dissolved	0.00438	0.00408	0.00441
Sodium (Na)-Dissolved	5.78	5.75	5.84
Strontium (Sr)-Dissolved	0.754	0.742	0.737
Thallium (TI)-Dissolved	0.000119	0.000124	0.000118
Tin (Sn)-Dissolved	0.00098	0.00090	0.00096
Titanium (Ti)-Dissolved	0.916	0.912	0.918
Uranium (U)-Dissolved	0.00200	0.00198	0.00191
Vanadium (V)-Dissolved	0.0069	0.0069	0.0070
Zinc (Zn)-Dissolved	3.62	3.79	3.64

Project Report To ALS File No. 868-021-01

Rebecca Burton, RESCAN ENVIRONMENTAL SERVICES

 ALS File No.
 L1228961

 Date Received
 25-Oct-12 10:45

 Date
 26-Oct-12

RESULTS OF ANALYSIS

Sample ID Date Sampled Time Sampled ALS Sample ID Matrix	1298-044 BATCH- 2 FEED:BOTTOM 25-OCT-12 08:30 L1228961-1 Water	1298-045 BATCH- 2 FEED: MID 25-OCT-12 08:30 L1228961-2 Water	1298-046 BATCH- 2 FEED:TOP 25-OCT-12 08:30 L1228961-3 Water
Physical Tests Hardness (as CaCO3)	503	512	513
pH	2.73	2.72	2.73
Total Suspended Solids	76.0	78.7	76.0
Total Dissolved Solids	2170	2140	2060
Turbidity	113	112	111
Anions and Nutrients			
Acidity (as CaCO3)	1030	1050	1050
Alkalinity, Bicarbonate (as CaCO3)	<1.0	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	<1.0	<1.0	<1.0
Ammonia, Total (as N)	0.0090	0.0090	0.0097
Bromide (Br)	<1.0	<1.0	<1.0
Chloride (CI)	<10	<10	<10
Fluoride (F)	1.39	1.33	1.34
Nitrate (as N)	0.53	0.52	0.53
Nitrite (as N)	<0.020	<0.020	<0.020
Orthophosphate-Dissolved (as P)	0.041	0.0422	0.0428
Phosphorus (P)-Total	0.0628	0.0643 1540	0.0687 1540
Sulfate (SO4)	1540	1540	1340
Total Metals	20.4	04.0	33.8
Aluminum (Al)-Total	36.1 0.00970	34.6 0.00986	0.00921
Antimony (Sb)-Total	0.00970	0.00988	0.00921
Arsenic (As)-Total	0.200	0.145	0.138
Barium (Ba)-Total	0.0177	0.0163	0.0159
Beryllium (Be)-Total Bismuth (Bi)-Total	<0.0025	<0.0025	<0.0025
Boron (B)-Total	< 0.050	< 0.050	< 0.050
Cadmium (Cd)-Total	0.0443	0.0420	0.0409
Calcium (Ca)-Total	153	153	151
Chromium (Cr)-Total	0.0246	0.0242	0.0235
Cobalt (Co)-Total	0.541	0.520	0.516
Copper (Cu)-Total	26.8	25.8	25.5
Iron (Fe)-Total	285	263	271
Lead (Pb)-Total	0.0399	0.0396	0.0379
Lithium (Li)-Total	0.0133	0.0117	0.0112
Magnesium (Mg)-Total	24.8	25.0	24.6
Manganese (Mn)-Total	17.3	16.5	16.3
Mercury (Hg)-Total	0.000076	0.000075	0.000077
Molybdenum (Mo)-Total	0.112	0.112	0.105
Nickel (Ni)-Total	0.211	0.202	0.200

	0.00	<0.30	< 0.30
Phosphorus (P)-Total	<0.30 2.26	2.20	2.11
Potassium (K)-Total	0.160	0.146	0.149
Selenium (Se)-Total	8.97	9.60	8.96
Silicon (Si)-Total	0.00548	0.00533	0.00516
Silver (Ag)-Total	4.33	4.16	4.09
Sodium (Na)-Total	4.33 0.847	0.818	0.794
Strontium (Sr)-Total	0.047	0.000151	0.000140
Thallium (TI)-Total	<0.000163	<0.000151	<0.000140
Tin (Sn)-Total		1.38	1.33
Titanium (Ti)-Total	1.35	0.00195	0.00187
Uranium (U)-Total	0.00196		0.0185
Vanadium (V)-Total	0.0197	0.0197 3.67	3.62
Zinc (Zn)-Total	3.81	3.07	3.02
Dissolved Metals			
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	34.4	34.9	34.1
Antimony (Sb)-Dissolved	0.00125	0.00112	0.00118
Arsenic (As)-Dissolved	0.154	0.153	0.153
Barium (Ba)-Dissolved	0.0967	0.0984	0.0975
Beryllium (Be)-Dissolved	0.0198	0.0187	0.0187
Bismuth (Bi)-Dissolved	< 0.0025	< 0.0025	< 0.0025
Boron (B)-Dissolved	< 0.050	< 0.050	< 0.050
Cadmium (Cd)-Dissolved	0.0422	0.0416	0.0418
Calcium (Ca)-Dissolved	161	164	165
Chromium (Cr)-Dissolved	0.0233	0.0224	0.0224
Cobalt (Co)-Dissolved	0.540	0.535	0.518
Copper (Cu)-Dissolved	25.4	24.9	24.9
Iron (Fe)-Dissolved	258	256	257
Lead (Pb)-Dissolved	0.0355	0.0343	0.0340
Lithium (Li)-Dissolved	0.0140	0.0126	0.0126
Magnesium (Mg)-Dissolved	24.4	24.8	24.8
Manganese (Mn)-Dissolved	16.4	16.3	16.6
Mercury (Hg)-Dissolved	0.000032	0.000031	0.000033
Molybdenum (Mo)-Dissolved	0.0137	0.0136	0.0135
Nickel (Ni)-Dissolved	0.201	0.197	0.196
Phosphorus (P)-Dissolved	< 0.30	< 0.30	< 0.30
Potassium (K)-Dissolved	1.91	1.94	1.94
Selenium (Se)-Dissolved	0.132	0.130	0.129
Silicon (Si)-Dissolved	6.41	6.50	6.54
Silver (Ag)-Dissolved	0.00490	0.00473	0.00485
Sodium (Na)-Dissolved	4.36	4.26	4.17
Strontium (Sr)-Dissolved	0.839	0.800	0.804
Thallium (TI)-Dissolved	0.000118	0.000115	0.000120
Tin (Sn)-Dissolved	< 0.00050	< 0.00050	< 0.00050
Titanium (Ti)-Dissolved	1.05	1.07	1.07
Uranium (U)-Dissolved	0.00194	0.00183	0.00184
Vanadium (V)-Dissolved	0.0098	0.0098	0.0098
Zinc (Zn)-Dissolved	3.64	3.44	3.52

Appendix I – Burnaby Tap Water Report



Physical and Chemical Analysis of Water Supply

Greater Vancouver Water District

2011- Capilano Water System

	Untreated		Treated			
Parameter	Average	Avianaga	D	Days	Canadian	-
	Average	Average	Range	Guideline Exceeded	Guideline	
Alkalinity as CaCO3 (mg/L)	2.4	2.0		Exceeded	Limit	Establishe
Aluminium Dissolved (mg/L)		2.9	2.6-3.2		none	
Aluminium Total (mg/L)	0.073	0.067	0.067		none	
Antimony Total (µg/L)	0.115	0.090	0.090		none	
Arsenic Total (µg/L)	<0.5	<0.5	<0.5	0	6	health
Barium Total (µg/L)	<0.5	<0.5	<0.5	0	10	health
Boron Total (mg/L)	2.8	2.2	2.2	0	1000	health
Bromate (mg/L)	<0.01	<0.01	< 0.01	0	5.0	health
		< 0.01	< 0.01	0	0.01	health
Bromide (mg/L)		<0.01	<0.01		none	
Cadmium Total (µg/L)	<0.2	< 0.2	< 0.2	0	5	health
Calcium Total (mg/L)	1.18	1.15	1.07-1.32		none	
Carbon Organic Dissolved (mg/L)	1.5	1.3	1.2-1.4		none	
Carbon Organic Total (mg/L)	1.55	1.35	1.13-1.42		none	
Chlorate (mg/L)		0.05	0.04-0.06	0	1.0	health
Chloride Total (mg/L)	0.42	2.1	1.7-3.1	0	≤ 250	aesthetic
Chromium Total (µg/L)	0.07	0.07	0.05-0.08	0	50	health
Color Apparent (ACU)	13	4	2-5		none	
Color True (TCU)	11	2	1-4	0	≤ 15	aesthetic
Conductivity (umhos/cm)	10	15	14-16		none	uesthetic
Copper Total (µg/L)	3.2	1.1	1-1.1		≤ 1000	aesthetic
Cyanide Total (mg/L)	<0.02	< 0.02	< 0.02	0	0.2	health
Fluoride (mg/L)	< 0.05	< 0.05	< 0.05	0	1.5	health
Hardness as CaCO; (mg/L)	3.62	3.48	3.25-4.04		none	nearm
Iron Dissolved (µg/L)	27	22	12-40		none	
Iron Total (µg/L)	60	47	28-79	0		
Lead Total (µg/L)	<0.5	<0.5	<0.5	· ·	10	aesthetic health
Magnesium Total (mg/L)	0.163	0.150	0.138-0.182		none	nearm
Manganese Dissolved (µg/L)	2.8	1.5	1.0-2.0			
Manganese Total (µg/L)	3.4	1.8	1.2-2.7	0	none	
Mercury Total (μg/L)	<0.05	<0.05	< 0.05	0	≤50	aesthetic
Nickel Total (µg/L)	<0.05	<0.05	<0.05	0	1	health
Nitrogen - Ammonia as N (mg/L)	<0.02	<0.03	<0.03		none	
Nitrogen - Nitrate as N (mg/L)	0.05	0.02			none	
Nitrogen - Nitrite as N (mg/L)	<0.01	<0.01	0.06-0.10	0	10	health
pH	6.4		<0.01	0	1.0	health
Phenols (µg/L)	<5	6.5	6.3-6.7	5	6.5 to 8.5	aesthetic
Phosphorus Total (µg/L)	<5	<5	<5		none	
Potassium Total (mg/L)		<5	<5		none	
Residue Total (mg/L)	0.149	0.134	0.133-0.134		none	
Residue Total (lig/L)	17	17	17		none	
Residue Total Fixed (mg/L)	14	12	12	0	≤ 500	aesthetic
Residue Total Volatile (mg/L)	10	11	11		none	
	6	6	6		none	
Selenium Total (µg/L)	<0.5	<0.5	<0.5	0	10	health
Silica as SiO ₂ (mg/L)	3.1	2.9	2.9		none	
Silver Total (µg/L)	<0.5	<0.5	< 0.5	1	none	
Sodium Total (mg/L)	0.598	1.81	1.81	0	≤200	aesthetic
Sulphate (mg/L)	0.83	0.82	0.7-1.0	0	≤500	aesthetic
Turbidity (NTU)	0.57	0.36	0.21-0.68			
Jranium Total (μg/L)	0.027		- 1200-1200 (11 miles 17 miles	0	<20	health
JV254 (A bs/cm)	0.067	0.043	0.036-0.047	1000	none	acaim
linc Total (µg/L)	<3	<3	<3	0	≤ 5000	aesthetic

These figures are average values from a number of laboratory analyses done throughout the year. Where the range is a single value no variation was measured for the samples analysed. Methods and terms are based on those of "Standard Methods of Water and Waste Water" 21st Edition 2005. Less than (<) denotes not detectable with the technique used for determination. Untreased water is from the intake prior to chlorination, treated water is from a sample line after 10 minutes chlorine contact time. Guidelines are taken from "Guidelines for Canadian Drinking Water Quality - Sixth Edition" Health and Welfare Canada 1996, updated to Dec 2010. Capilano source water is treated with sodium hypochlorite for distribution. Capilano Primary Distribution Plant was out of service from January 1st to April 29th, Aug 22nd to Aug 26th, and Sept 26th to Dec 31 due to high turbidity. It was operational for only 148 days in 2011.



Physical and Chemical Analysis of Water Supply

Greater Vancouver Water District

2011 - Seymour Water System

	Untreated		Treated			
Parameter	Average	Average	Range	<u>Days</u> Guideline	Canadian	Reason
I WILLIAM TO THE TOTAL THE TOTAL TO THE TOTAL THE TOTAL TO THE TOTAL THE TOTAL TO T	Average	Avelage	Kange	Exceeded	Guideline Limit	Guideline Establishe
Alkalinity as CaCO ₃ (mg/L)	3.0	6.7	4.9-9.6		none	237 (40213 1112
Aluminium Dissolved (mg/L)	0.068	0.047	0.025-0.086		none	
Aluminium Total (mg/L)	0.156	0.037	0.017-0.101	0	0.2	aesthetic
Antimony Total (µg/L)	<0.5	<0.5	<0.5	0	6	health
Arsenic Total (µg/L)	<0.5	<0.5	<0.5	0	10	health
Barium Total (µg/L)	3.9	3.2	2.9-3.8	0	1000	health
Boron Total (mg/L)	< 0.01	< 0.01	<0.01	0	5.0	health
Bromate (mg/L)		<0.01	< 0.01	0	0.01	health
Bronide (mg/L)		< 0.01	< 0.01		none	псини
Cadmium Total (µg/L)	<0.2	<0.2	<0.2	0	5	health
Calcium Total (mg/L)	1.56	3.26	2.59-3.86		none	neum
Carbon Organic Dissolved (mg/L)	1.4	0.58	0.4-0.8		none	
Carbon Organic Total (mg/L)	1.43	0.56	0.42-0.88		none	
Chlorate (mg/L)	20,557	0.025	0.01-0.05	0	1.0	health
Chloride Total (mg/L)	0.18	1.43	1.10-1.70	0	≤ 250	aesthetic
Chromium Total (µg/L)	0.09	0.07	< 0.05-0.09	0	50	health
Color Apparent (ACU)	13	1.1	<1-2		none	
Color True (TCU)	11	<1	<1	0	≤ 15	aesthetic
Conductivity (umhos/cm)	12	25	22-30		none	
Copper Total (µg/L)	3.6	<0.5	< 0.5	0	≤ 1000	aesthetic
Cyanide Total (mg/L)	<0.02	< 0.02	< 0.02	0	0.2	health
Fluoride (mg/L)	< 0.05	< 0.05	< 0.05	0	1.5	health
Hardness as CaCO3 (mg/L)	4.55	8.79	7.06-10.3		none	
Iron Dissolved (μg/L)	61	6	5-8		none	
Iron Total (µg/L)	143	8	<5-19	0	≤ 300	aesthetic
Lead Total (μg/L)	<0.5	<0.5	< 0.5	0	10	health
Magnesium Total (mg/L)	0.158	0.157	0.137-0.179		none	
Manganese Dissolved (μg/L)	4.7	4.4	2-8		none	
Manganese Total (μg/L)	5.9	4.9	2-9	0	≤ 50	aesthetic
Mercury Total (µg/L)	< 0.05	< 0.05	< 0.05	0	1	health
Nickel Total (µg/L)	<0.5	<0.5	< 0.5		none	
Nitrogen - Ammonia as N (mg/L)	< 0.02	< 0.02	< 0.02		none	
Nitrogen - Nitrate as N (mg/L)	0.07	0.07	0.02-0.11	0	10	health
Nitrogen - Nitrite as N (mg/L)	< 0.01	< 0.01	< 0.01	0	1.0	health
H	6.5	7.2	6.9-7.5	0	6.5 to 8.5	aesthetic
Phenols (µg/L)	<5	<5	<5		none	
Phosphorus Total (µg/L)	<5	<5	<5-6		none	
Potassium Total (mg/L)	0.163	0.163	0.138-0.184		none	
Residue Total (mg/L)	17	24	21-32		none	
Residue Total Dissolved (mg/L)	14	20	16-22	0	≤ 500	aesthetic
Residue Total Fixed (mg/L)	11	20	16-24		none	
Residue Total Volatile (mg/L)	6	5	3-8		none	
Selenium Total (μg/L)	<0.5	<0.5	<0.5	0	10	health
Silica as SiO ₂ (mg/L)	3.0	3.0	2.90-3.20		none	
Silver Total (µg/L)	<0.5	<0.5	< 0.5		none	
Sodium Total (mg/L)	0.54	1.41	1.22-1.53	0	≤ 200	aesthetic
Sulphate (mg/L)	1.2	2.8	2.4-3.3	0	≤ 500	aesthetic
Turbidity* (NTU)	0.72	0.06	0.05-0.09			
Uranium Total (μg/L)	0.018				<20	health
UV254 (Abs/cm)	0.064	0.009	0.005-0.014		none	
Zinc Total (µg/L)	<3	<3	<3	0	≤ 5000	aesthetic

These figures are average values from a number of laboratory analyses done throughout the year. Where the range is a single value no variation was measured for the samples analysed. Methods and terms are based on those of "Standard Methods of Water and Waste Water" 21st Edition 2005. Less than (*) denotes not detectable with the technique used for determination. Untreated water is from the intake or a sample site prior to coagulation, treated water is from a sample site downstream of SCFP clearwell. Guidelines are taken from "Guidelines for Canadian Drinking Water Quality - Sixth Edition" Health and Welfare Canada 1996, updated to Dec 2010. Seymour source water is filtered, treated with UV light for primary disinfection, sodium hypochlorite for secondary disinfection, lime to increase pH and alkalini and CO₂ to adjust pH. *Turbidities for raw and treated waters of Seymour source were taken from the data generated by SCFP on-line turbidity analyzers.



Physical and Chemical Analysis of Water Supply

Greater Vancouver Water District

2011 - Coquitlam Water System

	Untreated		Treated			
Dammatar		· .	D	Days	Canadian	Reason
<u>Parameter</u>	Average	Average	Range	Guideline	Guideline	The state of the s
A Ballaitu es Ca CO (ma II)				Exceeded	Limit	Establishe
Alkalinity as CaCO ₃ (mg/L)	1.38	8.58	5.2-10.3		none	
Aluminium Dissolved (mg/L)	0.064	0.063	0.051-0.068		none	
Aluminium Total (mg/L)	0.095	0.084	0.074-0.089		none	
Antimony Total (μg/L)	<0.5	<0.5	<0.5	0	6	health
Arsenic Total (μg/L)	<0.5	<0.5	< 0.5	0	10	health
Barium Total (µg/L)	2.5	2.3	2.2-2.5	0	1000	health
Boron Total (mg/L)	<0.01	< 0.01	< 0.01	0	5.0	health
Bronate (mg/L)		< 0.01	< 0.01	0	0.01	health
Bromide (mg/L)		< 0.01	< 0.01		none	
Cadmium Total (µg/L)	<0.2	<0.2	< 0.2	0	5	health
Calcium Total (mg/L)	0.873	0.877	0.784-0.900		none	
Carbon Organic Dissolved (mg/L)	1.45	1.39	1.20-1.80		none	
Carbon Organic Total (mg/L)	1.47	1.39	1.19-1.84		none	
Chlorate (mg/L)	C42.70m	<0.01	< 0.01	0	1.0	health
Chloride Total (mg/L)	0.39	1.87	1.5-2.9	0	≤ 250	aesthetic
Chromium Total (µg/L)	0.04	< 0.05	< 0.05	0	50	health
Color Apparent (ACU)	13	1.5	<1-2		none	
Color True (TCU)	11	<1	<1	0	≤ 15	aesthetic
Conductivity (umhos/cm)	8	27	16-38		none	
Copper Total (µg/L)	20	0.63	< 0.5-0.7	0	≤ 1000	aesthetic
Cyanide Total (mg/L)	<0.02	< 0.02	< 0.02	0	0.2	health
Fluoride (mg/L)	< 0.05	< 0.05	< 0.05	0	1.5	health
Hardness as CaCO3 (ing/L)	2.60	2.62	2.31-2.89		none	
Iron Dissolved (µg/L)	24	25	15-38		none	
Iron Total (µg/L)	55	53	39-73	0	≤ 300	aesthetic
Lead Total (µg/L)	0.7	<0.5	<0.5	0	10	health
Magnesium Total (mg/L)	0.103	0.104	0.085-0.120		none	neum
Manganese Dissolved (µg/L)	4.0	3.0	1.6-5.0		none	
Manganese Total (μg/L)	4.6	3.4	2.1-5.0	0	≤ 50	aesthetic
Mercury Total (µg/L)	<0.05	<0.05	< 0.05	0	1	health
Nickel Total (µg/L)	<0.5	<0.5	<0.5		none	neann
Nitrogen - Ammonia as N (mg/L)	<0.02	<0.02	< 0.02		none	
Nitrogen - Nitrate as N (ing/L)	0.10	0.10	0.07-0.13	0	10	health
Nitrogen - Nitrite as N (mg/L)	<0.01	<0.01	<0.01	0	1.0	health
pH	6.1	7.0	6.6-7.3	0	6.5 to 8.5	aesthetic
Phenols (ug/L)	<5	<5	<5	Ü	none	aestnetic
Phosphorus Total (μg/L)	<5	<5	<5		100000000000000000000000000000000000000	
Potassium Total (ng/L)	0.115	0.114	0.110-0.119		none	
Residue Total (mg/L)	14	27			none	
Residue Total (lig/L) Residue Total Dissolved (mg/L)	11		26-28	0	none	
Residue Total Dissolved (mg/L) Residue Total Fixed (mg/L)	9	24	21-27	0	≤ 500	aesthetic
Residue Total Volatile (mg/L)	6	20 7	18-23		none	
, ,			4-10	0	none	
Selenium Total (µg/L)	<0.5	<0.5	<0.5	0	10	health
Silica as SiO ₂ (mg/L)	2.5	2.5	2.1-2.7		none	
Silver Total (µg/L)	<0.5	<0.5	<0.5		none	
Sodium Total (ing/L)	0.49	5.36	5.01-5.86	0	≤ 200	aesthetic
Sulphate (mg/L)	0.69	0.70	0.60-0.80	0	≤ 500	aesthetic
Turbidity (NTU)	0.39	0.34	0.21-1.05			
Uranium Total (µg/L)	0.043			0	<20	health
UV254 (Abs/cm)	0.063	0.017	0.012-0.028		none	
UV254 App. (Abs/cm)	0.070	0.021	0.015-0.032		none	
Zinc Total (µg/L)	<3	<3	<3	0	≤ 5000	aesthetic

These figures are average values from a number of laboratory analyses done throughout the year. Where the range is a single value no variation was measured for the samples analysed. Methods and terms are based on those of "Standard Methods of Water and Waste Water" 21st Edizion 2005. Less than (<) denotes not detectable with the technique used for determination. Unreated water is from the intake prior to chlorination, treated water is from a single site in the GVWD distribution system downstream of chlorination. Guidelines are taken from "Guidelines for Canadian Drinking Water Quality - Swith Edizion" Health and Welfare Canada 1996, updated to Dec 2010. Guidelines are taken from "Guidelines for Canadian Drinking Water Quality - Swith Edizion" Health and Welfare Canada 1996, updated to Dec 2010. Coquition water is treated with ozone for primary disinfection, chlorine for secondary disinfection, sodium Carbonate to increase pH and alkalinity.

Appendix J – Toxicity Testing



8664 Commerce Court, Burnaby, BC V5A 4N7

WO#: 12539-540

Ms. Lesley Shelley Rescan Environmental Services Ltd. 1111 W. Hastings Street, 6th floor Vancouver, BC V6E 2J3

December 17, 2012

Dear Ms. Shelley:

Re: Toxicity testing on the sample identified as PP Effluent Tox test 1 (Collected on October 28, 2012)

Nautilus Environmental is pleased to provide you the results of the 96-h LC50 rainbow trout and the 48-h LC50 *Daphnia magna* toxicity tests on the above sample, received on October 29, 2012. Testing was conducted according to Environment Canada 1/RM/13, (Second Edition, 2000, with May 2007 amendments) and 1/RM/14, (Second Edition, 2000) protocols. By the client's request, the sample's initial pH of 9.0 was adjusted to 7.3 and 8.5 for rainbow trout and *D. magna*, respectively. The results of these tests are provided in the tables below and are based on the appended data. All other acceptability criteria outlined in the Environment Canada protocols were met.

Table A. Results for the 96-h rainbow trout test.

Sample ID	Collection Date and Time	96-h LC50 (%v/v) ¹
PP Effluent Tox test 1	October 28, 2012 @ 0200h	>100

Table B. Results for the 48-h *D. magna* tests.

Sample ID	Collection Date and Time	48-h LC50 (%v/v) [with 95% confidence limits] ¹
PP Effluent Tox test 1	October 28, 2012 @ 0200h	16.5 (14.5 – 18.8)

¹ Results relate only to the samples tested.

Please feel free to contact the undersigned at 604-420-8773 should you have any questions or require any additional information.

Yours truly,

Nautilus Environmental

Jacob Frank, B.Sc. Laboratory Biologist

Rainbow Trout Summary Sheet

Client: _	Rescan Environmental	Start Date/Time:	October 31/12 @ 1545
Work Order No.:	12539	Test Species:	Oncorhynchus mykiss
Sample Information:		Test Validity Criteri ≥ 90% control survival	a:
Sample ID:	PP Effluent Tox Test 1	WQ Ranges:	
Sample Date:	October 28/12 @ 0200		(L) = 7.0 to 10.3; pH = 5.5 to 8.5
Date Received:	October 29/12 @ 1300		
Sample Volume:	2 x 20L		
Other:	N/A		
Dilution Water:			
Type:	Dechlorinated Municipa	l Tap Water	
Hardness (mg/L CaCO	0 ₃):		
Alkalinity (mg/L CaCO	3):		
Test Organism Inform	nation:		
Batch No.:	092512		
Source:	Miracle Sping	js	
No. Fish/Volume (L):	10/15L		
Loading Density: _	0.49		
Mean Length ± SD (mr	m): 41 ± 4		nge: 35 - 48
Mean Weight ± SD (g)	0.73 ± 0.21	Rai	nge: 0.42 - 1.19
NaNO2 Reference To	xicant Results:		
Reference Toxicant ID	: RTNt27	· · · · · · · · · · · · · · · · · · ·	
Stock Solution ID:	12Nt01		
Date Initiated:	October 10/12		
96-h LC50 (95% CL):	8.1 (6.1 - 10.7) mg/L NaNO	2	
Reference Toxicant Me		0 (3.0 - 8.4) mg/L NaNO 30	2
Test Results:	The 96-h LC50 is >100% (v/v)		
Reviewed by:	Joh	Date revie	wed: Nov. 30/12

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Projects Sample I.D. W.O. # RBT Batch #: Date Collected Date Setup/Til Sample Setup D.O. meter: pH meter:	d/Tim me:	n e:	α	Ess to be to be DO-1 pH-1	126 097 097 207 3	1 39 2512 28 31	Tox +		1			7-d % Tota Aera Undi Pa To	Mo Il Pre- ition I luted rame emp ph D. (mg	°C g/L)	ion T djust le W	Q itial W	6.5	Ad IM USE	justm HCL d to a	ent dyst	30	15 9	-	
Cond. Meter:				C-1			•					Con	a. (µ:	S/cm)	(814		then	alta	- 4		18.3	1	
Concentration			# 5	Surviv	ors			7	Гетр	eratu	re (°C)	Diss	olved	Oxyg	jen (n	ng/L)			рН	:		1	uctivity 5/cm)
(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
CONT				10	10	10	10	14.0	14.5	146	146	146	10.1		9,8		9,8	7.1	7.0	68	6.8	48	40	47
6.25				10	10	10	10	14.0	14.5	145	4.5				99	9.9	1/1		6.9		6,5	69	225	235
12.5				10	10	10	10	14.0	14.5	115	146	145	99	9.7	8,8	98	99	7.1	7,0	69	6.9	69	491	462
25				10	10	10	10	145	14.5	146	146	146	13	9.7	99	9.8	9.8	7.4	69	6,9	6.8	40	626	611
50				10	10	10	10	14.5	145	146	146	146	9.9	9.7	9,9	9.8	9.8	7.2	6.9	ري	6.9	6,5	1103	1086
100				10	10	10	D	14.5	14.5	ins	146	146	99	9.8	9,9	9,9	98	7.3	6.7	69	69	69	18.39	1802
																				•				
			-																					
Initials				33F	_	^	_	JBF	SBP	^	~	~	SBF	JBF	^	~	~	SBF	13F		-	_	73L	~
WQ Ranges: T	(°C)	= 15	± 1; [00 (m	g/L) =	7.01	o 10.	3; pH	= 5.5	to 8.	5													
Sample Descri	ption/	/Comr	nents	3 :	<u></u>	ear	-						-				-							
Fish Description	n at 9	96?		all	1	<u>h</u>	04								-									
Other Observa	tions:		-																				. 3. 7	
Reviewed by:				16h		14.35										Date	Revie	ewed:		No	Vr	30/1	<u>, </u>	

Daphnia magna Summary Sheet

Start Date/Time: Nov 1//2 @ 1045h Daphnia magna Set up by: KLB
Set up by: KLB
Sample Information: Sample ID: PP EFFILIENT TOX 19SH 1. Sample Date: Oct 28 / 12. Date Received: Oct 29 / 12. Sample Volume: 2 x 20 L . WQ Ranges: T (*C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5 Test Organism Information: Broodstock No.: Age of young (Day 0): < 24 hours Age of young (Day 0): < 24 hours Avg No. young per brood in previous 7 d: O. Days to first brood: Q NaCI Reference Toxicant Results: Reference Toxicant ID: DM 90 Stock Solution ID: DX NA 02 Date Initiated: DW MBM 0A 22 / 12. Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Sample ID:
Sample ID: PP EFFLUENT Tox test 1. 2 90% mean control survival (no more than 2 mortalities in any control replicate) Sample Date: Oct 29 / 12. WQ Ranges: Date Received: 2 x 20 L . WQ Ranges: Test Organism Information: T (*C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5 Test Organism Information: Broodstock No.: LOLOV2 A Age of young (Day 0): < 24 hours
Sample ID:
Sample ID:
Sample Date: Oct 28 / 12 WQ Ranges: Date Received: 2 x 20 L . WQ Ranges: Test Organism Information: T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5 Test Organism Information: Broodstock No.: Age of young (Day 0): Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: NaCI Reference Toxicant Results: Reference Toxicant ID: Dim 90 Stock Solution ID: 12 NA 02 Date Initiated: 3w NBO Oct 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Date Received: Oct 29 / 12 WQ Ranges: Sample Volume: 2 x 20 L . T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5 Test Organism Information: Broodstock No.: IOIOV2 A
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5
Test Organism Information: Broodstock No.: IDIO02 A Age of young (Day 0): < 24 hours Avg No. young per brood in previous 7 d: 22 Mortality (%) in previous 7 d: 0 Days to first brood: 9 NaCl Reference Toxicant Results: Reference Toxicant ID: DM 90 Stock Solution ID: 12 NA 02 Date Initiated: JW DBY 031 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Broodstock No.: Age of young (Day 0): Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: NaCl Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Date Initiated: John 40 12 NA 02 Date Initiated: Alw 004 004 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Broodstock No.: Age of young (Day 0): Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: NaCl Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Date Initiated: John 40 12 NA 02 Date Initiated: Alw 004 004 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Broodstock No.: Age of young (Day 0): Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: NaCl Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Date Initiated: 3
Broodstock No.: Age of young (Day 0): Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: NaCl Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Date Initiated: John 40 12 NA 02 Date Initiated: Alw 004 004 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Age of young (Day 0): Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: NaCl Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Days to first brood: Days to first brood: Reference Toxicant ID: 12 NA 02 Date Initiated: Day Ager Oct 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Age of young (Day 0): Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: NaCl Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Days to first brood: Days to first brood: Reference Toxicant ID: 12 NA 02 Date Initiated: Day Ager Oct 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/L NaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Avg No. young per brood in previous 7 d: Mortality (%) in previous 7 d: Days to first brood: Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Dm 90 Stock Solution ID: Date Initiated: Jw Met Oct 22/12 48-h LC50 (95% CL): Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Mortality (%) in previous 7 d: Days to first brood: NaCl Reference Toxicant Results: Reference Toxicant ID: Stock Solution ID: Dm 90 Stock Solution ID: Dm 90 Stock Solution ID: Date Initiated: JW 004 004 22 / 12 48-h LC50 (95% CL): Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
NaCl Reference Toxicant Results: Reference Toxicant ID: Dm 90 Stock Solution ID: 12 NG 02 Date Initiated: JM MOT OCI 22/12 48-h LC50 (95% CL): 3.9 (3.2-4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6-4.4) g/L NaCL
NaCl Reference Toxicant Results: Reference Toxicant ID: Dm 90 Stock Solution ID: 12 N9 02 Date Initiated: JM Net 004 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Reference Toxicant ID: Dm 90 Stock Solution ID: 12 N9 02 Date Initiated: JM Med 004 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Reference Toxicant ID: Dm 90 Stock Solution ID: 12 N9 02 Date Initiated: JM Med 004 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Reference Toxicant ID: Dm 90 Stock Solution ID: 12 N9 02 Date Initiated: JM Med 004 22 / 12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Stock Solution ID: 12 NG 02 Date Initiated: JNA 02 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Stock Solution ID: 12 NG 02 Date Initiated: JNA 02 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Date Initiated: 3N New Oct 22/12 48-h LC50 (95% CL): 3.9 (3.2 - 4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
48-h LC50 (95% CL): 3.9 (3.2-4.9) g/LNaCL Reference Toxicant Mean and Historical Range: 4.0 (3.6-4.4) g/L NaCL
Reference Toxicant Mean and Historical Range: 4.0 (3.6 - 4.4) g/L NaCL
Reference Toxicant CV (%):
Test Results: The 48h LC50 is estimated at 16.5 % (V/V) w/ 95 % confidence limits
01 11 6 % A 18 % % (V/VI).
at 14.5 % & 18.8 % (V/V).
41 H-3 10 0 10 (V) V)
41 H-3 10 - 10.0 10 (4/4)
Reviewed by: Date reviewed: Nov. 30/12

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Sample ID: Work Order No.:	hesco PPEAT 1954	luent					No. O	rganisms Test C	s/volun)rganis	ne: Nox ne: 10/2 sm: D.mag by: Y.J.	00mL gna		1045	ih
DO meter:	DO-1				рΗι	meter: _				Conduc	٠.	meter:	C-1	. :
Concentration % (v/v)		lumber Organi		No. Immobilized	Ter	mperatu (°C)	ire	Dissolve (m	ed oxyg g/L)	jen	рН			uctivity /cm)
76 (V/V)	ПСР	24	48	48	0	24	48	0 2	24 4	8 0	24	48	0	48
Control	Α	10	60	0	19,0	20.0	ડિ આ	9,0	۶	4 8.1		20	355	361
	В													
	С				Section 1					114 100 = 100				100 May 2
	. D	10			10 -	0.0	W	0.0		0 0			(1-0	1:00
6.25	A	10	0	0,	19.0	20.0	ro,o	9,0	2	3 8.0		ارع	478	477
	В	-											145 (E.S.)	
	C									5000 Exc. 860			Halling.	
12.5	D A	10	9	6	19.0	20.0	200	90	2	-380		8.1	599	591
12.5	В	10	7	A.T.	1,10	QU.U	<i>(</i> ,	1,0		7 0.0				3 7 1
	С													
	D							466						
25	Α	10	0	-	19,5	20.0	ج,م2	9.0	8	-3 8.1		£3	808	fus
	В			:				A STATE OF THE STA			ę.			in the second
	C													
	D													
50	Α	10	O		19,5	50.0	حما	9.0		2481		24	1199	1199
	В													
	С	<u> </u>				h. 4								
	D							6.0		0.5			10.4	
100	Α	0			19.5	90.0		9,0	6	8.5			1816	
	В			1				SHARES ST				1605	1888	
	C D											200		Manager 1
Toohnisian I		TUB	Xno		VIR	rub	_	rub		~ YUB		٦	VIR	1
Technician Ir WQ Ranges: T			361	/L) = 3.6 to 9.4:		1		ad 1001 (ala			(.6)-	19.5	H-9,2	ICOS
100% Unadjusk	. ,								J	we-	(mgit)	9.0	tond bush	199 FF 5 (m)
100 r Unadjus	Hardness	•	LINC	Alkalinity*				Initial W	vo T	Adjustme	ent	Time.	Adjusted	wo
Conc.			/L as C			Temp (°	°C)	19.5				19		
Control (MHW)	100	2	-	10		DO (mg	/L)	9.1				9.	0	
Highest conc.	10(ĠO_		2 4		pН		9,2	611	adjusted wi	HCR	8.		
						Cond (µ	iS/cm)	1799			4		316	A 22
Sample Descrip	tion:	<u></u>	ear						PHO	idjusted	(100	51.610) prios	to diluti
Comments:	Batch#:	101012A	7-d pre	evious # young/bro	ood: a	\mathcal{L}	Day of	1st Brood	q	Previo	us 7-d	% Morta	ality: 💍	veguest
Reviewed by:			JOU	_		_ Dat	e rev	ewed:		De	e. 6	112	· · · · · · · · · · · · · · · · · · ·	·

CETIS Analytical Report

Report Date: Test Code: 14 Nov-12 15:35 (p 1 of 1) 12540 | 12-2953-4277

Daphnia magna 48-h Acute Survival Test

Nautilus Environmental

Dapinna magi	la 40-11 Acute Cui VI	vai 103t			Naudius Environmental
Analysis ID: Analyzed:	11-2283-3661 14 Nov-12 15:34	Endpoint: Analysis:	48h Survival Rate Untrimmed Spearman-Kärber	CETIS Ver Official Re	
Batch ID:	19-0860-3573	Test Type:	Survival (48h)	Analyst:	Jeslin Wijaya
Start Date:	01 Nov-12 10:45	Protocol:	EC/EPS 1/RM/14	Diluent:	Mod-Hard Synthetic Water
Ending Date:	03 Nov-12 11:30	Species:	Daphnia magna	Brine:	
Duration:	49h	Source:	In-House Culture	Age:	<24h
Sample ID:	09-2962-7616	Code:	3768FDE0	Client:	Rescan
Sample Date:	28 Oct-12 02:00	Material:	Water Sample	Project:	
Receive Date:	29 Oct-12 13:00	Source:	Rescan		
Sample Age:	4d 9h (11.2 °C)	Station:	PP Effluent		

Spearman-Kärber Estimates

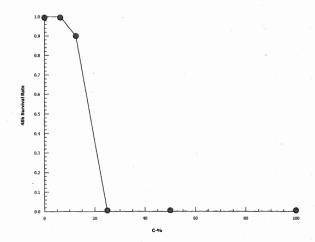
Threshold Option	Threshold	Trim	Mu ·	Sigma	EC50	95% LCL	95% UCL	
Control Threshold	0	0.00%	1.217	0.02856	16.49	14.46	18.81	

vival Rate Summary				Cal	culated Varia	ite(A/B)				
Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
Negative Control	1	1	1 .	1	0	0	0.0%	0.0%	10	10
	1	1	1	1	0	0	0.0%	0.0%	10	10
	1	0.9	0.9	0.9	0	0	0.0%	10.0%	9	10
	1	0	0	0	- , , 0	0		100.0%	0	10
	1	0	0	0	0	0		100.0%	0	10
	1	0	0	0	0	0 -		100.0%	0	10
•	Control Type	Control Type Count	Control Type Count Mean Negative Control 1 1 1 1	Control TypeCountMeanMinNegative Control1111111	Control Type Count Mean Min Max Negative Control 1 1 1 1 1 1 1 1 1	Control Type Count Mean Min Max Std Err Negative Control 1 1 1 1 0 1 1 1 1 0	Control Type Count Mean Min Max Std Err Std Dev Negative Control 1 1 1 1 0 0 1 1 1 1 0 0	Control Type Count Mean Min Max Std Err Std Dev CV% Negative Control 1 1 1 1 0 0 0.0% 1 1 1 1 0 0 0.0%	Control Type Count Mean Min Max Std Err Std Dev CV% %Effect Negative Control 1 1 1 1 0 0 0.0% 0.0% 1 1 1 1 0 0 0.0% 0.0% 1 0.9 0.9 0.9 0 0 0.0% 10.0% 1 0 0 0 0 0 100.0% 1 0 0 0 0 0 100.0%	Control Type Count Mean Min Max Std Err Std Dev CV% %Effect A Negative Control 1 1 1 1 0 0 0.0% 0.0% 10 1 1 1 1 0 0 0.0% 0.0% 10 1 0.9 0.9 0.9 0 0 0.0% 10.0% 9 1 0 0 0 0 0 100.0% 0 1 0 0 0 0 0 100.0% 0

48h Survival Rate Detail

C-%	Control Type	Rep 1	
0	Negative Control	1	
6.25		1	
12.5		0.9	
25		0	
50		0	
100		0	

Graphics



W.O.#: 12540

Hardness and Alkalinity Datasheet

			Alkalinity							
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO ₄ used to pH 4.2	Total Alkalinity (mg/LCaCO ₃)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L CaCO₃)	Techniciai
PP Effluent	Noville END	50	1.3	1,4	14		(OO	10.6		Emm
MHW	Noviliz	50	3.6	3.7	24 76		50	5.0	100	rus
		14 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -								
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	<u> L</u>	L	<u> </u>	1						<u> </u>
		Notes: @	Diluted t	à locme mi	D.I. wate					
Reviewed by:		. 7/	Gh.		Date Revie			Non	, 30/12	

Nautilus Environmental

Chain of Custody (electronic)

Sample Collection By:								ANALYSES REQUIRED								
odinpie conceitori by.	Report to	:		· · ·	Invoice to:			toxic	Π						့	
Company	Rescan F	nvironmenta	nl .		Rescan Enviro	Trout Toxi	na t			-				Receipt Temperature (°C)		
Address	1111 West Hasting Street				1111 West Ha		nag							ratı		
City/Prov/Postal Code	Vancouver, BC, V6E 2J3				Vancouver, BC, V6E 2J3			ia n			-				edι	
Contact	Lesley Shelley or Kelsey Norlund				Lesley Shelley or Kelsey Norlund			apr							l el	
Phone	604-689-9	9460			Vancouver, BC, V6E 2J3 Lesley Shelley or Kelsey Norlund 604-689-9460			e D							효	
Email	Ishelley@	rescan.com;	knorlund@	rescan.com		Acute	Acute Dapnia magna							ece		
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER	# OF CONTAINERS	COMMENTS	96 hr./	48 hr	·.						œ ·	
PP Effluent Tox Test	Crt 281	2 0200h	Water	20L	2	·	X	Х							11.2	
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							253	28	\vdash		,					
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							10	<u> </u>								
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PROJECT INFORMATION		SAMPLE RECEIPT			RELIQUINSHED BY (CLIENT)				RELIQUINSHED BY (COURIER)							
Client:		Total # Containers:			Signature:				Signature:							
P.O. No.:		Good Condition?			Print:					Print:						
					Company:					Company:						
Shipped Via:		Matches Schedule?			Time/Date:				Time/Date:							
										DECEMED BY (LABORATORY)						

SPECIAL INSTRUCTIONS/COMMENTS:

Identify sample as Rescan Project # 868-021-01 on invoices

RECEIVED BY (COURIER) |RECEIVED BY (LABORATORY)

Signature: Signature: Print: Print:

Company: Company: Time/Date: Time/Date: