

Snell & Wilmer
LLP
LAW OFFICES

15 West South Temple
Suite 1200
Beneficial Tower
Salt Lake City, UT 84101
801.257.1900
801.257.1800 (Fax)
www.swlaw.com

Denise A. Dragoo, Esq.
(801) 257-1998
ddragoo@swlaw.com

COPY

C/015/032 Incoming

3724

Q

DENVER
LAS VEGAS
ORANGE COUNTY
PHOENIX
SALT LAKE CITY
TUCSON

January 10, 2011
HAND DELIVERED

Ms. Dana Dean, P.E.
Associate Director
Utah Division of Oil, Gas and Mining
1594 West North Temple
Salt Lake City, Utah 84116

RE: Crandall Canyon Mine, C/015/032; Division Order 10A; Response to Division Letter of December 21, 2010

Dear Ms. Dean:

On behalf of Genwal Resources, Inc., enclosed is a copy of Genwal's December 14, 2010 response to Division Order 10A (Task #3582), which was inadvertently omitted from our delivery to you on Thursday, January 6, 2011. Also, please discard the Tables labeled Boise AYCT Q3/Q4 2008 & Q1 2009 QTD and SLC AYCT Q4 2008 & Q1 2009 QRD, copies enclosed.

Please let me know if you have further questions regarding this response.

Very truly yours,



Denise A. Dragoo

DD:jmc
Enclosures

File in:

- Confidential
- Shelf
- Expandable

In *C/0150032 Incoming*
Date: *01/10/2011*. For additional information

RECEIVED

JAN 10 2011

DIV. OF OIL, GAS & MINING



COPY

P.O. Box 910, East Carbon, Utah 84520 794 North "C" Canyon Rd, East Carbon, Utah 84520
Telephone (435) 888-4000 Fax (435) 888-4002

Daron Haddock
Permit Supervisor
Utah Division of Oil, Gas and Mining
P.O. Box 145801
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801

December 14, 2010

Re: Crandall Canyon Mines, C/015/032
Division Order 10A
Response to Task #3582
Bullet Items 1, 3 and 4

Dear Mr. Haddock:

Enclosed are six (6 ea.) copies of the response to Task #3582 (letter of July 15, 2010), additional informational requests (bullet items 1, 3 and 4 of Section 1) as defined in the Revised Stipulation of November 4, 2010. Response to bullet items 2 and 5 were submitted on November 30, 2010.

Bullet item 1 (*deletion of any previously approved language.....*) is covered under the amended narrative language for Appendix 7-65, included herein.

Bullet item 3 (*a summary/chronology of the experimental process.....*) is covered under the various stand-alone attachments included herein, which area not submitted for inclusion in the MRP.

Bullet item 4 (*a discussion of the iron sludge disposal options.....*) is covered in the Appendix 7-65 narrative and also under a separate submittal of a change to the Centennial (Tower) MRP C/007/019), submitted to your office on December 14, 2010.

If you have any questions or comments regarding this submittal please contact me at 435 888-4017.

Sincerely,

David Shaver
Resident Agent

cc: Denise Dragoo, Esq.

APPLICATION FOR PERMIT PROCESSING

Permit Change
 New Permit
 Renewal
 Transfer
 Exploration
 Bond Release

Permit Number: 015/032

Title of Proposal: Response to Division Order DO10A, Task #3582

Mine: Crandall Canyon Mines

Bullet items 1,3 and 4

Permittee: GENWAL Resources, Inc.

Description, include reason for application and timing required to implement.

Instructions: If you answer yes to any of the first 8 questions (gray), submit the application to the Salt Lake Office. Otherwise, you may submit it to your reclamation specialist.

- Yes No 1. Change in the size of the Permit Area? _____ acres Disturbed Area? _____ acres increase decrease.
- Yes No 2. Is the application submitted as a result of a Division Order?
- Yes No 3. Does application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes No 4. Does application include operations in hydrologic basins other than as currently approved?
- Yes No 5. Does application result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes No 6. Does the application require or include public notice/publication?
- Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- Yes No 9. Is the application submitted as a result of a Violation?
- Yes No 10. Is the application submitted as a result of other laws or regulations or policies? Explain:
- Yes No 11. Does the application affect the surface landowner or change the post mining land use?
- Yes No 12. Does the application require or include underground design or mine sequence and timing?
- Yes No 13. Does the application require or include collection and reporting of any baseline information?
- Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- Yes No 15. Does application require or include soil removal, storage or placement?
- Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
- Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- Yes No 19. Does the application require or include certified designs, maps, or calculations?
- Yes No 20. Does the application require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided for?
- Yes No 22. Does application involve a perennial stream, a stream buffer zone or discharges to a stream?
- Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Attach 3 complete copies of the application.

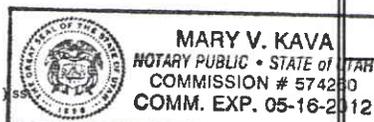
I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein. (R645-301-123)

Received by Oil, Gas & Mining

Signed: Name - Position - Date

Subscribed and sworn to before me this 12th day of December, 2010

Mary V. Kava
 Notary Public
 My Commission Expires: May 16, 2012
 Attest: STATE OF UTAH
 COUNTY OF Carbon



ASSIGNED TRACKING NUMBER

**GENWAL RESOURCES, INC
CRANDALL CANYON MINES
C/015/032**

THIS SUBMITTAL IS IN RESPONSE TO:

**DIVISION ORDER DO10A
REVISED STIPULATION NOVEMBER 4, 2010
ADDITIONAL INFORMATIONAL REQUESTS
TO ADDRESS TASK #3582
(BULLET ITEMS 1, 3 and 4)**

SUBMITTED: DECEMBER 14, 2010

SLC AYCT Q4 2008 & Q1 2009 QTD

	Ogden	Riverdale	Bountiful	33Rd South	66th South	Tooele	American Fork	Orem	YOY
Oct. 08	110	125	80	86	71	52	35	71	630
Oct. 07	101	115	76	122	97	65	56	70	712
% change	9%	9%	5%	-30%	-37%	-20%	-47%	1%	-12%

Nov. 08	162	259	105	135	79	72	57	131	1000
Nov. 07	89	116	66	73	145	64	73	87	771
% change	82%	123%	59%	85%	-46%	14%	-21%	35%	39%

Dec. 08	284	319	149	187	151	105	87	168	1450
Dec. 07	272	220	153	253	148	152	135	153	1466
% change	4%	45%	3%	-26%	2%	-31%	-20%	10%	-1%

Feb. 09	5	16	7	9	4	3	1	8	53
Feb. 08	223	187	84	180	122	99	98	117	1110
% change								Run Rate	186

Boise AYCT Q3/Q4 2008 & Q1 2009 QTD

	Caldwell	Front	Meridian	Nampa	Orchard	YOY
Jul. 08	176	82	86	170	77	591
Jul. 07	90	66	65	117	65	403
% change	49%	20%	24%	31%	16%	32%

Aug. 08	173	101	101	179	94	648
Aug. 07	124	117	129	156	258	784
% change	28%	-16%	-28%	13%	-174%	-21%

Sept. 08	159	81	100	92	190	622
Sept. 07	108	107	111	213	155	694
% change	32%	-32%	-11%	-132%	18%	-12%

Oct. 08	132	99	112	153	110	606
Oct. 07	91	90	87	187	98	553
% change	31%	9%	22%	-22%	11%	9%

Nov. 08	137	75	108	57	101	578
Nov. 07	133	71	92	210	97	603
% change	3%	5%	15%	-34%	4%	-5%

Dec. 08	194	119	121	346	154	934
Dec. 07	248	139	169	401	147	1104
% change	-28%	-17%	-40%	-16%	5%	-18%

Jan. 09	0	0	0	0	0	0
Jan. 08	13	13	13	13	13	52
% change	-100%	-100%	-100%	-100%	-100%	-100%

Feb. 09	0	5	0	8	3	16
Feb. 08	257	122	136	338	146	999
% change	#DIV/0!	-2340%	#DIV/0!	-4125%	-4767%	-6144%

APPENDIX 7-65

REPLACEMENT PAGES

APPENDIX 7-65

CRANDALL CANYON MINE MINE DISCHARGE WATER IRON TREATMENT FACILITY

Discussion

Attachment 1	Maelstrom Oxidizer Unit
Attachment 2	Iron Treatment Bench Test Results, and Settling Basin Volume Determination
Attachment 3	Pit Liner Information
Attachment 4	Wildcat Sediment Pond C Volume Determination
Attachment 5	Settling Basin Clean-up Volume Estimation
Attachment 6	Drainage Information
Attachment 7	Safety Factor Determination
Attachment 8	Construction Specifications and Drawings
Attachment 9	Temporary Use of Crandall Sediment Pond
Attachment 10	MSDS Sheets for Nalco 7763 and Nalco 8187

DISCUSSION

BACKGROUND

As a result of the Crandall Canyon Mine disaster of August 6, 2007, the mine has been de-activated and the portals have been sealed. Mine water inflow has built up to the extent that water is now discharging from the portals and is discharged through a 12" pipe into Crandall Creek under UPDES permit UT0024368. The mine is presently discharging approximately 500 gallons per minute, with the flow fluctuating with barometric pressure and seasons. In early 2009 the iron concentrations in the water began to exceed UPDES limits. By the summer of 2009, Crandall Creek below the mine began to display an orange discoloration from the iron staining, resulting in violations from both DOGM and Division of Water Quality. Because there is no way to treat the water underground the company has constructed an aeration treatment system located on the surface in the "old loadout" area, immediately below the portal bench. In concept, the facility consists of **three** basic components; 1) an aeration devise (**a.k.a., "maelstrom" unit**) which allows atmospheric oxygen to chemically react with the dissolved iron in the water, thereby creating iron particulates, 2) **a chemical injection system which adds a coagulant (ahead of the maelstrom) and a flocculant (after the maelstrom), to enhance particle settling,** and 3) a settling basin which allows the iron particulates to settle out of the water. (See Attachment 8 for the construction specifications and engineering drawings for the facility. Attachment 8 also contains an as-built drawing of the treatment facility as of November, 2010. It should be noted that construction is on-going as new improvements continue to be added.)

INSTALLATION OF SETTLING BASIN

A new 12" HDPE pipeline has been tapped into the existing discharge line from the mine near the upper portals and extends to the new facility. It is equipped with shutoff valves, which allows the flow of mine water to be routed down to the treatment facility, or bypassed directly to the existing UPDES outfall. This line is supported by cables attached to bolts drilled into the ledgerrock and epoxied in place.

The settling basin is contained on three sides by an earthen berm constructed from a structural granular borrow material. The berm was constructed in 8" lifts and compacted to 90% density using vibratory sheeps-foot mechanical compacting equipment, and the embankments do not exceed 2.5H/1V sideslopes. As shown in Attachment 7, the berm has been designed and constructed to achieve a 1.3 safety factor. Attachment 7 also includes geotechnical information about the granular borrow material used for construction of the berm. The settling basin and berm are constructed in the area previously referred to as the "Old Loadout Area". To make room for this old loadout, a large enclave was blasted out of the solid ledgerrock in the past. This blasted rock was then used as fill material to extend the loadout area, and to construct the

adjacent Forest Service road. This area was originally compacted for construction purposes, but was also compacted even more through many years of loading operations involving loaded trucks and front-end loaders operating on the site. Prior to constructing the settling basin berm all loose material was removed from the site, revealing the underlying compacted rock subsurface. Therefore, the foundational material for the berm and basin is either the solid sandstone bedrock from the original ledge, or else the highly compacted rock material located next to it. Refer to Figure 1 of Attachment 8, which shows the extent of the solid bedrock underlying the basin and berm. It should also be noted that the inner portion of the basin containment is constructed from a pre-existing concrete wall. This wall is a massive 12" thick, reinforced concrete structure which was part of the original "old loadout" system.

The berm is ringed on top with a double row of concrete Jersey barriers placed side-by-side with the intervening space filled with earthen material for added stability. The remaining side of the basin is constructed from the 12" thick pre-existing concrete wall mentioned above. The Jersey barriers on the earth berm, along with the existing concrete wall left over from the old loadout, define the limits of the settling basin. The barriers also provide public safety by keeping vehicular traffic, foot traffic and animals from entering the basin area.

The interior of the basin is lined with a pit liner similar to that used for containing drilling fluids in drilling operations. (See Attachment 3 for additional information on the liner material.) The pit liner is secured around the perimeter by tucking it into the space between the barrier walls and backfilling with earth material. A felt underlining was also placed down before (below) the pit liner to provide protection against damage. A chain link fence is installed around the basin atop the barriers to provide additional public security.

The outslopes of the berm have been covered with a layer of gravel to help prevent erosion and maintain stability. Also, the outer toe of the berm located adjacent to the Forest Service road has been armored with concrete jersey barriers sufficient to prevent potential erosion from surface runoff along the road.

Prior to constructing the berm and placing the pit-liner, an underdrain system was installed in the area of the basin. This underdrain system consists of cleaned drain rock and perforated drainpipe placed in a trench running along the upper toe of the berm at the lower (down-dip) end of the basin. The drain is then routed in a buried 4" pipe to the main discharge line. This underdrain system is designed to carry any water, possibly coming from pin-hole leaks in the pit liner, directly out from the basin so that it cannot saturate any portion of the berm. The pit liner is fabricated and fused as a single piece and is not expected to leak, but the underdrain system was installed as a measure of added insurance. As mentioned previously, the berm has been constructed on the site of the old loadout which was constructed on both solid rock blasted out of the ledge, and on previously compacted structural fill material.

INSTALLATION OF THE MAELSTROM UNIT

The treatment facility consists of a manufactured mechanical aeration device known as the "Maelstrom Oxidizer Unit". (See Attachment 1 for additional information regarding this

unit.) This oxidizer unit consists of a pre-fabricated high-density plastic structure equipped with a series of baffles and a 20 hp blower. The mine water is fed into one end of the unit where it then travels a serpentine route over and under the baffles, and at the same time, a large volume of air is forced through the water by way of a number of nozzles located in the bottom of the unit. The unit has been sized according to the anticipated flow rate, such that the dissolved oxygen in the water as it exits from the unit is nearly 100%. The high oxygen content then reacts chemically to change the dissolved iron from the ferrous state to the ferric state, which forms iron precipitates which can then be settled out. The maelstrom unit is located ahead of the settling basin, and is also the focal point for the injection of the coagulant and flocculant treatment processes and the sludge re-circulation system described below.

INSTALLATION OF CHEMICAL INJECTION SYSTEM

Based on field trials it was determined that, in order to successfully settle out the iron it was necessary to add a chemical coagulant to the water ahead of the maelstrom, and also add a chemical flocculant to the water after the maelstrom. The coagulant presently used is an aluminum chloride compound, specifically Nalco 8187. This coagulant provides the “seed” mechanism for the iron to adhere to as it goes through the oxidation process. After being oxidized the coagulated ferric iron particles are still too small to settle out on their own. Therefore, a flocculant is injected into the water after it exits from the maelstrom. The flocculant is a polyacrylamide, specifically Nalco 7763. The treated water is then allowed to sent to a settling basin. The MSDS sheets for both Nalco 8187 and Nalco 7763 is included in Attachment 10.

The chemical treatment equipment is housed within a pre-existing shed located adjacent to the settling basin. The shed has been retrofitted to accommodate the chemical injection apparatus, including new roofing, interior walls, insulation, heating, and lighting. Two overhead equipment doors have been installed to allow storage bulk storage of the chemicals within the shed, and a 2-ton jib crane has been installed to allow handling of the chemical storage totes. A 4" water line was installed, tapping off the main discharge line, to bring a continuous supply of mine water into the treatment shed. The shed is divided into two bays; a storage bay and a treatment bay. Both bays are heated and insulated. The storage bay is designed to store up to seven totes of coagulant and two totes of flocculant. The bay also can store up to 5000 gallons of clean water to be used as make-up water for the chemical system.

The treatment bay houses the chemical mixing and injection system. The coagulant is injected into the discharge water through an adjustable metering pump. This chemical is added to the 4" split of minewater and then piped out of the shed, where it is injected into the main flow of mine discharge water immediately ahead of the maelstrom unit. The flocculant chemical is premixed in a factory-built make-down unit. This unit automatically batches up a pre-determined quantity of concentrated floc solution which can then be used on an as-needed basis. During the batching process, the floc is pumped from the factory-supplied tote into the make-down unit through an adjustable-rate metering pump. At the same time, clean make-up water (stored in tanks in the adjacent storage bay) is pumped into the make-down unit at a controlled rate. This produces a floc solution with a consistent, known and pre-determined concentration. This

solution is then pumped (at an adjustable rate) into a separate split of push water which is then pumped out of the shed and injected into the mine discharge water at the outlet end of the maelstrom unit, prior to discharge into the settling basin.

The treatment facility is presently (as of November 25, 2010) being upgraded so that all elements of the chemical treatment can be automatically controlled and monitored. A flow meter will be installed at the inlet to the maelstrom unit to give a continuous electronic reading of the mine-water flow. This flow rate will be sent back to a programmable controller which will automatically adjust the injection rate of both the coagulant and the flocculant as the mine-water discharge rate varies. This will allow the system to maintain a consistent level of chemical dosage at all times, and will allow the operators to easily make fine-tune adjustments of the chemical injection rates. The programmable controller will also constantly monitor the operational status of the facility, and can immediately send warning messages and alarms to company personnel in remote locations via computer interface if any part of the system needs maintenance or repair. The programmable controller will also keep data-base records of chemical usage, flow rates, and unplanned outages.

The treatment shed has been set up to allow storage of four totes of coagulant and one tote of flocculant. At current injection rates, this will allow the system to operate about six weeks before requiring refill of the coagulant storage, and about 6 months for the flocculant. However, addition stores of both chemical will always be available in the adjacent storage bay which can easily be pumped into the treatment bay storage totes. Therefore, the facility has been designed to operate on a long-term continuous basis without requiring any chemical replacement supply disruptions.

At present (November 25, 2010) the facility has been successfully treating the mine discharge water so that all UPDES compliance levels have been met for the past 9 months since March, 2010. However, the company is now implementing measures to minimize the amounts of both the coagulant and flocculant used in the treatment process. For example, the automated (programmable controller) control and monitoring system will allow precise fine-tuning of the chemical injection rate to the minimum needed for regulatory compliance.

As mentioned previously, the purpose of the coagulant is to provide seed particles for the oxygenated ferric iron to adhere to in preparation for settling. In an attempt to reduce the amount of coagulant usage, the company has also experimented with re-circulation of the iron sludge back through the maelstrom unit. In theory, the precipitated iron particles in the re-circulated sludge can then provide the seed particles for the mine-water ferric iron to adhere to, thus reducing the need for the aluminum chloride coagulant to accomplish the same function. Toward this end, the company has installed six intake suction manifolds in the upper bay of the settling basin. From these manifolds, concentrated iron sludge material is pumped back into the inlet end of the maelstrom unit over and over again. This re-circulation system now appears to be effective in holding down the necessary dosage of coagulant. However, since the flocculant make-down unit (described above) was only recently installed, and has not yet been fully adjusted, the full extent of the efficacy of the sludge re-circulation system is not yet known. This is because there are multiple variables affecting the ultimate treatment parameters, including

mine-water discharge rate, coagulant injection rate, flocculant injection rate, and re-circulation concentration and volume rate. Due to the on-going, inter-related chemical reactions required for successful treatment, each variable affects all the others, and makes qualitative analysis of the individual variable somewhat more complicated and time-consuming. However, efforts to fine-tune the system in an effort to reduce the overall chemical consumption continues.

~~Samples of the Crandall mine water were sent to the factory for bench testing and the results were very encouraging, showing treated water well within UPDES compliance levels. (Results of the bench test are included in Attachment 2.)~~

While the bench testing indicates that the iron should settle in 5.5 hours sufficient to meet UPDES compliance levels, the option remains open to treat the water with chemical flocculants as well if needed to enhance the settling rate. Previous bench tests conducted by Nalco Chemical showed that particle settling rates can be greatly accelerated through the application of a small amount of chemical additives. Electric power has been installed to the unit which could be utilized in the future for a chemical pumping/injection system. However, a simpler and perhaps more dependable system would involve the use of chemical gel-logs. These logs are designed to be immersed in to stream flow after aeration and dissolve at a predetermined rate in order to add the proper amount of chemical flocculant to the discharge water ahead of the settling basin. Typically, such gel-log applications can operate for several weeks without requiring attendance. The oxidizer unit has been constructed such that if, in the future, iron levels in the mine-water increase sufficiently to the extent that chemical treatment is required in addition to the oxidization, either a chemical injection system or gel-log chamber can easily be fitted to the unit.

The chemically treated water from the oxidizer unit is then sent to the settling basin. This basin is constructed within a compacted earthen berm. Iron precipitates generated in the oxidizer unit drops out of suspension and accumulates in the settling basin. The basin has been designed with nearly twice the volume (i.e., retention time) recommended from the bench testing in order to maximize the potential for meeting UPDES compliance level (see Attachment 2 for details). The basin has been divided into four individual cells, separated one from another by filter fabric curtains extending across the full width of the basin. These dividing curtains have been installed to force the water flow through the basin to follow a serpentine pattern from inlet to outlet. This is designed to maximize the retention time of the water in the basin to allow maximum settling of the iron sludge material. The treated water exits the basin through a spillway, dropping into an inlet structure to a discharge pipe which is buried under the road and connects to the existing discharge line leading to the designated UPDES outfall point. A flow meter has also been installed in the line. The UPDES water samples are taken at the outlet of the basin prior to entering the pipe leading to the outfall. This is similar to the manner and location in which the UPDES monitoring was previously conducted, and is agreeable to Division of Water Quality.

CLEAN-OUT

Precipitated iron is allowed to settle and accumulate in the settling basin. ~~Because of the newness of this type of facility it is not known at this time the exact nature of the iron precipitate material that is expected to accumulate in the settling basin as a result of the oxidizer treatment.~~

It is assumed that the accumulations will be visible as they begin to settle out in the bottom of the basin, because the water is generally clear and inherently devoid of suspended solids. Also regular sampling of the water at the approved UPDES outfall will provide a good indication that the settling mechanism is functioning properly. By utilizing both visual observations and sampling results it should become apparent when the basin is ready to be cleaned. Since the rate of accumulations is expected to be consistent (unlike a sediment pond that fills up in response to often violent precipitation events), the cleaning process can be anticipated well in advance. Also, due to the slow rate of accumulation, the accumulation level should be easy to monitor. A series of floating booms will be strung across the basin to slow down and spread out the flow of water through the basin, in order to maximize retention time and to help direct the pattern of material accumulation within the bottom of the basin.

As indicated by the calculations appearing in Attachment 5, the basin should be capable of holding several years of accumulation before cleaning is required. However, in order to be safe, the company commits to cleaning the basin when accumulations have reached the 7812' level, which would be about 3' deep at the deepest part of the basin. As explained in Attachment 5, this still leaves ample pond volume above the accumulation level to achieve the 5.5 hour settling time recommended by the bench testing. Several staff gauges (sediment markers) will be installed in the deepest areas of the basin to serve as a visual aid in determining when the basin should be cleaned. Because the iron staining may render the tick marks of the staff gauges illegible, additional markers will be also be installed beside the gauges whose top is cut off at the 7812' elevation in order to make visual observations of the accumulation level easier. The company proposes to use the accumulation level of 7812' for the initial cleaning. However, based on operational experience, this level may be changed to reflect actual (versus hypothetical) accumulation rates, refinements in clean-out techniques, topographic and spatial patterns of accumulations within the basin, and other operational dynamics.

In order to facilitate cleaning the sludge material from the basin, the company has installed a number of cleaning tube in the basin. Each tube consists of several segments of 4" pvc pipe glued together to make a long continuous tube which extends across the width of the basin. The far end of the tubes are sealed closed, and the near end (located at the road-side of the basin) is open. There are mor than twenty of these cleaning tubes installed parallel to each other from the top end of the basin to the bottom. Each of the tubes has a number of holes drilled at closely-spaced intervals along the top and across the entire length of the tube. During the cleaning operation, a 2" flexible non-collapsible suction hose is inserted into the cleaning tube. This suction hose is then connected to a pump or vacuum truck. The overlying sludge material is sucked though the holes in the top of the cleaning tube and into the inner suction hose. As cleaning proceeds, the inner hose is slowly pulled across the length of the basin, cleaning the sludge above it as it moves. After one of the tubes is cleaned in this manner, the inner suction hose is inserted in the adjacent tube, and the process is repeated.

After the accumulated material has reached the 7812' level (which is 4' below the surface level), the clean-out will begin. Without prior operational experience it is difficult at this time to predict the exact nature of the precipitated iron accumulation material that will have to be cleaned out of the bottom of the basin. However, based on input from Division staff, literature on

treatment systems for mining sites suggest that solids content in the accumulation material is about 5%. This consistency of material would allow removal by vacuum methods. Vacuum tanker trucks will be positioned along the road next to the basin in preparation for clean-up. The semi-flexible 4" suction inlet line will be lowered into the deepest part of the basin, which is located at the lower (outlet) end of the facility, where iron accumulations are expected to be deepest, and the material will be sucked up into the waiting trucks. Care will be taken during the clean-out process to minimize stirring up the accumulations so that suspended iron particles do not begin to flow out of the pond. During the clean-out process, excelsior logs or other suitable sediment control (filtration) devices will be installed at the basin outlet spillway to help trap any iron material stirred up. Visual observations and sampling of the water will be made at the spillway (i.e., UPDES monitoring point) to make certain that stirred up iron material is not exiting the basin. If needed, cleaning operations will be delayed until sufficient time is allowed to re-settle any stirred up material. Experience will help refine the cleaning technique. For example, it may be determined that using a perforated suction line that allows multiple access points for material entry along the length of the pipe is more effective than a single entry point. It may also be determined that several cleanup suction lines can be left permanently in place at designated locations within the basin to make future clean-out efforts quicker and easier. Experience will tell.

Prior to cleaning operation a sample of the iron material will be taken and analyzed for RCRA hazardous constituents. If the RCRA analysis shows the material to be hazardous, it will be disposed of at an approved, licensed hazardous waste disposal facility. However, if the results of this RCRA analysis show the material to be non-hazardous, the iron precipitate material from the basin clean-out will be hauled to the company-owned Wildcat Loadout where it will be disposed of in Sediment Pond C. During the initial cleaning, a sample of the sludge was taken and analyzed for RCRA metals and other constituents. The results show the material to be non-toxic and non-hazardous. A copy of the analysis is presented in Attachment 9. Several cleaning operations have been initiated, each with notification of the Division. Initially, the sludge was quite fluffy. The material was sucked out of the basin using a vacuum truck, and was hauled off site and disposed of at the Wildcat Loadout Sediment Pond C, as per the approved plan. There it can dry out and remain in-place until buried at final reclamation, or if the volume is excessive, it can be scooped out and moved to the approved refuse disposal pile located at the loadout. Under the currently approved Mining and Reclamation Plan for the Wildcat Loadout (C/007/033), this refuse pile will be buried under at least 4' of earthen material upon final reclamation. (As shown in Attachment 4, Sediment Pond C is a very large pond with ample capacity to contain more than 2.5 acre-ft (108,900 cu. ft.) of material and still have sufficient volume to contain a 10-year/24-hour precipitation event. This is far more volume than is expected to be needed to accommodate the iron clean-out material, as explained in Attachment 5. However, under no circumstance will the pond level be allowed to exceed the 10-year/24-hour design capacity level. Additional information about Wildcat Sediment Pond C and the refuse disposal pile can be found in Mining & Reclamation Plan C/007/033 on file with the Division.

The initial sludge material hauled to Wildcat was determined by laboratory analysis to be mostly water. Therefore, attempts have been made to densify the sludge to allow for more efficient cleaning and disposal in the future. The sludge re-circulation (mentioned above, to

reduce the coagulant usage), had the desirable side effect of making the sludge much more dense. The company also attempted to run the sludge through a cyclone separator during the cleaning process in hopes of obtaining a more concentrated sludge, but this was not successful. The company then conducted a series of cleanings wherein the sludge material was pumped directly into geotube filtration bags. This technique showed encouraging results, but unfortunately, freezing winter weather conditions, and the complexities of rigging up a separate flocculant system has prevented the geobag option from being as yet fully explored and developed. However, given the promising preliminary results, the company intends to resume geobag cleaning trials as soon as weather conditions permit.

Under the currently approved plan, this sludge material is hauled to the Wildcat Loadout (permitted under MRP C/007/033), where it is disposed of in Sediment Pond C. However, the company is currently in the process of turning ownership of the Wildcat Loadout over to the Intermountain Power Agency (IPA). Therefore, as an alternate to the Wildcat disposal site, the company is now proposing to dispose of the Crandall iron sludge material at the Centennial (Tower) minesite in the defunct Sediment Pond A. This pond area was once part of the sediment and drainage control facilities, but was abandoned during later expansion of the Centennial surface facilities. This pond structure is now designated as an "excess spoil and development waste storage" site, as shown on Plate 6. Even though it is referred to as "Pond A" it no longer receives any runoff drainage, and is now a dry and empty depression.

The storage capacity of Tower Pond A is 48,610 cubic feet or 1.12 acre-feet, available for Crandall sludge storage. Based on the limited experience of iron sludge disposal to date it is difficult at this time to estimate the actual volume of future sludge disposal needed on an on-going basis. However, based on previous experience, the sludge dries out quickly to a concentrated residual cake with minimal volume. This cake dried out in a layer about 1" thick, covering an area of about 800 sq. ft. in the bottom of Wildcat Pond C, for a total volume of approximately 66 cubic ft. This material was initially generated at the Crandall treatment facility over a three month period and involved cleaning about half the sludge from the pond. Therefore, the 66 cu. ft of dried sludge represents approximately one and a half months worth of treatment. One years worth of treatment would generate about 528 cu ft or 19.5 cu yards of dried material. Therefore the Tower Pond A, with 48,610 cu. ft of storage capacity, could hold 92 years worth of dried material. It is interesting to note that, as part of the initial approval of the Crandall iron treatment facility, prior to any actual operating experience, preliminary calculations prepared in consultation with the Division concluded that the Wildcat Pond C could hold more than 250 years worth of expected accumulated dried out sludge material. Wildcat Pond C has a usable storage capacity of 2.577 ac-ft. In comparison, Tower Pond A has a usable capacity of 1.12 ac-ft. Therefore, comparing the ratio of pond capacities would indicate that Tower Pond A would appear to be capable of holding in excess of 108 years worth of Crandall iron sludge. Although this estimate may be considered somewhat "quick-and-dirty", and while future cleaning experience with the Crandall iron treatment facility will certainly provide a more accurate estimate of anticipated sludge disposal volume requirements, it presently appears that Tower Pond A can provide a reasonable long-term disposal option for the Crandall iron sludge, especially in light of the limited operation experience to date that indicates more than 90 years worth of storage capacity. In the meantime, the company will continue to experiment with alternate sludge disposal options, such

as geo-bag filtration devices, which would hopefully provide a more cost-effective alternative for longer-term sludge disposal.

Prior to initiating any cleaning of the basin, the company will provide a minimum of 24-hour notice to the Division.

MAINTENANCE

There may be times during required maintenance that the oxidizer must be shut down for repair or cleaning, at which time the mine discharge water will need to bypass the treatment system. By opening the by-pass valve located ahead of the oxidizer unit, the water will be directed into a flexible 8" discharge hose which will route the water around the settling basin and into the main sediment pond through the existing disturbed ditch DD-10 and culvert C-4 located immediately below the treatment facility. Information included in the back of Attachment 6 shows that an 8" hose can carry nearly 1300 gpm, which is adequate for bypassing the normal flow from the mine discharge. Disturbed ditch DD-10 and culvert C-4 are both sized to adequately handle the maximum anticipated bypass flow of about 1000 gpm in addition to the potential flow from a 10-year, 24-hour precipitation event, as shown in Appendix 7-4.

Prior to bypassing any mine water into the sediment pond for maintenance or cleaning of the settling basin the static water level in the sediment pond will be decanted to as low as possible below the elevation level of 7773.2'. This will ensure that there is still sufficient capacity left in the pond to accommodate a 10-year/24-hour precipitation event. At no time during the flow bypass will the water level in the sediment pond be allowed to exceed the 7773.2' level, unless specifically authorized by the Division. A clearly visible reference marker will be installed within the sediment pond to clearly delineate the 7773.2' elevation level so that persons in charge of the maintenance operations can observe the water level at all times during any bypass situation. Any decanting of the sediment pond will be done according to the requirements of the approved UPDES permit for this outfall point. Also, prior to bypassing any water into the sediment pond, the sediment level in the pond will be verified to be below the approved clean-out level of 7769'. *(Note: The sediment pond was completely cleaned in December of 2009, immediately prior to putting the iron treatment facility into operation, and certification reports were supplied to the Division).* Since the required capacity volume for a 10yr-24hr event is 2.45 acre-ft, this leaves a usable volume of 0.77 acre-ft for the purpose of maintenance bypass, assuming the water level has been previously decanted down to the sediment cleanout level of 7769'. This equates to 251,000 gallons. At an average flow rate of 500 gpm from the mine, the sediment pond could theoretically contain over 8 hours worth of by-passed discharge flow. In other words, this could allow more than 8 hours of time to perform maintenance work on the treatment facility before the sediment pond was filled to within the 10/24 capacity volume level at the maximum level of 7773.2'. This should provide sufficient time for most routine or emergency maintenance procedures, especially in light of the mechanical simplicity of the system. Details of the sediment pond capacity for this scenario can be found in Appendix 7-4.

Prior to initiating any routine or scheduled maintenance on the oxidizer unit or the settling basin, the company will provide a minimum 24-hour notice to the Division. Emergency

maintenance occasions will be reported to the Division immediately.

DRAINAGE

The "old loadout area" is depicted on Plate 7-5 and in Appendix 7-4 (Sedimentation and Drainage Control Plan) as disturbed drainage area WSDD-10. Much of this area is now dedicated to the installation of the iron treatment facility. The treated minewater, along with any direct precipitation falling into the settling basin, is discharged into Crandall Creek via the original approved UPDES outfall point. Therefore, part of this treatment area is now excluded from draining into the sediment pond as disturbed area drainage. The basin berm, which supports the concrete barrier wall, serves to effectively separate the settling basin from the disturbed area drainage around it. Effectively, all surface drainage now bypasses the treatment facility area, and there is no co-mingling of storm surface runoff with the mine discharge water undergoing treatment. Relevant drainage information from Appendix 7-4 is included in Attachment 6 for ease of reference. This attachment also contains information that shows the adequacy of the basin spillway and the discharge pipe to handle the combined flow of the mine water and a 10 year/24 hour precipitation event on the surface.

While the facility is neither an ASCA nor a small area exemption, it represents a small area within the disturbed area wherein runoff is treated along with the mine discharge water and discharges through an approved UPDES outfall point, and therefore does not drain to the sediment pond. Also, the outer toe of the berm located adjacent to the Forest Service road has been armored with concrete jersey barriers sufficient to prevent potential erosion from surface runoff along the road, and to route surface drainage around the basin into drainage ditch DD-10, thence into culvert C-4, and thence into the sediment pond. Calculations in Appendix 7-4 show that these drainage structures are adequately sized to handle the bypass flow (at a peak of about 1200 gpm) in addition to the 10 yr-24 hr precipitation event design flow.

FINAL RECLAMATION

~~There is every reason to believe that water will permanently discharge from the Crandall Mine portals. The iron level of the mine water historically was very low, and began rising only after the water began to build up and impound within the mine workings following the mine collapse of 2007. It is now the consensus that the elevated iron concentration will be a permanent situation, and that the reclamation plan must provide for a permanent means of treating the discharge water so as to meet UPDES requirements, even subsequent to final reclamation. To address this situation, the company commits to revising the reclamation plan in the near future.~~

~~Based on recent input from various state and federal agencies (Div. Oil, Gas and Mining; Forest Service, BLM, Div. Water Resources, Div. Wildlife Resources) a conceptual treatment plan for final reclamation was agreed upon. This plan would utilize a passive aeration system (modifying the existing portal access road into a long, cascading, open-air aeration waterway); emptying out into a set of large settling basins to be constructed in the area presently occupied by the shop/warehouse building. The company commits to collecting the necessary baseline data, consulting with the appropriate agencies, and revising the reclamation plan in accordance with the~~

~~agreed-upon passive concept, so that the revised reclamation plan can be approved by August 1, 2010. This plan will include not only the facility design but also projected operating and maintenance costs for long-term (perpetual) bonding considerations. In light of the long-term treatment requirements for final reclamation, the existing treatment facility is now considered temporary (i.e., short-term, operational) and will be removed at the time of final reclamation after the permanent (post-reclamation) passive facility is constructed.~~

BASELINE MONITORING

Additional baseline data **has been** incorporated into the **approved plan**. This data includes: 1) flow quantities from the seep in the sandstone ledge above the treatment facility, 2) historical data concerning the iron concentration levels in the mine discharge water, and 3) performance data demonstrating the effectiveness of the existing treatment system methodology of oxidation/settling, as opposed to other treatment methods such as reverse-osmosis, fine-element filtration, chemical coagulants/flocculants, etc.

1) Ledge seep water flow: The treatment area is separated from the portal bench above by a massive sandstone ledge of bare sandstone rock. There are several seeps emanating from this ledge and this seep water drains down the ledge toward the area of the settling basin. Based on previous measurements, the flow is minimal (approximately 1-2 gpm), but constant. A concrete trough has been poured behind the existing retaining wall (between the ledge rock and the back of the wall) to collect this seepage water and route it through a 4" PVC pipe to the settling basin overflow culvert inlet. In this manner the seepage water is contained, can be monitored, and is also subject to treatment thru dilution. The flow data collected from monitoring this seep will be provided to the Division and will assist in determining the most appropriate geotechnical method for future reclamation of this area, i.e., final reclamation. Monitoring will be conducted monthly, although freeze/thaw conditions in winter months will have to be factored into interpreting the data. The monitoring information will be provided to the Division (via email) prior to the end of each month and will continue until the Division determines that it is no longer necessary, ~~and at a minimum, until such time as the revised final reclamation plan has been approved, since this information will be needed in order to properly design the approximate-original-contour requirements for the "old loadout area"~~.

The location of the seep water discharge pipe into the basin overflow culvert inlet provides safe and convenient access for collection of this data. It should also be noted that much of the seep water seems to be coming from underneath the concrete pad of the old crusher building sitting on top of the ledge. Since this building, and its concrete floor, will be removed during final, there is a high probability that much of the seep water can be isolated and contained at time of final reclamation. ~~This issue will be addressed in greater detail in the preparation of the revised final reclamation plan.~~ Details of this seep collection system can be found in the engineering drawings in Attachment 8.

2) Mine discharge water quality: This data is essentially the monthly UPDES sampling and monitoring that is presently on-going.

3) Operational performance data: In addition to the normal UPDES data (item 2), the company commits to gathering data to reflect on the effectiveness of the oxidation/settling methodology employed in the existing system. ~~This data will facilitate the design of a final reclamation treatment system that will include perpetual treatment of the mine-water discharge.~~ This data will be collected monthly and will be provided to the Division via email. Samples will be collected from the 12" HDPE pipeline prior to the oxidizer unit, and at the UPDES sampling point at the outlet of the settling basin. The analytical parameters will include the following:

Iron (total, dissolved, and ferrous)
Manganese (total and dissolved)
Aluminum (total and dissolved)
Alkalinity
Sulfate
pH
Dissolved Oxygen

BONDING

~~As described above (under FINAL RECLAMATION) this facility is to be considered as a short-term, operational facility, designed to treat to the discharge water up until the time of final reclamation, but not thereafter. Because the facility has been constructed using non-permanent structures it will be easy to reclaim. For example, the earthen berm has been constructed out of less than 700 cubic yards of granular borrow which can easily be hauled off or used as backfill material during final reclamation. The oxidizer unit is a pre-fabricated unit that can be removed with a fork-lift. The Jersey barriers can be removed with a backhoe and hauled off to be re-used elsewhere. There is no concrete to be removed and disposed of. The only concrete associated with the facility is a small amount which was poured behind the existing retaining wall which will remain in place during final reclamation. Because all components can easily be dismantled and removed (i.e., are not permanent), any increased costs for reclamation should be negligible. Indeed, if the iron concentrations of the mine water come back into compliance naturally, as they have always been in the past, the treatment facility might no longer be needed and could be disassembled prior to final reclamation of the minesite. Based on discussions with Division, in light of the short-term, non-permanent nature of construction of the facility, the cost of reclamation would be less than \$3000, which include demolition and disposal costs.~~

~~It should also be noted that at the present time (November, 2009), the Crandall Canyon Mines reclamation bond contains positive coverage for the following reasons:~~

~~1) The East Mountain Drillpads have been reclaimed and the Division has determined that the site now qualifies for Phase 1 bond release. This bond is presently posted at \$286,196. Phase 1 release would free up 60% of this amount, or \$171,717 which could be transferred to apply to any increase resulting from the treatment facility.~~

~~2) Due to the construction of the Crandall Canyon Memorial, the upper end of the mineyard has been deeded over to Emery County, and will not be reclaimed as reflected in the current mine~~

reclamation bond. Based on estimates previously submitted to the Division (Task #3092, April 6, 2009, reprint available on request), this should result in a reduction of the reclamation costs of the minesite by about estimated amount of \$77,798. This positive bonding re-adjustment could also be utilized to cover any increase resulting from the installation of the treatment facility.

—As stated previously, the company is committed, under Division Order DO09A, to revising the final reclamation plan to include a permanent, passive treatment facility which will replace the existing one. This revised reclamation plan will include a major re-evaluation of the overall reclamation costs of the Crandall Canyon minesite, and subsequent bond re-adjustments. In light of this pending revision, and the relatively minor reclamation and operating costs associated with the existing facility, and the existing bonding excess presently in place, the company requests that bonding considerations for this existing facility be delayed temporarily and worked into the upcoming “permanent facility” revised reclamation plan and bond.

OFF-SITE IMPACTS

In early 2009 the iron concentrations in the water began to exceed UPDES limits. By the summer of 2009, Crandall Creek below the mine began to display an orange discoloration from the iron staining, resulting in violations from both DOGM and Division of Water Quality. Therefore, the company commits to perform an on-site inspection of the Crandall Creek drainage with the appropriate regulatory agencies, once access is possible (late spring/early summer 2010). The purpose of the inspection will be to assess the extent of the total iron accumulations within Crandall Creek. Following the site-visit, the Division (with concurrence with the Forest Service, and consultation from other agencies) will make a determination as to what clean-up measures, if any, should be taken to remove the iron accumulations from the stream channel.

BACK-UP/CONTINGENCY PLAN

—The company commits to establishing a back-up/contingency plan for the oxidizer unit once it has been demonstrated that the mine-water discharge levels of total iron are within UPDES limits for three consecutive months.

TEMPORARY USE OF CRANDALL SEDIMENT POND

(Note: This section has been added subsequent to the initial approval of the iron treatment facility)

—During late April and early May of 2010, the iron accumulation material (a.k.a., cleanout sludge) was cleaned out of the settling basin for the first time. There was at this time approximately three months worth of sludge material accumulated in the basin. Cleanout was accomplished by installing a total of ten cleanout tubes sequentially across the entire width of the the basin, from top to bottom. Each cleanout tube was constructed of 4" pvc pipe with ½" holes drilled on 8" centers along the top of the pipe. At the time of cleaning, a 2" flexible hose was inserted into the cleanout tube, with the other end connected to a vacuum truck. During cleanout,

the open end of the vacuum hose was slowly retracted through the length of the cleanout tube, sucking the sludge from the immediate area through the holes in the outer tube. This process was then repeated for each tube until the entire length of the basin had been cleaned. The sludge material was then hauled by tanker truck to the Wildcat Loadout and discharged into Sediment Pond C, as per the plan. In total, 38 truckloads of sludge were cleaned from the basin, totaling 216,000 gallons of material.

————— Laboratory analysis of the cleanout sludge shows that it is in compliance with all standards for RCRA metals (see Exhibit 4, Attachment 9). Lab analysis also shows that the sludge material is mostly water, being 94.12% water, 5.88% solids (see Exhibits 1 and 5, Attachment 9). Shortly after the cleanout, representatives of the Division inspected the material in Pond C at Wildcat. By this time much of the solids had settled out, leaving a clear supernate on top. This supernate material was sampled and analyzed (see Exhibits 2 and 6, Attachment 9). Exhibit 3, Appendix 9 shows additional photos of the Wildcat Pond C as the sludge continued to settle and dry out. Within the next several weeks the sludge material dried up entirely, leaving only a thin residue caked in the bottom of Pond C.

————— The company is now experimenting with various methods to improve on the cleanout process. The sludge material in the settling basin is voluminous, but mostly water (94% water, 6% solids). Therefore, efforts to remove as much of the water as possible from the sludge prior to disposal are now being explored. These efforts will include the use of hydrocyclones and/or mechanical filtration devices used during cleanout, on a trial basis. To facilitate the testing of these new methods, the company will utilize the Crandall Canyon Mine sediment pond on a temporary basis for short-term storage of the cleanout material. This period of utilization will be restricted during the summer and early autumn months 2010 when seasonal weather conditions will promote effective evaporation of the sludge material. By being able to store the material in the Crandall sediment pond, rather than hauling it 40 miles away to Wildcat, a greater degree of flexibility can be employed in the trial and error methods for developing the most effective de-watering process. Such de-watering process will then be incorporated into the long-term cleanout program. It should be emphasized that use of the Crandall sediment pond during this testing period will be temporary, ending October 30, 2010.

————— It should be noted that in no case will the sediment level (of the combined sediment/sludge material) in the pond be allowed to accumulate above the presently approved 7770' maximum sediment level. It should also be noted that at no time will the total water level in the sediment pond be allowed to exceed the 7773.2' elevation as a result of the cleaning/testing. By not exceeding this level, the sediment pond will still maintain sufficient capacity to hold surface runoff from a 10-year, 24-hour precipitation event. A high-water level marker has been installed in the pond to make certain that this level is not exceeded during cleaning and testing. In the unlikely event that any supernate water needs to be decanted from the pond during this time, it will be decanted in accordance with the approved UPDES permit. It is encouraging to note that, should decanting be necessary, analysis of the supernate from the initial cleaning showed compliance with all UPDES parameters. It should also be noted that any sludge material deposited in the Crandall sediment pond during this time will eventually be removed and disposed of as part of the normal approved sediment pond clean-out procedure.

FUTURE COMMITMENTS

(Note: This section has been added subsequent to the initial approval of the iron treatment facility)

Following the termination of the clean out testing period (ending October 30th, 2010), the following revisions to Appendix 7-65, Mine Discharge Water Iron Treatment Facility, will be submitted to the Division of Oil, Gas and Mining by November 30th, 2010:

- a) ~~Deletion of any previously approved language, discussion or attachment that is no longer relevant or applicable based upon current conditions.~~
- b) ~~Revisions that reflect the design, as-built construction, operation, clean out and maintenance aspects of the Mine Discharge Water Iron Treatment System.~~
- c) ~~A summary/chronology of the experimental process that led to the final design including:~~

~~A summary of the various treatment methods that were examined/tested.~~

~~A discussion as to the chemical additives that were employed during the trial and error process. The discussion shall include the ratios of chemicals that were utilized in the various test configurations as well as the corresponding water quality results.~~

~~An up to date tabulation of the mine water flow data that has been collected since the installation of the AVF Flow Meter~~

~~The field data and lab analytical results that were obtained during the various test configurations/water treatment approaches that were explored.~~

- d) ~~A discussion of iron sludge disposal options as contingency in the event that the Wildcat Loadout facility is no longer available to receive the material.~~
- e) ~~An up to date summary of the operational costs for the operational water treatment system configuration including: chemical costs, labor costs, maintenance costs, clean-out costs and equipment repair/replacement costs.~~

ON-GOING STATUS AS OF NOVEMBER, 2010

The company has been working on the design, permitting, construction and operation of the iron treatment facility since January, 2009. Under the existing treatment system, the mine-water discharge has been brought into compliance with UPDES parameters since March, 2010. Presently, the facility is being upgraded to allow greater dependability under the constraints of the requirements for continuous 24/7 operational performance and regulatory compliance. Much of

the work has been on a “trial-and-error” basis because the iron treatment issue is relatively new to the Utah coal industry, and accepted treatment methodologies for eastern coal mines often involve dis-similar water chemistry and differing operating and environmental circumstances. Also, much of the construction/operation of the facility has been under near-emergency conditions, given the fact that the company was in violation with several state agencies, and the discharge into Crandall Creek has been under constant scrutiny from other federal and local agencies. The constant pressure and necessity to keep the discharge water in compliance at all times has made it more difficult to make adjustments, add new equipment or explore new treatment options. To date, the company has spent nearly \$600,000 on construction, operation, clean-out and maintenance of the system. It is important to note that these costs cannot be construed as representative of future treatment costs, given the emergency nature, and “trial-and-error” nature of the development of the facilities to date. The company will continue efforts to improve the system to provide increased reliability, develop more efficient sludge removal/disposal techniques and to minimize the amount of chemicals used in the treatment. Once these more pressing and immediate objectives have been met, the company will be able to explore other options and alternatives for treatment.

ATTACHMENT 1
MAELSTROM OXIDIZER UNIT

~~ATTACHMENT 2~~

~~1) IRON TREATMENT BENCH TEST RESULTS~~

~~2) SETTLING BASIN VOLUME DETERMINATION~~

SETTLING BASIN VOLUME DETERMINATION

- 1) ~~Continuous flow readings from September 9, 2009 through October 27, 2009 have been taken on a daily basis. The cumulative flow over this 48 day time period was 33,249,830 gallons. This equates to 692,704 gal/day = 481 gal/min. The instantaneous readings ranged between a low of 314 gpm to a high of 1033 gpm. The average instantaneous reading was 491 gpm, which agrees closely with the cumulative average of 481 gpm. Therefore, the design parameter for the treatment facility was chosen at 500 gpm.~~
- 2) ~~Based on the bench test conducted by the manufacturer of the oxidizer unit (see Attachment 2) compliance levels of iron reduction was achieved with a 5.5 hr retention (settling) time; without the use of chemical flocculants or coagulants.~~
- 3) ~~Therefore, the manufactures recommended settling basin volume is:~~
~~————— 5.5 hrs x 500 gal/min x 60 min/hr = 165,000 gal~~
- 4) ~~Based on computer generated volumetrics, the proposed settling basin has a volume of 288,000 gallons. Therefore, the settling basin is 288,000/165,000 = 1.75 time bigger than the manufacturer's recommendation. Actual usable settling volume will gradually decrease as accumulation material settles in the bottom of the basin.~~
- 5) ~~However, if during operation of the facility, it is determined that additional settling is needed, a chemical coagulant and/or flocculant can be added. The oxidizer unit has been modified to allow easy addition of a chemical injection system in the future. These chemicals dramatically increase the settling rate of the iron particulates.~~

ATTACHMENT 3
PIT LINER INFORMATION

~~ATTACHMENT 4~~

~~WILDCAT SEDIMENT POND C
VOLUME DETERMINATION~~

~~ATTACHMENT 5~~

~~SETTLING BASIN CLEAN-UP VOLUME
ESTIMATION~~

SETTLING BASIN CLEAN-UP VOLUME ESTIMATION

Based on history of non-compliance the iron level has been about 2 to 3 mg/liter (spiking on occasion to 8 mg/liter), with compliance level being 1 mg/liter. Therefore, to achieve compliance could require the removal of up to 7 mg/liter of iron

Removal of 7 mg/liter of iron from a 500 gal/min flow would result in 21 kg/day iron removal, or 33.4 k/day of iron oxide. Assuming the accumulation material which settles at the bottom of the basin is in a semi-liquid (slurry) form of 5% solids (iron oxide)-95% water, the yearly volume of accumulated sludge material would be approximately 8,200 cubic feet. The stage volumes for the settling basin are as follows:

<u>elevation</u>	<u>cumulative volume(cu ft)</u>	<u>years of storage</u>
7810'	1,487	0.18
7811'	4,429	0.54
7812'	9,105	1.11
7813'	15,856	1.93
7814'	23,241	2.83
7815'	31,055	3.78
7816' (water level)	39,135	4.77

Based on the manufacturer's bench testing, 5.5 hours of settling time is sufficient to bring the treated mine-water into UPDES compliance. Five and one half hours of discharge is equivalent to 165,000 gallons or 22,059 cubic feet. Since the total basin volume at the spillway level is 39,135 cubic feet, the available capacity of basin volume for iron accumulation over 17,000 cubic feet. As indicated by the figures above, this equates to an estimated two years of storage. Although these estimates are conservative and subject to speculative variables at this time, it seems safe to assume that the basin can hold sufficient iron accumulations to allow for a regular scheduled clean-out program.

Cleaning out the basin when the accumulations have reached a depth of 3' (i.e., at elevation 7812') would leave sufficient capacity for adequate settling volume above the accumulations. At this level, clean-out could be expected about once per year.

According to Attachment 4, "Wildcat Pond C Volume Determination" (attached hereto), Pond C has excess capacity to store 2.577 ac-ft of material while still retaining sufficient free-board capacity for a 10-year, 24-hour storm event.

$$\frac{2.577 \text{ ac-ft} \times 43560 \text{ cu ft}}{\text{ac-ft}} \times \frac{\text{year}}{8200 \text{ cu ft}} = 13.7 \text{ years}$$

Since Wildcat Loadout Sediment Pond C is in a very dry environment, it is safe to assume that the iron material will dry out soon after it is put in the pond. In this case, assuming the accumulation material is 5% solids-95% water, the pond could hold more than 250 years worth of material. The purpose of this "quick-and-dirty" calculation is to demonstrate that there is ample reason to conclude that the volume of Wildcat Sediment Pond C is more than capable of containing the iron accumulation material from the Crandall Mine for a very long time.

ATTACHMENT 6
DRAINAGE INFORMATION

ATTACHMENT 7

SAFETY FACTOR DETERMINATION

ATTACHMENT 8
CONSTRUCTION SPECIFICATIONS
AND DRAWINGS

~~ATTACHMENT 9~~

~~TEMPORARY USE OF CRANDALL SEDIMENT POND~~

~~Exhibit 1...Photos of cleanout sludge material. Note separation of supernate after several hours retention time.~~

~~Exhibit 2...Correspondence and photos of sampling by Division of the supernate, Wildcat Pond C.~~

~~Exhibit 3...Photos of sludge disposal, Wildcat Pond C.~~

~~Exhibit 4...RCRA analysis of sludge material.~~

~~Exhibit 5...Total solids analysis of sludge material.~~

~~Exhibit 6...Analysis of sludge supernate taken from Wildcat Pond C~~

~~Exhibit 7...Crandall Canyon Mine sediment pond cleaning certification (taken from 2009 annual report filed with Division)~~

ATTACHMENT 10

MSDS SHEETS FOR
NALCO 7763 AND NALCO 8187



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCLEAR® 7763**

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 0 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION

May cause irritation with prolonged contact. Toxic to aquatic organisms.
Do not get in eyes, on skin, on clothing. Do not take internally. Wear suitable protective clothing. Keep container tightly closed. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water. Protect product from freezing.
Wear suitable protective clothing, gloves and eye/face protection.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.
Water in contact with the product will cause slippery floor conditions.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

May cause irritation with prolonged contact.

SKIN CONTACT :

May cause irritation with prolonged contact.

INGESTION :

Not a likely route of exposure. If swallowed a jelly mass may form which in digestion may cause blockage.



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

INHALATION :

Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get medical attention.

SKIN CONTACT :

Remove contaminated clothing. Wash off affected area immediately with soap and plenty of water. If symptoms develop, seek medical advice.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition. If swallowed a jelly mass may form which in digestion may cause blockage.

5. FIRE FIGHTING MEASURES

FLASH POINT : Not flammable

LOWER EXPLOSION LIMIT : Not flammable

UPPER EXPLOSION LIMIT : Not flammable

EXTINGUISHING MEDIA :

Foam, Dry powder, Carbon dioxide, Other extinguishing agent suitable for Class B fires

UNSUITABLE EXTINGUISHING MEDIA :

Do not use water unless flooding amounts are available.



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Notify appropriate government, occupational health and safety and environmental authorities. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Spill may be slippery.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Water in contact with the product will create a voluminous, slippery gel. Soak up as thoroughly as possible with inert absorbent material or sawdust. Do NOT hose down area until all possible traces of polymer are removed. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

This product is toxic to fish and other water organisms. Do not discharge directly into lakes, ponds, streams, waterways or public water supplies.

7. HANDLING AND STORAGE

HANDLING :

Do not take internally. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not get in eyes, on skin, on clothing. Use with adequate ventilation. Keep the containers closed when not in use.

STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers. Protect product from freezing.

SUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit
--------------	-----------	-----	-------	-------------------



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

ENGINEERING MEASURES :

General ventilation is recommended.

RESPIRATORY PROTECTION :

Due to its low volatility and toxicity, the hazard potential associated with this material is relatively low. Respiratory protection is not normally needed.

HAND PROTECTION :

Nitrile gloves PVC gloves

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Emulsion
APPEARANCE	Opaque Off-white
ODOR	Hydrocarbon
SPECIFIC GRAVITY	1.03 - 1.07 @ 77 °F / 25 °C
DENSITY	8.6 - 9.0 lb/gal
SOLUBILITY IN WATER	Emulsifiable
pH (100 %)	8
VISCOSITY	400 - 1,200 cps @ 77 °F / 25 °C
FREEZING POINT	< -4 °F / < -20 °C
VOC CONTENT	27.4 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures. Extremes of temperature

MATERIALS TO AVOID :

Addition of water results in gelling. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product and a 1% aqueous solution of the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Sheepshead Minnow	96 hrs	> 1,000 mg/l	1% Aqueous Solution of a Similar Product
Rainbow Trout	96 hrs	> 1,000 mg/l	1% Aqueous Solution of a Similar Product
Fathead Minnow	96 hrs	34.3 mg/l	Product
Inland Silverside	96 hrs	52.5 mg/l	Product



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	280 mg/l		1% Aqueous Solution of Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	400 mg/l		1% Aqueous Solution of Product

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	70 - 90%

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :

**PRODUCT IS NOT REGULATED DURING
TRANSPORTATION**

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit www.nalco.com and request access



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING
TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING
TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

CERCLA/SUPERFUND, 40 CFR 302 :

Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

**SAFETY DATA SHEET****PRODUCT****NALCLEAR® 7763****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

Limitation: For use as an adjuvant in the manufacture of paper and paperboard in an amount not to exceed that necessary to accomplish the technical effect and not to exceed 2 percent (as polymer) by weight of the paper or paperboard.

NSF INTERNATIONAL :

This product has received NSF/International certification under NSF/ANSI Standard 60 in the coagulation and flocculation category. This product has received NSF/International certification under NSF/ANSI Standard 60 in the Filtration Aid category. The official name is "Polyacrylamide." Maximum product application dosage is : 1 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :

Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product. Trace levels of listed components may be present.

MICHIGAN CRITICAL MATERIALS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

NATIONAL REGULATIONS, CANADA :**WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight® CD-ROM Version), Ariel Research Corp., Bethesda, MD.



SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS® CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS® CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight® CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS® CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight® (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight® CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS® CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 11/06/2009

Version Number : 1.20

**SAFETY DATA SHEET****PRODUCT****ULTRION® 8187****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION****PRODUCT NAME :** ULTRION® 8187**APPLICATION :** WATER CLARIFICATION AID**COMPANY IDENTIFICATION :**
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198**EMERGENCY TELEPHONE NUMBER(S) :** (800) 424-9300 (24 Hours) CHEMTREC**NFPA 704M/HMIS RATING****HEALTH :** 2 / 2 **FLAMMABILITY :** 0 / 0 **INSTABILITY :** 0 / 0 **OTHER :**
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Aluminum Chloride Hydroxide	12042-91-0	30.0 - 60.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******WARNING**

Irritating to eyes.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

Not flammable or combustible. May evolve HCl under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :**EYE CONTACT :**

Can cause moderate irritation.

SKIN CONTACT :

May cause irritation with prolonged contact.

Nalco Company 1601 W. Diehl Road · Naperville, Illinois 60563-1198 · (630)305-1000
For additional copies of an MSDS visit www.nalco.com and request access



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

INGESTION :

Not a likely route of exposure. May cause mucosal damage.

INHALATION :

Not a likely route of exposure. May cause irritation of mucous membranes.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get medical attention.

SKIN CONTACT :

Remove contaminated clothing. Wash off affected area immediately with plenty of water. If symptoms develop, seek medical advice.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire. Keep containers cool by spraying with water.



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

FIRE AND EXPLOSION HAZARD :

Not flammable or combustible. May evolve HCl under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

STORAGE CONDITIONS :

Store the containers tightly closed. Store separately from bases.

SUITABLE CONSTRUCTION MATERIAL :

PVC, Buna-N, Polyurethane, Polypropylene, Polyethylene, Viton, HDPE (high density polyethylene), 100% phenolic resin liner

UNSUITABLE CONSTRUCTION MATERIAL :

Brass, Hypalon, Stainless Steel 304, EPDM, Mild steel, Stainless Steel 316L, Neoprene, Epoxy phenolic resin

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Country/Source Substance(s) Category: ppm mg/m3

ENGINEERING MEASURES :

General ventilation is recommended.

RESPIRATORY PROTECTION :

Due to its low volatility and toxicity, the hazard potential associated with this material is relatively low. Respiratory protection is not normally needed.

HAND PROTECTION :

When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Colorless
ODOR	None
SPECIFIC GRAVITY	1.34 @ 77 °F / 25 °C
DENSITY	11.1 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	3.5
FREEZING POINT	32 °F / 0 °C
BOILING POINT	219.2 °F / 104 °C
VAPOR PRESSURE	Same as water
VOC CONTENT	0.00 % EPA Method 24



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Avoid extremes of temperature.

MATERIALS TO AVOID :

Strong Bases

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: HCl

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Inland Silverside	96 hrs	> 5,000 mg/l	Product
Rainbow Trout	96 hrs	590 mg/l	Product
Fathead Minnow	96 hrs	1,094 mg/l	Product



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 5,000 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	4,773 mg/l		Product
Ceriodaphnia dubia	48 hrs	> 5,000 mg/l		Product

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Ceriodaphnia dubia		15 mg/l / 30 mg/l	Reproduction	Product

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 99 mg/l

Chemical Oxygen Demand (COD) : 490 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
5 d	< 14 mg/l	Product

Greater than 95% of this product consists of inorganic substances for which a biodegradation value is not applicable.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Aluminum Chloride Hydroxide : Eye irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required.



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

- | | |
|---|-----------------------------------|
| X | Immediate (Acute) Health Hazard |
| - | Delayed (Chronic) Health Hazard |
| - | Fire Hazard |
| - | Sudden Release of Pressure Hazard |
| - | Reactive Hazard |

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

Product must be used at a pH above 5.5 to retain its FDA status. Limitations: no more than required to produce intended technical effect.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

NSF INTERNATIONAL :

This product has received NSF/International certification under NSF/ANSI Standard 60 in the coagulation and flocculation category. The official name is "Polyaluminum Chloride." Maximum product application dosage is : 180 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

**SAFETY DATA SHEET****PRODUCT****ULTRION® 8187****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :

Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

D2B - Materials Causing Other Toxic Effects - Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

This product contains substance(s) which are not in compliance with the Law Regulating the Manufacture and Importation Of Chemical Substances and are not listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

Nalco Company 1601 W. Diehl Road · Naperville, Illinois 60563-1198 · (630)305-1000

For additional copies of an MSDS visit www.nalco.com and request access

9 / 11



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Nalco Company 1601 W. Diehl Road · Naperville, Illinois 60563-1198 · (630)305-1000
For additional copies of an MSDS visit www.nalco.com and request access



SAFETY DATA SHEET

PRODUCT

ULTRION® 8187

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Ariel Insight (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/31/2009
Version Number : 3.0

CHRONOLOGY AND EXPERIMENTAL TREATMENT
METHODS

Crandall Canyon Mine

Chronology and Experimental Treatment Methods

Date:	Description:	Result:
	Install Maelstrom Oxidizer	Transferring quantities of oxygen into a liquid to oxidize and precipitate metals.
February 2010		
2/24/2010	Sodium Hydroxide Test without Oxidizer	No flock evident; no visual change, small reduction in iron.
2/25/2010	Sodium Hydroxide plus Nalclear 7763 and Oxidizer	A flock was evident after 30 minutes; however we could never repeat these results.
March 2010		
3/15/2010	Nalclear 7763 Flocculant and 7888 (8187) Coagulant Test	Chemicals together produced a good flock and dropped out quickly.
3/16/2010	Nalclear 7763 Flocculant and 7888 (8187) Coagulant	Pond began clearing up within 24 hours.
3/18/2010	Installed New AVFM Flow Meter	Begin recording accurate Mine Flows.
3/19/2010	8158 Coagulant with Nalclear 7763	No flock evident; no visual change. 8158 Did not work.
3/25/2010	Neo-Solutions 18100 Coagulant with Nalclear 7763	Some flock visible, but did not drop out as quickly as the 7888.
3/29/2010	Begin re-circulation of the sludge to reduce 8187 Chemical	Field Test after approximately 2 weeks.
April 2010		
4/13/2010	Begin cleaning out treatment pond.	Hauling sludge to Wildcat Pond C.
4/15/2010	Get results from RCRA Metal 8 test	
4/16/2010	Field test after re-circulation of sludge	8187 Coagulant chemical was cut in half.
May 2010		
5/7/2010	End of Cleaning	
June 2010		
6/10/2010	Install larger pumps for maximum recirculation	Recirculating approximately 450 gpm.
July 2010		
7/19/2010	Send samples of Sludge to various de-watering companies	
7/19/2010	Begin pumping into Crandall Canyon Sediment Pond.	
August 2010		
8/23/2010	End of Cleaning	
September 2010		
9/23/2010	Install Flocculant Make-down unit	Flocking and dropping out within minutes.
October 2010		
10/20/2010	Geobag Testing with WaterSolve with Solve 151 Flocculant	Geobag testing successful.
10/22/2010	Water-Solve and SGS meeting about polymer testing	SGS will order supplies for polymer testing.
November 2010		
11/5/2010	Try cyclone with sludge	Did not work.

Chronology for Iron Treatment Pond at Crandall Canyon Mine:

- 8/6/2007 Crandall Canyon Mine Collapse
- 10/2007 Crandall Canyon Mine Portals were sealed
- 01/2008 Mine Water began to spill from the Mine Portals
- 10/2008 Total Iron begins to climb
- 02/2009 NOV from Division of Water Quality -
Violation of the total iron effluent limitation requirements.
- 08/2009 NOV from Division of Water Quality –
Discoloration of Crandall Creek.
- 12/2009 Maelstrom Oxidizer installed
- 1/28/2010 UPDES Sample: Total Iron = 3.2 mg/L
- 2/12/2010 Conference call about the Nalco 7762 Chemical;
- 2/23/2010 UPDES Sample: Total Iron = 3.3 mg/L
- 2/24/2010 Sodium Hydroxide Test without Oxidizer – Did not flock;
- 2/25/2010 Meet on site with Bill (Nalco) NaOH Test with Oxidizer and
Flocculent 7763 – Needed to raise the pH to >10 to get a flock;
Could never repeat our results.
- 3/15/2010 Begin working with Nalco Chemicals
Flocculent 7763
Coagulant 7888
Chemicals produced a good flock and fell out quickly
- 3/16/2010 DOGM came down to look at the pond. Pond is beginning to
change color from orange to a light green color. Pond is clearing
up using the Nalco chemicals, 7888 and 7763.
- 3/18/2010 Install a new AVFM flow meter. Work on piping for Chemicals.
- 3/19/2010 Tried a new Coagulant Chemical 8158
Chemical did not work.
- 3/25/2010 Tried a new Neo Solutions Chemical 18100
Chemical did not work as well as the 7888.
- 3/26/2010 UPDES Sample: Total Iron = 0.323 mg/L

3/29/2010 Begin recirculation of the sludge

4/1/2010 Sampled for Dissolved Aluminum.

4/6/2010 Conference call with Jeff Studenka at DWQ; discussed Aluminum testing. Conference call with Steve and Kevin at DOGM. Need to do a RCRA metals 8 test on iron sludge.

4/8/2010 Forest Service meeting. Discussed alternatives to treating the Mine Water. DOGM also joined the meeting via phone conferencing. Experimented with insertion points of chemicals. Took sludge samples for RCRA test to lab.

4/9/2010 Sampled for Aluminum.

4/13/2010 Begin Cleaning Pond with vacuum truck – Haul to Wildcat Pond C.

4/15/2010 Get RCRA Metal 8 results:
1. Arsenic <0.10
2. Barium 0.825
3. Cadmium <0.02
4. Chromium <0.02
5. Lead <0.05
6. Selenium <0.10
7. Silver <0.02
8. Mercury <0.0005

4/16/2010 Recirculation test. Able to cut the 8187 Chemical in half

4/21/2010 UPDES Sample: Total Iron = 0.497 mg/L

4/26/2010 Recirculation test - Cut the 8187 Chemical in half.

4/28/2010 Meet with Ringi and Wendell on site about setting up programmable controller

5/5/2010 Meeting on site to look at Crandall Creek with the Forest Service, Division of Water Quality, DOGM, and Karla from JBR. The group decided no action needed to be taken at that time.

5/7/2010 End of Cleaning.
Total of 38 loads and 216,000 gallons of sludge hauled to Wildcat Pond C.

5/12/2010 Do another recirculation test. Still flocking and dropping out.

5/17/2010 Sampled for Aluminum.

5/18/2010 UPDES Sample: Total Iron = 0.502 mg/L

5/25/2010 Install new curtain in pond – ECI updates electrical for large pumps

6/4/2010 WET Test

6/7/2010 WET Test

6/9/2010 WET Test

6/10/2010 New Pumps and Manifolds installed; recirculation added approximately 450 gpm

6/18/2010 WET Test

6/21/2010 WET Test

6/23/2010 WET Test
UPDES Sample: Total Iron = 0.427 mg/L

7/13/2010 Meet with Nalco to discuss flocculent problem. Get a quote for an Automatic Batch system (Make-down unit).

7/15/2010 Ferrous Iron Samples

7/19/2010 Sent 5 gallon bucket samples of sludge to 3 Geotube companies and one press company.
Begin Pumping directly into Sediment Pond.

7/21/2010 UPDES Sample: Total Iron = 0.68 mg/L

7/23/2010 Talked with WaterSolve about GeoTube Cleaning and Polymer Testing.

7/27/2010 Meet with Darrell Lewis from United Central Industrial Supply on site to go over GeoTube setup.
DOGM on site.

7/28/2010 Ordered a Geotube to try from United Central Industrial Supply.

7/30/2010 Start enclosing pumping shed.

8/3/2010 Order Make-down unit for flocculent system.

8/18/2010 DOGM on site. Inspection from Division of Water Quality.

8/23/2010 End of Pond Cleaning.

8/27/2010 UPDES Sample: Total Iron = 0.39 mg/L

9/16/2010 Install Crane for moving around chemical totes.

9/23/2010 Install Make-down unit for flocculent.

- 9/29/2010 UPDES Sample: Total Iron = 0.17 mg/L
- 10/20/2010 Meet on site with Randy from WaterSolve.
Test Geotube with Solve 151 Flocculent.
- 10/21/2010 Meeting with DOGM and WaterSolve.
Discuss Polymer testing.
- 10/29/2010 UPDES Sample: Total Iron = 0.71 mg/L
- 11/22/2010 UPDES Sample: Total Iron = 0.43 mg/L
- 12/01/2010 Meeting with Mike Herkimer from Division of Water Quality.

MINE WATER FLOWS

Crandall Canyon Mine Flows

January 2010	February 2010	March 2010	April 2010	May 2010	GPM
01/01/10	02/01/10	03/01/10	04/01/10	05/01/10	577
353	392	No reading	789	732	598
01/02/10	02/02/10	03/02/10	04/02/10	05/02/10	614
354	365	120	543	514	567
01/03/10	02/03/10	03/03/10	04/03/10	05/03/10	473
362	392	375	519	502	468
01/04/10	02/04/10	03/04/10	04/04/10	05/04/10	471
367	412	No reading	501	403	471
01/05/10	02/05/10	03/05/10	04/05/10	05/05/10	465
386	414	No reading	502	542	467
01/06/10	02/06/10	03/06/10	04/06/10	05/06/10	479
371	419	No reading	464	478	479
01/07/10	02/07/10	03/07/10	04/07/10	05/07/10	445
437	No reading	No reading	460	420	445
01/08/10	02/08/10	03/08/10	04/08/10	05/08/10	464
350	406	No reading	419	425	464
01/09/10	02/09/10	03/09/10	04/09/10	05/09/10	493
No reading	409	No reading	448	442	493
01/10/10	02/10/10	03/10/10	04/10/10	05/10/10	504
No reading	400	No reading	433	430	504
01/11/10	02/11/10	03/11/10	04/11/10	05/11/10	694
No reading	406	No reading	428	420	660
01/12/10	02/12/10	03/12/10	04/12/10	05/12/10	563
No reading	395	No reading	No read	454	590
01/13/10	02/13/10	03/13/10	04/13/10	05/13/10	496
No reading	364	No reading	520	541	509
01/14/10	02/14/10	03/14/10	04/14/10	05/14/10	457
No reading	362	No reading	445	449	473
01/15/10	02/15/10	03/15/10	04/15/10	05/15/10	453
411	342	No reading	425	422	458
01/16/10	02/16/10	03/16/10	04/16/10	05/16/10	443
417	326	No reading	412	422	446
01/17/10	02/17/10	03/17/10	04/17/10	05/17/10	450
553	218	No reading	429	421	524
01/18/10	02/18/10	03/18/10	04/18/10	05/18/10	523
No reading	371	No reading	423	421	502
01/19/10	02/19/10	03/19/10	04/19/10	05/19/10	469
777	491	450	429	429	502
01/20/10	02/20/10	03/20/10	04/20/10	05/20/10	464
No reading	No reading	430	445	448	464
01/21/10	02/21/10	03/21/10	04/21/10	05/21/10	549
No reading	109	427	598	512	522
01/22/10	02/22/10	03/22/10	04/22/10	05/22/10	706
No reading	No reading	450	740	693	740
01/23/10	02/23/10	03/23/10	04/23/10	05/23/10	682
No reading	421	No reading	No read	670	682
01/24/10	02/24/10	03/24/10	04/24/10	05/24/10	643
No reading	393	No reading	502	492	694
01/25/10	02/25/10	03/25/10	04/25/10	05/25/10	494
200	433	485	451	448	521
01/26/10	02/26/10	03/26/10	04/26/10	05/26/10	483
303	123	481	434	460	501
01/27/10	02/27/10	03/27/10	04/27/10	05/27/10	495
No reading	No reading	457	444	444	508
01/28/10	02/28/10	03/28/10	04/28/10	05/28/10	518
No reading	177	423	660	670	504
01/29/10		03/29/10	04/29/10	05/29/10	493
No reading		449	812	786	510
01/30/10		03/30/10	04/30/10	05/30/10	474
No reading		587	718	661	474
01/31/10		03/31/10		05/31/10	473
228					479
368	340	452	507		521

Note: Old meter not accurate. Do not use total flows.

Note: New Meter installed on 03/19/2010.

Crandall Canyon Mine Flows

Date	Time	Pressure	GPM	Recorded by:
6/1/2010	1050	30.01	505	Brenda
6/1/2010	1500	30.04	498	Bert
6/2/2010	9:00	30.09	486	Bert
6/2/2010	15:00	30.30	482	Bert
6/3/2010	9:00	30.02	484	Bert
6/3/2010	15:00	29.95	490	Bert
6/4/2010	9:00	30.04	507	Brenda
6/4/2010	15:00	29.95	496	Brenda
6/5/2010	9:00	30.14	490	Brenda
6/5/2010	15:00	30.12	482	Brenda
6/6/2010	9:00	30.21	468	Brenda
6/6/2010	15:00	30.11	463	Brenda
6/7/2010	9:00	30.14	488	Brenda
6/7/2010	15:00	29.94	470	Brenda
6/8/2010	9:00	30.12	427	Bert
6/8/2010	15:00	30.04	500	Bert
6/9/2010	9:00	30.04	512	Bert
6/9/2010	15:00	30.00	516	Bert
6/10/2010	9:00	29.84	604	Bert
6/10/2010	15:00	29.73	716	Bert
6/11/2010	9:00	29.91	427	Bert
6/11/2010	15:00	29.87	522	Bert
6/12/2010	9:00	29.94	510	Brenda
6/12/2010	15:00	30.05	486	Brenda
6/13/2010	9:00	30.12	543	Brenda
6/13/2010	15:00	No power	487	Brenda
6/14/2010	9:00	30.19	550	Brenda
6/14/2010	15:00	30.15	486	Brenda
6/15/2010	9:00	30.14	450	Brenda
6/15/2010	15:00	30.14	450	Brenda
6/16/2010	9:00	30.10	472	Bert
6/16/2010	15:00	30.12	513	Bert
6/17/2010	9:00	30.12	517	Bert
6/17/2010	15:00	30.10	500	Bert
6/18/2010	9:00	30.10	516	Bert
6/18/2010	15:00	30.05	517	Bert
6/19/2010	9:00	30.09	516	Bert
6/19/2010	15:00	30.08	519	Bert
6/20/2010	9:00	30.11	473	Brenda
6/20/2010	15:00	30.02	504	Brenda
6/21/2010	9:00	30.08	501	Brenda
6/21/2010	15:00	30.01	506	Brenda
6/22/2010	With inspectors - Unable to leave			Brenda
6/22/2010	15:00	30.16	451	Brenda
6/23/2010	9:00	30.31	483	Brenda
6/23/2010	15:00	30.23	486	Brenda
6/24/2010	9:00	30.20	507	Bert
6/24/2010	15:00	30.11	486	Bert
6/25/2010	9:00	30.12	486	Bert
6/25/2010	15:00	30.07	495	Bert
6/26/2010	9:00	30.11	492	Bert
6/26/2010	15:00	30.05	472	Bert
6/27/2010	9:00	30.09	482	Bert
6/27/2010	15:00	30.07	477	Bert
6/28/2010	9:00	30.15	475	Brenda
6/28/2010	15:00	30.10	463	Brenda
6/29/2010	9:00	30.25	476	Brenda
6/29/2010	15:00	30.15	481	Brenda
6/30/2010	9:00	30.20	489	Brenda
6/30/2010	15:00	30.10	490	Brenda
			29240	504

Crandall Canyon Mine Flows

Date	Time	Pressure	GPM	Recorded by:
7/1/2010	9:00	30.19	463	Brenda
7/1/2010	15:00	30.10	505	Brenda
7/2/2010	9:00	30.01	547	Bert
7/2/2010	15:30	29.89	537	Bert
7/3/2010	9:10	29.89	547	Bert
7/3/2010	15:00	29.86	540	Bert
7/4/2010	9:00	30.02	560	Bert
7/4/2010				
7/6/2010	10:00	30.08	519	Brenda
7/6/2010	15:00:00	30.03	506	Brenda
7/7/2010	9:00	30.11	514	Brenda
7/7/2010	15:00	30.09	498	Brenda
7/8/2010	Had guys in the mine couldn't leave the phones			Brenda
7/8/2010	Had guys in the mine couldn't leave the phones			Brenda
7/9/2010	9:00	30.29	444	Brenda
7/9/2010	15:00	30.25	520	Brenda
7/10/2010	9:00	30.28	488	Bert
7/10/2010	15:00	30.12	492	Bert
7/11/2010	9:00	30.28	511	Bert
7/11/2010	15:00	30.04	493	Bert
7/12/2010	9:00	30.10	492	Bert
7/12/2010	14:30	30.02	502	Bert
7/13/2010	9:00	30.05	512	Bert
7/13/2010	13:00	29.98	512	Bert
7/14/2010	9:00	30.17	499	Brenda
7/14/2010	15:00	30.16	496	Brenda
7/15/2010	9:00	30.30	502	Brenda
7/15/2010	15:00	30.26	488	Brenda
7/16/2010	9:00	30.31	479	Brenda
7/16/2010	15:00	30.24	452	Brenda
7/17/2010	9:00	30.22	436	Brenda
7/17/2010	15:00	30.20	450	Brenda
7/18/2010	10:00	30.20	442	Bert
7/18/2010	15:00	30.13	434	Bert
7/19/2010	9:00	30.11	460	Bert
7/19/2010	15:00	30.06	430	Bert
7/20/2010	9:00	30.11	483	Bert
7/20/2010	15:00	30.03	490	Bert
7/21/2010	9:00	30.16	483	Bert
7/21/2010	15:00	30.06	480	Bert
7/22/2010	8:30	30.12	506	Brenda
7/22/2010	15:00	30.07	486	Brenda
7/23/2010	9:00	30.14	491	Brenda
7/23/2010	15:00	30.10	573	Brenda
7/24/2010	9:00	30.19	567	Brenda
7/24/2010	15:00	30.12	560	Brinda
7/25/2010	9:00	30.21	577	Brenda
7/25/2010	15:00	30.11	572	Brenda
7/26/2010	9:00	30.15	580	Bert
7/26/2010	15:00		576	Bert
7/27/2010	9:45	30.18	468	Bert
7/27/2010	15:00	30.02	516	Bert
7/28/2010	9:00	30.21	513	Bert
7/28/2010	15:00	30.20	513	Bert
7/29/2010	9:00	30.31	515	Bert
7/29/2010	15:00	30.24	500	Bert
7/30/2010	9:00	30.21	518	Brenda
7/30/2010	15:00	30.16	508	Brenda
7/31/2010	9:00	30.13	522	Brenda
7/31/2010	15:00	30.16	529	Brenda
			28796	496

Crandall Canyon Mine Flows

Date	Time	Pressure	GPM	Recorded by:
8/1/2010	9:00	30.16	548	Brenda
8/1/2010	15:00	30.13	544	Brenda
8/1/2010	9:00	30.23	534	Brenda
8/2/2010	15:00	30.16	529	Brenda
8/3/2010	9:00	30.26	486	Bert
8/3/2010	15:00	30.23	468	Bert
8/4/2010	9:00	30.26	506	Bert
8/4/2010	15:00	30.22	516	Bert
8/5/2010	9:00	30.21	513	Bert
8/5/2010	15:00	30.13	510	Bert
8/6/2010	9:00	30.20	512	Bert
8/6/2010	15:00	30.21	515	Bert
8/7/2010	9:00	30.13	509	Brenda
8/7/2010	15:00	30.14	930	Brenda
8/8/2010	9:00	30.20	535	Brenda
8/8/2010	15:00	30.12	533	Brenda
8/9/2010	10:30	30.18	540	Brenda
8/9/2010	15:00	30.18	540	Brinda
8/10/2010	9:00	30.20	535	Brenda
8/10/2010	15:00	30.13	527	Brenda
8/11/2010	9:30	30.26	526	Bert
8/11/2010	15:00	30.16	544	Bert
8/12/2010	9:00	30.06	570	Bert
8/12/2010	15:00	29.99	549	Bert
8/13/2010	9:00	30.12	529	Bert
8/13/2010	15:00	30.08	549	Bert
8/14/2010	9:00	30.08	600	Bert
8/14/2010	15:00	30.03	623	Bert
8/15/2010	9:00	30.23	714	Brenda
8/15/2010	15:00	30.19	528	Brenda
8/16/2010	9:00	30.19	485	Brenda
9/16/2010	15:00	30.13	485	Brenda
9/17/2010	9:00	30.13	481	Brenda
9/17/2010	15:00		492	Brenda
9/18/2010	9:00	30.21	495	Brenda
9/18/2010	15:00	30.18	506	Brenda
8/19/2010	9:00	30.14	506	Bert
8/19/2010	15:30	30.09	558	Bert
8/20/2010	9:00	30.18	557	Bert
8/20/2010	15:00	30.10	557	Bert
8/21/2010	9:00	30.20	575	Bert
8/21/2010	15:00	30.14	530	Bert
8/22/2010	9:00	30.15	542	Bert
8/22/2010	15:00	30.06	537	Bert
8/23/2010	9:00	30.31	543	Brenda
8/23/2010	15:00	30.33	532	Brenda
8/24/2010	9:00	30.39	522	Brenda
8/24/2010	15:00	30.33	496	Brenda
8/25/2010	9:00	30.39	510	Brenda
8/25/2010	15:00	30.30	485	Brenda
8/26/2010	9:00	30.32	530	Brenda
8/26/2010	15:00	30.21	500	Brenda
8/27/2010	9:00	30.26	560	Bert
8/27/2010	15:00	30.26	505	Bert
8/28/2010	9:00	29.89	553	Bert
8/28/2010	15:00	29.73	571	Bert
8/29/2010	9:00	29.85	624	Bert
8/29/2010	15:00	29.78	610	Bert
8/30/2010	9:00	29.94	584	Bert
8/30/2010	15:00	29.82	503	Bert
8/31/2010	9:00	30.18	553	Brenda
8/31/2010	15:00	30.15	568	Brenda
			33617	551

Crandall Canyon Mine Flows

Date	Time	Pressure	GPM	Recorded by:
9/1/2010	15:00	30.17	505	Brenda
9/2/2010	9:00	30.28	501	Brenda
9/2/2010	15:00	30.28	460	Brenda
9/3/2010	9:00	30.34	473	Brenda
9/3/2010	15:00	30.30	462	Brenda
9/4/2010	9:00	30.23	484	Bert
9/4/2010	15:00	30.11	488	Bert
9/5/2010	9:00	29.40	520	Bert
9/5/2010	15:00	29.83	498	Bert
9/6/2010	9:00	30.13	544	Bert
9/6/2010	15:00	30.11	534	Bert
9/7/2010	9:00	30.14	533	Bert
9/7/2010	15:00	30.08	548	Bert
9/8/2010	9:00	30.08	528	Brenda
9/8/2010	15:00	29.95	533	Brenda
9/9/2010	9:00	29.87	559	Brenda
9/9/2010	15:00	29.86	553	Brenda
9/10/2010	9:00	30.15	546	Brenda
9/10/2010	15:00	30.14	529	Brenda
9/11/2010	9:00	30.32	483	Brenda
9/11/2010	15:00	30.27	478	Brenda
9/12/2010	0:00	30.33	470	Bert
9/12/2010	0:00	30.24	463	Bert
9/13/2010	0:00	30.23	470	Bert
9/13/2010	0:00	30.18	461	Bert
9/14/2010	9:01	30.20	469	Bert
9/14/2010	15:01	30.11	464	Bert
9/15/2010	9:01	30.20	485	Bert
9/15/2010	15:01	30.14	464	Bert
9/16/2010	9:00	30.22	468	Brenda
9/16/2010	15:00	30.16	462	Brenda
9/17/2010	9:00	30.17	483	Brenda
9/17/2010	15:00	30.05	472	Brenda
9/18/2010	9:00	30.18	484	Brenda
9/18/2010	15:00	30.13	463	Brenda
9/19/2010	9:00	30.17	487	Brenda
9/19/2010	15:00	30.06	485	Brenda
9/20/2010	9:00	29.96	516	Bert
9/20/2010	15:00	29.89	517	Bert
9/21/2010	9:00	29.98	527	Bert
9/21/2010	15:00	29.89	530	Bert
9/22/2010	9:00	29.85	549	Bert
9/22/2010	15:00	29.76	582	Bert
9/23/2010	9:00	30.07	590	Bert
9/23/2010	15:00	30.10	514	Bert
9/24/2010	9:00	30.35	494	Brenda
9/24/2010	15:00	30.32	490	Brenda
9/25/2010	9:00	30.44	499	Brenda
9/25/2010	15:00	30.37	496	Brenda
9/26/2010	9:00	30.34	469	Brenda
9/26/2010	15:00	30.26	447	Brenda
9/27/2010	9:00	30.30	458	Brenda
9/27/2010	15:00	30.25	454	Brenda
9/28/2010	9:00	30.27	500	Bert
9/28/2010	15:00	30.30	499	Bert
9/29/2010	9:00	30.19	478	Bert
9/29/2010	15:00	30.09	464	Bert
9/30/2010	9:00	30.20	624	Bert
9/30/2010	15:00	30.14	564	Bert
			29570	501

Crandall Canyon Mine Flows

Date	Time	Pressure	GPM	Recorded by:
10/1/2010	9:00	30.28	514	Bert
10/1/2010	15:00	30.25	490	Bert
10/2/2010	9:00	30.30	830	Brenda
10/2/2010	15:00	30.21	851	Brenda
10/3/2010	9:00	30.23	639	Brenda
10/3/2010	15:00	30.14	813	Brenda
10/4/2010	9:00	30.18	682	Brenda
10/4/2010	15:00	30.11	493	Brenda
10/5/2010	9:00	30.23	454	Brenda
10/5/2010	15:00	30.25	509	Brenda
10/6/2010	9:00	30.35	516	Bert
10/6/2010	15:00	30.22	490	Bert
10/7/2010	9:00	30.24	502	Bert
10/7/2010	15:00	30.15	495	Bert
10/8/2010	9:00	30.23	533	Bert
10/8/2010	15:00	30.25	513	Bert
10/9/2010	9:00	comp.down	544	Bert
10/9/2010	15:00	comp.down	514	Bert
10/10/2010	9:00	30.31	501	Brenda
10/10/2010	15:00	30.19	508	Brenda
10/11/2010	9:00	30.19	523	Brenda
10/11/2010	15:00	30.14	517	Brenda
10/12/2010	9:00	30.34	507	Brenda
10/12/2010	15:00	30.31	506	Brenda
10/13/2010	9:00		499	Brenda
10/13/2010	15:00	30.43	484	Brenda
10/14/2010	9:00	comp.down	462	Bert
10/14/2010	15:00	comp.down	459	Bert
10/15/2010	9:00	comp.down	478	Bert
10/15/2010	15:00	comp.down	476	Bert
10/16/2010	9:00	comp.down	486	Bert
10/16/2010	15:00	30.17	470	Bert
10/17/2010	9:00		449	Bert
10/17/2010	15:00		498	Bert
10/19/2010	9:00		519	Brenda
10/19/2010	15:00	30.17	480	Brenda
10/20/2010	9:00	30.20	530	Brenda
10/20/2010	15:00	30.09	520	Brenda
10/21/2010	9:00	30.08	520	Brenda
10/21/2010	15:00	29.97	531	Brenda
10/22/2010	15:00		595	Alex
10/23/2010	9:00		594	Alex
10/23/2010	15:00		584	Alex
10/24/2010	9:00		590	Alex
10/24/2010	15:00		578	Alex
10/25/2010	9:00		605	Alex
10/25/2010	15:00		599	Alex
10/26/2010	9:00	29.87	561	Brenda
10/26/2010	15:00	29.85	610	Brenda
10/27/2010	9:00	30.23	573	Brenda
10/27/2010	15:00	30.34	528	Brenda
10/28/2010	9:00	30.54	508	Brenda
10/28/2010	15:00	30.46	487	Brenda
10/29/2010	9:00	30.37	492	Brenda
10/29/2010	15:00	30.35	481	Brenda
10/30/2010	9:00	30.11	478	Bert
10/30/2010	15:00	29.90	498	Bert
10/31/2010	9:00	30.21	472	Bert
10/31/2010	15:00	30.18	500	Bert
			31638	536

Crandall Canyon Mine Flows

Date	Time	Pressure	GPM	Recorded by:
11/1/2010	9:00	30.34	498	Bert
11/1/2010	15:00	30.34	473	Bert
11/2/2010	10:00	30.57	458	Bert
11/2/2010	15:00	30.29	471	Bert
11/3/2010	9:00	30.55	436	Brenda
11/3/2010	15:00	30.55	420	Brenda
11/4/2010	9:00	30.42	461	Brenda
11/4/2010	15:00	30.33	444	Brenda
11/5/2010	9:00	30.30	481	Brenda
11/5/2010	15:00	30.23	475	Brenda
11/6/2010	9:00	30.27	491	Brenda
11/6/2010	15:00	30.19	485	Brenda
11/7/2010	9:00	30.12	518	Bert
11/7/2010	15:00	30.05	502	Bert
11/8/2010	9:00	29.80	570	Bert
11/8/2010	15:00	29.79	552	Bert
11/9/2010	9:00	29.90	605	Bert
11/9/2010	15:00	29.91	597	Bert
11/10/2010	9:00	29.92	608	Bert
11/10/2010	15:00	29.88	598	Bert
11/11/2010		30.20	574	Brenda
11/11/2010	15:00	30.25	545	Brenda
11/12/2010	9:00	30.54	493	Brenda
11/12/2010	15:00	30.36	483	Brenda
11/13/2010	9:00	30.35	497	Brenda
11/13/2010	15:00	30.20	492	Brenda
11/14/2010	9:00	30.11	522	Brenda
11/14/2010	15:00	30.01		Brenda
11/15/2010	9:00	29.90	557	Bert
11/15/2010	15:00	29.99	551	Bert
11/16/2010	9:00	29.87	541	Bert
11/16/2010	15:00	29.75	561	Bert
11/17/2010	9:00	30.27	555	Bert
11/17/2010	15:00	30.25	522	Bert
11/18/2010	9:00	30.16	510	Bert
11/18/2010	15:00			Bert
11/19/2010	9:00	30.02	519	Brenda
11/19/2010	15:00	29.91	506	Brenda
11/20/2010	9:00	29.77	568	Brenda
11/20/2010	15:00	29.65	573	Brenda
11/21/2010	9:00	29.64	586	Brenda
11/21/2010	15:00	29.50	603	Brenda
11/22/2010	9:00	29.82	604	Brenda
11/22/2010	15:00	29.87	586	Brenda
11/23/2010	9:00	29.88	581	Bert
11/23/2010	15:00	29.67	553	Bert
11/24/2010	9:00	29.76	555	Bert
11/24/2010	15:00	29.87	529	Bert
11/25/2010	9:00	30.18	555	Bert
11/25/2010	15:00	30.19	524	Bert
11/26/2010	9:00	30.38	504	Bert
11/26/2010	15:00	30.28	510	Bert
11/27/2010	9:00	30.07	505	Brenda
11/27/2010	15:00	29.87	469	Brenda
11/28/2010	9:00	29.49	meter out	Brenda
11/28/2010	15:00		meter out	Brenda
11/29/2010	9:00		meter out	Brenda
11/29/2010	15:00		meter out	Brenda
11/30/2010	9:00		meter out	Brenda
11/30/2010	15:00		meter out	Brenda
			27376	526

RCRA SLUDGE ANALYSIS



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 4/15/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 Flock
Sampled By: D.M.
Date: 4/8/2010 Time: 11:00
Received
Date: 4/8/2010 Time: 14:05

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU

Notes:

Lab I.D. #: 999 Mine Code 8 Site Code

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Metals by ICP</u>							
Arsenic, Total	<0.10	mg/L	0.10	EPA 200.7	4/13/2010	10:37	BLP
Barium, Total	0.825	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
Cadmium, Total	<0.02	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
Chromium, Total	<0.02	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
Lead, Total	<0.05	mg/L	0.050	EPA 200.7	4/13/2010	10:37	BLP
Selenium, Total	<0.10	mg/L	0.10	EPA 200.7	4/14/2010	10:35	BLP
Silver, Total	<0.02	mg/L	0.020	EPA 200.7	4/13/2010	10:37	BLP
<u>Manual Cold Vapor</u>							
Mercury, Total	<0.0005	mg/L	0.0005	EPA 245.1	4/14/2010	13:57	BLP

Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.

MONTHLY UPDES SAMPLES

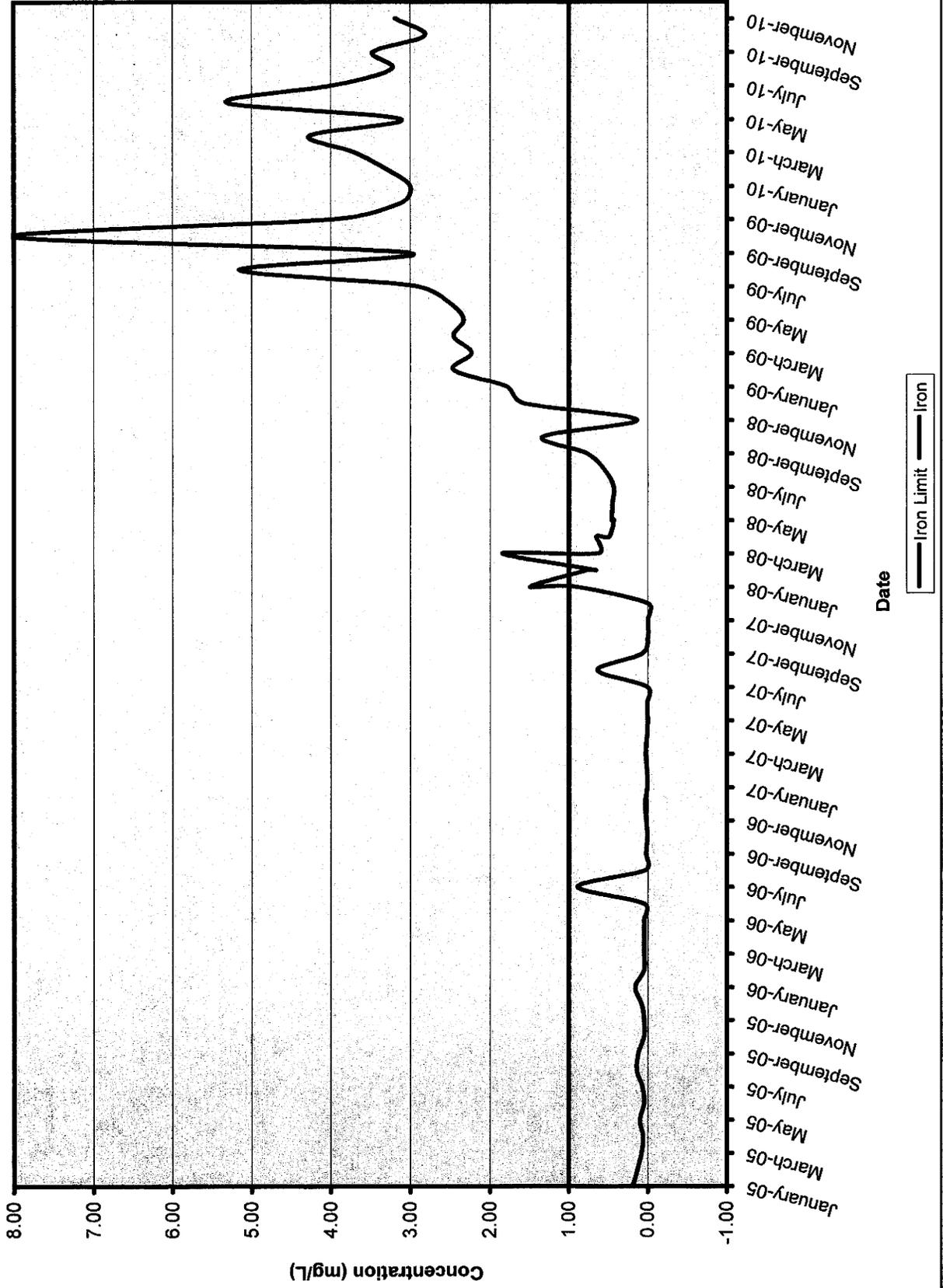
Crandall Canyon Mine

Pre-Treatment Mine Water 2010

Parameter	Units	January	February	March	April	May	June
Field							
pH	std. units	6.98	7.76	7.27	6.91	6.93	7.26
Temperature	deg. C	8.1	10.1	10.9	10.2	11	13.5
Conductivity	µmhos/cm2	1010	1030	1030	1000	1000	981
Dissolved Oxygen	mg/L	4.89	5.31	6.31	6.53	5.23	4.3
Lab							
Iron	total, mg/L	3.000	3.300	3.709	4.268	3.119	5.312
Iron	dissolved, mg/L	0.9	1.3	1.531	1.11	0.965	0.689
Iron	ferrous, mg/L	<0.10	0.77	1.2	1.23		0.848
Aluminum	total, mg/L	<0.10	<0.10	0.13	<0.02	0.04	0.06
Aluminum	dissolved, mg/L	<0.10	<0.10	0.11	<0.02	<0.02	<0.02
Manganese	total, mg/L	0.14	0.13	0.13	0.114	0.126	0.134
Manganese	dissolved, mg/L	0.14	0.13	0.13	0.124	0.126	0.114
Alkalinity	Bicarbonate, mg/L	381	379	374	380	382	380
Alkalinity	Carbonate, mg/L	<10	<10	<10	<10	<10	<10
Alkalinity	Total	381	379	374	380	382	380
Sulfate	mg/L	159	170	174	182.2	183.6	170
TDS	mg/L	648	631	625	624	630	646
Suspended Solids	mg/L	7	6	6	8	6	8
Chloride	mg/L						
Calcium	Dissolved, mg/L						
Potassium	Dissolved, mg/L						
Sodium	Dissolved, mg/L						
Magnesium	Dissolved, mg/L						
Silica	Dissolved, mg/L						
Hot Acidity	mg/L						

Crandall Canyon Mine											
Pre-Treatment Mine Water 2010											
Parameter	Units	July	August	September	October	November	December				
Field											
pH	std. units	7.27	7.1	7.05	6.97	7.21					
Temperature	deg. C	16	11	12	11	11					
Conductivity	µmhos/cm2	956	564	950	937	939					
Dissolved Oxygen	mg/L	4.48	4.53	4.58	4.35	6.73					
Lab											
Iron	total, mg/L	3.970	3.230	3.470	2.810	3.190					
Iron	dissolved, mg/L	0.73	0.83	0.69	0.61	<0.03					
Iron	ferrous, mg/L	1.04	1.187	1.004	0.912	1.29					
Aluminum	total, mg/L	<0.03	<0.03	<0.03	0.06	<0.03					
Aluminum	dissolved, mg/L	<0.03	<0.03	<0.03	<0.03	<0.03					
Manganese	total, mg/L	0.113	0.113	0.112	0.11	0.104					
Manganese	dissolved, mg/L	0.113	0.113	0.112	0.11	0.104					
Alkalinity	Bicarbonate, mg/L	370	374	375	380	378					
Alkalinity	Carbonate, mg/L	<5	<5	<5	<5	<5					
Alkalinity	Total	370	374	375	380	378					
Sulfate	mg/L	158	157	168	167	160					
TDS	mg/L	606	618	598	600	609					
Suspended Solids	mg/L	8	10	7	<5	6					
Chloride	mg/L		10	11	11	11					
Calcium	Dissolved, mg/L		100.41	100.85	100.2	97.67					
Potassium	Dissolved, mg/L		8.24	8.27	8.27	8					
Sodium	Dissolved, mg/L		35.06	34.59	35.88	34.37					
Magnesium	Dissolved, mg/L		55.69	55.31	55.17	54.35					
Silica	Dissolved, mg/L		7.4	9.2	8.66	8.84					
Hot Acidity	mg/L		-372	-370	-368	-368					

Genwal Resources, Inc. (002) - Total Iron Average
Pre-Treatment Mine Water



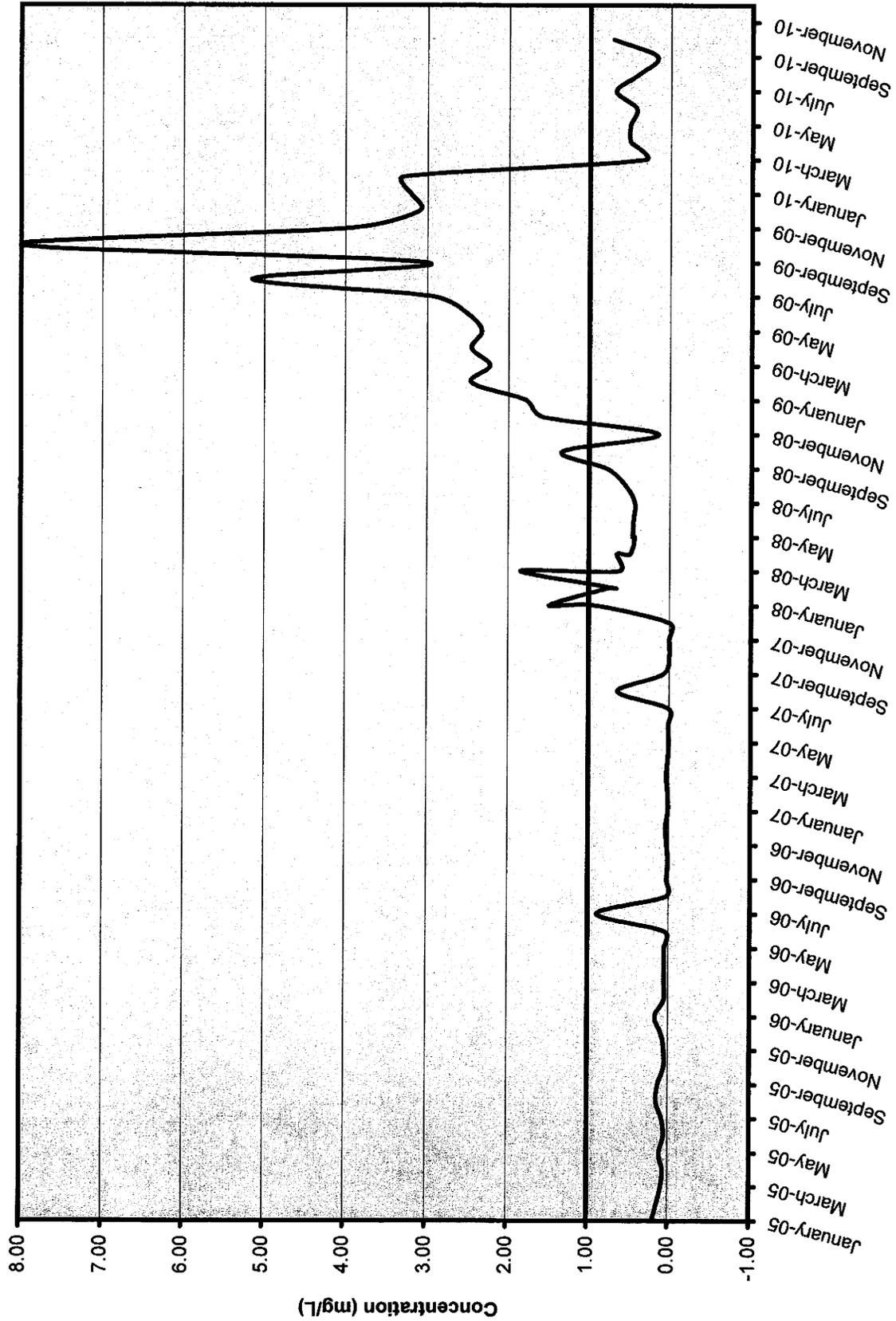
Crandall Canyon Mine

Post-Treatment Mine Water 2010

Parameter	Units	January	February	March	April	May	June
Field							
pH	std. units	7.42	7.94	7.76	7.06	7.14	8.07
Temperature	deg. C	8	11.2	9.7	10.4	10.5	13.7
Conductivity	µmhos/cm2	990	1040	990	970	980	983
Dissolved Oxygen	mg/L	10.21	8.69	8.51	8.37	9.8	8.67
Lab							
Iron	total, mg/L	3.2	3.3	0.323	0.497	0.502	0.427
Iron	dissolved, mg/L	<0.10	0.12	0.011	0.064	<0.010	<0.010
Iron	ferrous, mg/L	<0.10	<0.10	0.07	0.404	0.144	0.132
Aluminum	total, mg/L	<0.10	<0.10	0.68	1.31	1.00	1.04
Aluminum	dissolved, mg/L	<0.10	<0.10	0.12	0.16	<0.02	0.02
Manganese	total, mg/L	0.14	0.13	0.117	0.106	0.103	0.119
Manganese	dissolved, mg/L	0.14	0.13	0.117	0.106	0.108	0.100
Alkalinity	Bicarbonate, mg/L	369	367	360	365	373	373
Alkalinity	Carbonate, mg/L	<10	<10	<10	<10	<10	<10
Alkalinity	Total	369	367	360	365	373	373
Sulfate	mg/L	160	169.4	173	179.8	185.2	171
TDS	mg/L	652	621	620	616	628	628
Suspended Solids	mg/L	6	10	7	7	4	<4

Crandall Canyon Mine Post-Treatment Mine Water 2010							
Parameter	Units	July	August	September	October	November	December
Field							
pH	std. units	7.98	7.6	7.53	7.47	7.67	
Temperature	deg. C	13	12	13	9	9	
Conductivity	µmhos/cm2	929	877	939	933	925	
Dissolved Oxygen	mg/L	8.46	9.43	10.67	11.23	11.71	
Lab							
Iron	total, mg/L	0.68	0.39	0.17	0.71	0.43	
Iron	dissolved, mg/L	0.04	0.04	0.05	0.06	<0.03	
Iron	ferrous, mg/L	0.44	0.321	0.24	0.03	0.121	
Aluminum	total, mg/L	2.34	1.41	0.27	0.5	0.55	
Aluminum	dissolved, mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	
Manganese	total, mg/L	0.095	0.109	0.107	0.109	0.101	
Manganese	dissolved, mg/L	0.095	0.109	0.107	0.109	0.101	
Alkalinity	Bicarbonate, mg/L	359	360	373	380	362	
Alkalinity	Carbonate, mg/L	<5	<5	<5	<5	<5	
Alkalinity	Total	359	360	373	380	362	
Sulfate	mg/L	157	153	164	166	159	
TDS	mg/L	610	622	591	605	617	
Suspended Solids	mg/L	11	<5	<5	<5	<5	

Genwal Resources, Inc. (002) - Total Iron Average
Post-Treatment Mine Water



— Iron Limit — Iron



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 2/12/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002 - Pre Treatment
Sampled By: DK
Date: 1/28/2010 Time: 14:30
Received
Date: 1/28/2010 Time: 17:00

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
1010	8.1	6.98	4.89	

Notes:

Lab I.D. #: 949 Mine Code 8 Site Code

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	381	mg/L as CaCO ₃	10	SM2320-B-97	2/2/2010	9:28	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	2/2/2010	9:28	BLP
Alkalinity, Total	381	mg/L as CaCO ₃	20	SM2320-B-97	2/2/2010	9:28	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	2/11/2010	8:44	BLP
Solids, Total Dissolved	648	mg/L	20	SM 2540 C-97	1/28/2010	17:11	BLP
Solids, Total Suspended	7	mg/L	4	SM 2540 D-97	1/28/2010	17:11	BLP
<u>I.C./F.I.A.</u>							
Sulfate	159.0	mg/L	1	EPA 300.0	2/5/2010	10:45	BLP

Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 2/12/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002
Sampled By: DK
Date: 1/28/2010 Time: 14:45
Received
Date: 1/28/2010 Time: 17:00

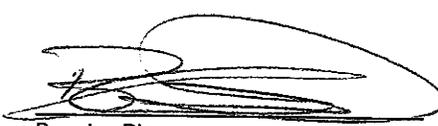
Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
990	8	7.42	10.21	

Notes:

Lab I.D. #: 950 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	369	mg/L as CaCO ₃	10	SM2320-B-97	2/2/2010	9:28	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	2/2/2010	9:28	BLP
Alkalinity, Total	369	mg/L as CaCO ₃	20	SM2320-B-97	2/2/2010	9:28	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	2/11/2010	8:44	BLP
Solids, Total Dissolved	652	mg/L	20	SM 2540 C-97	1/28/2010	17:11	BLP
Solids, Total Suspended	6	mg/L	4	SM 2540 D-97	1/28/2010	17:11	BLP
<u>I.C./F.I.A.</u>							
Sulfate	160.0	mg/L	1	EPA 300.0	2/5/2010	10:45	BLP


 Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



AMERICAN
WEST
ANALYTICAL
LABORATORIES

Karla Knoop
JBR Environmental Consultants, Inc.
8160 So. Highland Dr. Ste A-4
Sandy, UT 84093-

TEL: (801) 943-4144

FAX: (801) 942-1852

RE: Crandall Canyon

463 West 3600 South
Salt Lake City, Utah
84115

Dear Karla Knoop:

Lab Set ID: 1001409

American West Analytical Laboratories received 2 sample(s) on 1/29/2010 for the analyses presented in the following report.

All analyses were performed in accordance to The NELAC Institute protocols unless noted otherwise. American West Analytical Laboratories is certified by The NELAC Institute in the following states: Utah, Colorado, Idaho, and Texas. Certification document is available upon request. If you have any questions or concerns regarding this report please feel free to call.

(801) 263-8686

Toll Free (888) 263-8686

Fax (801) 263-8687

-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or purging efficiency. The "Reporting Limit" found on the report is equivalent to the practical quantitation limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit.

This is a revision to a report originally issued 2/1/2010. Pages 1, 4, and 5 have been revised.

Thank You,

Approved by:

Laboratory Director or designee

Report Date: 2/1/2010 Page 1 of 15

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



INORGANIC ANALYTICAL REPORT

Client: JBR Environmental Consultants, Inc. **Contact:** Karla Knoop
Project: Crandall Canyon
Lab Sample ID: 1001409-001
Client Sample ID: 002 - Pretreatment
Collection Date: 1/28/2010 2:30:00 PM
Received Date: 1/29/2010

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

463 West 3600 South
Salt Lake City, Utah
84115

TOTAL METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	1/29/2010 7:19:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	1/29/2010 5:43:00 PM	SW6010C	0.10	3.0	
Manganese	mg/L	1/29/2010 4:46:00 PM	SW6020A	0.0012	0.14	

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Report Date: 2/1/2010 Page 2 of 15

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



INORGANIC ANALYTICAL REPORT

Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall Canyon
Lab Sample ID: 1001409-002
Client Sample ID: 002
Collection Date: 1/28/2010 2:45:00 PM
Received Date: 1/29/2010

AMERICAN
WEST
ANALYTICAL
LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

TOTAL METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	1/29/2010 7:31:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	1/29/2010 5:59:00 PM	SW6010C	0.10	3.2	
Manganese	mg/L	1/29/2010 5:14:59 PM	SW6020A	0.0012	0.14	

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer



INORGANIC ANALYTICAL REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall Canyon
Lab Sample ID: 1001409-001
Client Sample ID: 002 - Pretreatment
Collection Date: 1/28/2010 2:30:00 PM
Received Date: 1/29/2010

DISSOLVED METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	1/29/2010 4:43:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	1/29/2010 4:43:00 PM	SW6010C	0.10	0.90	
Manganese	mg/L	1/29/2010 5:58:11 PM	SW6020A	0.0012	0.14	

Reissue of a previously generated report. An unnecessary footnote has been removed. Information herein supersedes that of previously issued reports.

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Report Date: 2/1/2010 Page 4 of 15

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



INORGANIC ANALYTICAL REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall Canyon
Lab Sample ID: 1001409-002
Client Sample ID: 002
Collection Date: 1/28/2010 2:45:00 PM
Received Date: 1/29/2010

DISSOLVED METALS

463 West 3600 South
Salt Lake City, Utah
84115

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	1/29/2010 4:59:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	1/29/2010 4:59:00 PM	SW6010C	0.10	< 0.10	
Manganese	mg/L	1/29/2010 6:27:13 PM	SW6020A	0.0012	0.14	

Reissue of a previously generated report. An unnecessary footnote has been removed. Information herein supersedes that of previously issued reports.

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Report Date: 2/1/2010 Page 5 of 15

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



INORGANIC ANALYTICAL REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall Canyon
Lab Sample ID: 1001409-001
Client Sample ID: 002 - Pretreatment
Collection Date: 1/28/2010 2:30:00 PM
Received Date: 1/29/2010

463 West 3600 South
Salt Lake City, Utah
84115

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Iron, Ferrous	mg/L	1/29/2010 10:00:00 AM	HACH 8146	0.10	< 0.10	

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Report Date: 2/1/2010 Page 6 of 15

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



INORGANIC ANALYTICAL REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall Canyon
Lab Sample ID: 1001409-002
Client Sample ID: 002
Collection Date: 1/28/2010 2:45:00 PM
Received Date: 1/29/2010

463 West 3600 South
Salt Lake City, Utah
84115

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Iron, Ferrous	mg/L	1/29/2010 10:00:00 AM	HACH 8146	0.10	< 0.10	

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Report Date: 2/1/2010 Page 7 of 15

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

 Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1001409
Project: Crandall Canyon

Dept: ME
SampType: LCS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	% REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
LCS-4907	Aluminum	mg/L	SW6010C	1.1	1.000	0	110	75-125				1/29/2010
LCS-4907	Iron	mg/L	SW6010C	1.1	1.000	0	106	75-125				1/29/2010
LCS-4908	Iron	mg/L	SW6010C	1.0	1.000	0	103	75-125				1/29/2010
LCS-4908	Aluminum	mg/L	SW6010C	1.1	1.000	0.02998	104	75-125				1/29/2010
LCS-4907	Manganese	mg/L	SW6020A	0.20	0.2000	0	99.9	85-115				1/29/2010
LCS-4908	Manganese	mg/L	SW6020A	0.20	0.2000	0	100	85-115				1/29/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Permit sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Pictorial or subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.

Lab Set ID: 1001409

Project: Crandall Canyon

Dept: ME
 SampType: MBLK

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
MB-4907	Aluminum	mg/L	SW6010C	< 0.10				-				1/29/2010
MB-4907	Iron	mg/L	SW6010C	< 0.10				-				1/29/2010
MB-4908	Iron	mg/L	SW6010C	< 0.10				-				1/29/2010
MB-4908	Aluminum	mg/L	SW6010C	< 0.10				-				1/29/2010
MB-4907	Manganese	mg/L	SW6020A	< 0.0012				-				1/29/2010
MB-4908	Manganese	mg/L	SW6020A	< 0.0012				-				1/29/2010



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.

Lab Set ID: 1001409

Project: Crandall Canyon

Dept: ME

SampType: MS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
1001409-001BMS	Aluminum	mg/L	SW6010C	0.98	1.000	0	98.5	75-125				1/29/2010
1001409-001BMS	Iron	mg/L	SW6010C	1.9	1.000	0.8960	103	75-125				1/29/2010
1001409-001AMS	Iron	mg/L	SW6010C	3.9	1.000	2.960	96.0	75-125				1/29/2010
1001409-001AMS	Aluminum	mg/L	SW6010C	1.2	1.000	0.08307	108	75-125				1/29/2010
1001409-001BMS	Manganese	mg/L	SW6020A	0.34	0.2000	0.1372	101	70-130				1/29/2010
1001409-001AMS	Manganese	mg/L	SW6020A	0.34	0.2000	0.1397	97.8	70-130				1/29/2010



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

 Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1001409
Project: Crandall Canyon

Dept: ME
SampType: MSD

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
1001409-001BMSD	Aluminum	mg/L	SW6010C	0.92	1.000	0	91.9	75-125	6.93	20		1/29/2010
1001409-001BMSD	Iron	mg/L	SW6010C	1.9	1.000	0.8960	104	75-125	0.517	20		1/29/2010
1001409-001AMS	Iron	mg/L	SW6010C	4.0	1.000	2.960	101	75-125	1.27	20		1/29/2010
1001409-001AMS	Aluminum	mg/L	SW6010C	1.2	1.000	0.08307	107	75-125	0.439	20		1/29/2010
1001409-001BMSD	Manganese	mg/L	SW6020A	0.34	0.2000	0.1372	101	70-130	0.456	20		1/29/2010
1001409-001AMS	Manganese	mg/L	SW6020A	0.34	0.2000	0.1397	99.3	70-130	0.894	20		1/29/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Evidence of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

 Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1001409
Project: Crandall Canyon

Dept: WC
SampType: LCS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
LCS-R10805	Iron, Ferrrous	mg/L	HACH 8146	0.94	1.000	0	94.0	90-110				1/29/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1001409
Project: Crandall Canyon

Dept: WC
SampType: MBLK

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
MB-R10805	Iron, Ferrous	mg/L	HACH 8146	< 0.10								1/29/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Payment sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.

Lab Set ID: 1001409

Project: Crandall Canyon

Dept: WC

SampleType: MS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
1001409-002CMS	Iron, Ferrous	mg/L	HACH 8146	0.92	1.000	0	92.0	80-120				1/29/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pertinent sampling information is located on the attached CDC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertising, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

 Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1001409
Project: Crandall Canyon

Dept: WC
SampType: MSD

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
1001409-002CMSD	Iron, Ferrous	mg/L	HACH 8146	0.95	1.000	0	95.0	80-120	3.21	15		1/29/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the republication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 3/12/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002 Pre
Sampled By: JRS/DM
Date: 2/23/2010 **Time:** 15:15
Received
Date: 2/23/2010 **Time:** 16:37

Field Measurements					
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU	
1030	10.1	7.76	5.31		

Notes:

Lab I.D. #: 958 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
Wet Chem.							
Alkalinity, Bicarbonate	379	mg/L as CaCO ₃	10	SM2320-B-97	3/2/2010	9:40	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	3/2/2010	9:40	BLP
Alkalinity, Total	379	mg/L as CaCO ₃	20	SM2320-B-97	3/2/2010	9:40	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	3/11/2010	8:28	BLP
Solids, Total Dissolved	631	mg/L	20	SM 2540 C-97	3/1/2010	15:18	BLP
Solids, Total Suspended	6	mg/L	4	SM 2540 D-97	3/1/2010	15:18	BLP
I.C./F.I.A.							
Sulfate	170.0	mg/L	1	EPA 300.0	2/25/2010	14:07	BLP

Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 3/12/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002 Post
 Sampled By: JRS/DM
Date: Time:
 2/23/2010 14:33
 Received
Date: Time:
 2/23/2010 16:37

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
1040	11.2	7.94	8.69	

Notes:

Lab I.D. #: 957 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	367	mg/L as CaCO ₃	10	SM2320-B-97	3/2/2010	9:40	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	3/2/2010	9:40	BLP
Alkalinity, Total	367	mg/L as CaCO ₃	20	SM2320-B-97	3/2/2010	9:40	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	3/11/2010	8:28	BLP
Solids, Total Dissolved	621	mg/L	20	SM 2540 C-97	3/1/2010	15:18	BLP
Solids, Total Suspended	10	mg/L	4	SM 2540 D-97	3/1/2010	15:18	BLP
<u>I.C./F.I.A.</u>							
Sulfate	169.4	mg/L	1	EPA 300.0	2/25/2010	14:07	BLP

Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



AMERICAN WEST ANALYTICAL LABORATORIES
Karla Knoop
JBR Environmental Consultants, Inc.
8160 So. Highland Dr. Ste A-4
Sandy, UT 84093-
TEL: (801) 943-4144
FAX (801) 942-1852

RE: Crandall / Genwall

463 West 3600 South
Salt Lake City, Utah
84115

Dear Karla Knoop:

Lab Set ID: 1002365

American West Analytical Laboratories received 2 sample(s) on 2/23/2010 for the analyses presented in the following report.

All analyses were performed in accordance to The NELAC Institute protocols unless noted otherwise. American West Analytical Laboratories is certified by The NELAC Institute in the following states: Utah, Colorado, Idaho, and Texas. Certification document is available upon request. If you have any questions or concerns regarding this report please feel free to call.

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or purging efficiency. The "Reporting Limit" found on the report is equivalent to the practical quantitation limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit.

Thank You,

Approved by: Jose G. Rocha
Laboratory Director or designee



INORGANIC ANALYTICAL REPORT

Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall / Genwall
Lab Sample ID: 1002365-001
Client Sample ID: 002-Post
Collection Date: 2/23/2010 2:33:00 PM
Received Date: 2/23/2010

AMERICAN
WEST
ANALYTICAL
LABORATORIES

DISSOLVED METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	2/25/2010 8:06:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	2/25/2010 8:06:00 PM	SW6010C	0.10	0.12	
Manganese	mg/L	2/24/2010 8:20:43 PM	SW6020A	0.0012	0.13	

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer



INORGANIC ANALYTICAL REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall / Genwall
Lab Sample ID: 1002365-002
Client Sample ID: 002-Pretreatment
Collection Date: 2/23/2010 3:15:00 PM
Received Date: 2/23/2010

DISSOLVED METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	2/25/2010 8:21:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	2/25/2010 8:21:00 PM	SW6010C	0.10	1.3	
Manganese	mg/L	2/24/2010 9:07:12 PM	SW6020A	0.0012	0.13	

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686

Toll Free (888) 263-8686

Fax (801) 263-8687

mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer



INORGANIC ANALYTICAL REPORT

Client: JBR Environmental Consultants, Inc. **Contact:** Karla Knoop
Project: Crandall / Genwall
Lab Sample ID: 1002365-001
Client Sample ID: 002-Post
Collection Date: 2/23/2010 2:33:00 PM
Received Date: 2/23/2010

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

TOTAL METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	2/25/2010 7:24:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	2/25/2010 7:24:00 PM	SW6010C	0.10	3.3	
Manganese	mg/L	2/24/2010 9:24:38 PM	SW6020A	0.0012	0.13	

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer



INORGANIC ANALYTICAL REPORT

Client: JBR Environmental Consultants, Inc. **Contact:** Karla Knoop
Project: Crandall / Genwall
Lab Sample ID: 1002365-002
Client Sample ID: 002-Pretreatment
Collection Date: 2/23/2010 3:15:00 PM
Received Date: 2/23/2010

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

TOTAL METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Aluminum	mg/L	2/25/2010 7:39:00 PM	SW6010C	0.10	< 0.10	
Iron	mg/L	2/25/2010 7:39:00 PM	SW6010C	0.10	3.3	
Manganese	mg/L	2/24/2010 10:11:05 PM	SW6020A	0.0012	0.13	

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer



INORGANIC ANALYTICAL REPORT

AMERICAN WEST ANALYTICAL LABORATORIES
Client: JBR Environmental Consultants, Inc. Contact: Karla Knoop
Project: Crandall / Genwall
Lab Sample ID: 1002365-001
Client Sample ID: 002-Post
Collection Date: 2/23/2010 2:33:00 PM
Received Date: 2/23/2010

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Iron, Ferrous	mg/L	2/23/2010 6:30:00 PM	HACH 8146	0.10	< 0.10	

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer



INORGANIC ANALYTICAL REPORT

Client: JBR Environmental Consultants, Inc. **Contact:** Karla Knoop
Project: Crandall / Genwall
Lab Sample ID: 1002365-002
Client Sample ID: 002-Pretreatment
Collection Date: 2/23/2010 3:15:00 PM
Received Date: 2/23/2010

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Iron, Ferrous	mg/L	2/23/2010 6:30:00 PM	HACH 8146	0.10	0.77	

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
-mail: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1002365
Project: Crandall / Genwall

Dept: ME
SampType: LCS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	% REC	Limits	% RPD	RPD Limit	Qualifiers	Analysis Date
LCS-5295	Aluminum	mg/L	SW6010C	1.0	1.000	0	103	75-125				2/25/2010
LCS-5295	Iron	mg/L	SW6010C	0.99	1.000	0	98.5	75-125				2/25/2010
LCS-5296	Aluminum	mg/L	SW6010C	1.1	1.000	0	105	75-125				2/25/2010
LCS-5296	Iron	mg/L	SW6010C	0.99	1.000	0	98.6	75-125				2/25/2010
LCS-5295	Manganese	mg/L	SW6020A	0.21	0.2000	0	103	85-115				2/24/2010
LCS-5296	Manganese	mg/L	SW6020A	0.21	0.2000	0	104	85-115				2/24/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the environment, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1002365
Project: Crandall / Genwall

Dept: ME
Sample Type: MBLK

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	% REC	Limits	% RPD	RPD Limit	Qualifiers	Analysis Date
MB-5295	Aluminum	mg/L	SW6010C	< 0.10				-				2/25/2010
MB-5295	Iron	mg/L	SW6010C	< 0.10				-				2/25/2010
MB-5296	Aluminum	mg/L	SW6010C	< 0.10				-				2/25/2010
MB-5296	Iron	mg/L	SW6010C	< 0.10				-				2/25/2010
MB-5295	Manganese	mg/L	SW6020A	< 0.0012				-				2/24/2010
MB-5296	Manganese	mg/L	SW6020A	< 0.0012				-				2/24/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.

Lab Set ID: 1002365

Project: Crandall / Genwall

Dept: ME

SampType: MS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
1002365-001BMS	Aluminum	mg/L	SW6010C	1.1	1.000	0	107	75-125				2/25/2010
1002365-001BMS	Iron	mg/L	SW6010C	1.1	1.000	0.1163	103	75-125				2/25/2010
1002365-001AMS	Aluminum	mg/L	SW6010C	1.1	1.000	0.04110	102	75-125				2/25/2010
1002365-001AMS	Iron	mg/L	SW6010C	4.2	1.000	3.276	93.6	75-125				2/25/2010
1002365-001BMS	Manganese	mg/L	SW6020A	0.33	0.2000	0.1273	99.8	70-130				2/24/2010
1002365-001AMS	Manganese	mg/L	SW6020A	0.33	0.2000	0.1297	98.5	70-130				2/24/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pending sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion, or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and accuracy in the strictest of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES

Kyle F. Gross
Laboratory Director

463 West 3600 South

Salt Lake City, Utah 84115

(801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687

e-mail: awal@awal-labs.com, web: www.awal-labs.com

Jose Rocha
QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.

Lab Set ID: 1002365

Project: Crandall / Genwall

Dept: ME

SampType: MSD

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	% REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
1002365-001BM/MSD	Aluminum	mg/L	SW6010C	1.1	1.000	0	106	75-125	0.964	20		2/25/2010
1002365-001BM/MSD	Iron	mg/L	SW6010C	1.1	1.000	0.1163	101	75-125	1.99	20		2/25/2010
1002365-001AM/MSD	Aluminum	mg/L	SW6010C	1.0	1.000	0.04110	101	75-125	1.36	20		2/25/2010
1002365-001AM/MSD	Iron	mg/L	SW6010C	4.2	1.000	3.276	88.5	75-125	1.22	20		2/25/2010
1002365-001BM/MSD	Manganese	mg/L	SW6020A	0.32	0.2000	0.1273	97.2	70-130	1.62	20		2/24/2010
1002365-001AM/MSD	Manganese	mg/L	SW6020A	0.33	0.2000	0.1297	97.9	70-130	0.361	20		2/24/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

463 West 3600 South

Salt Lake City, Utah 84115

(801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687

e-mail: awal@awal-labs.com, web: www.awal-labs.com

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.

Lab Set ID: 1002365

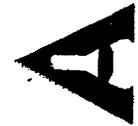
Project: Crandall / Genwall

Dept: WC

SampType: LCS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
LCS-R11577	Iron, Ferrous	mg/L	HACH 8146	0.95	1.000	0	95.0	90-110				2/23/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES

Kyle F. Gross
Laboratory Director

463 West 3600 South

Salt Lake City, Utah 84115

(801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687

e-mail: awal@awal-labs.com, web: www.awal-labs.com

Jose Rocha
QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.

Lab Set ID: 1002365

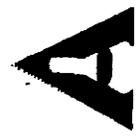
Project: Crandall / Genwall

Dept: WC

SampleType: MBLK

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
MB-R11577	Iron, Ferrrous	mg/L	HACH 8146	< 0.10								2/23/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Pending sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than that to the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1002365
Project: Crandall / Genwall

Dept: WC
SampType: MS

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	% REC	Limits	% RPD	RPD Limit	Qualifiers	Analysis Date
1002365-001CMS	Iron, Ferrrous	mg/L	HACH 8146	0.94	1.000	0	94.0	80-120				2/23/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Permit sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith.



AMERICAN WEST ANALYTICAL LABORATORIES
 463 West 3600 South
 Salt Lake City, Utah 84115
 (801) 263-8686, Toll Free (888) 263-8686, Fax (801) 263-8687
 e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer

QC SUMMARY REPORT

CLIENT: JBR Environmental Consultants, Inc.
Lab Set ID: 1002365
Project: Crandall / Genwall

Dept: WC
SampType: MSD

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	% REC	Limits	% RPD	RPD Limit	Qualifiers	Analysis Date
1002365-001CMSD	Iron, Ferrrous	mg/L	HACH 8146	0.95	1.000	0	95.0	80-120	1.06	15		2/23/2010

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAP protocols. Permit sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

American West Analytical Laboratories

WORK ORDER Summary

23-Feb-10

Work Order: 1002365

WO Type: Standard

Client ID: JBR400	Contact: Karla Kroop
Project ID: Crandall / Genwall	PM:
Project: Crandall / Genwall	QC Level: LEVEL II
ChkList Completed On: 2/23/2010	Completed By: <i>HW</i>
ChkList Reviewed On: 2/23/2010	Reviewed By: <i>HW</i>
WO Reviewed On: 2/23/2010	Reviewed By: 50 <i>HW</i>

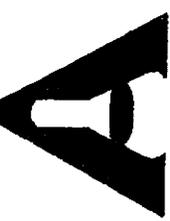
COMMENTS:

PA Rush; QC2;

SP

Sample ID	Client Sample ID	Date Collected	Date Received	Date Due	Matrix	Test Code	Hld	MS	SEL	Sub	Storage
1002365-001A	002-Post	2/23/2010 2:33:00 PM	2/23/2010 6:12:16 PM	3/4/2010	Aqueous	3005A-ICPMS-PR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	df - met
	SEL Analytes: AL FE			3/4/2010		6010C-W	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - met
	SEL Analytes: MN			3/4/2010		6020-W	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - met
1002365-001B				3/4/2010		3005A-DIS-PR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	df - dis met
	SEL Analytes: AL FE			3/4/2010		6010C-DIS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - dis met
	SEL Analytes: MN			3/4/2010		6020-DIS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - dis met
1002365-001C				3/4/2010		FE2-W- HACH8146	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	df - fe2
1002365-002A	002-Pretreatment	2/23/2010 3:15:00 PM		3/4/2010		3005A-ICPMS-PR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	df - met
	SEL Analytes: AL FE			3/4/2010		6010C-W	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - met
	SEL Analytes: MN			3/4/2010		6020-W	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - met
1002365-002B				3/4/2010		3005A-DIS-PR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	df - dis met
	SEL Analytes: AL FE			3/4/2010		6010C-DIS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - dis met
	SEL Analytes: MN			3/4/2010		6020-DIS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	df - dis met
1002365-002C				3/4/2010		FE2-W- HACH8146	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	df - fe2

(801) 263-8686
(888) 263-8686
Fax (801) 263-8687
Email: awal@awal-labs.com



Address B160 HIGHLAND DR.
City SANDY State UT Zip 84083
Phone 801-943-4144 Fax 801-942-1852
Contact Karla Knorp
E-mail KKnorp@jbreenv.com
Project Name Crandall/Grenvall
Project Number/P.O.# —
Sampler Name Jamey Sage

Turn Around Time (Circle One)
1 day 2 day 3 day 4 day 5 day Standard

LABORATORY USE ONLY

SAMPLES WERE:
 1 Shipped or hand delivered: Y
 2 Ambient or Chilled: Y
 3 Temperature: -17
 4 Received Broken/Leaking (Improperly Sealed): Y
 5 Properly Preserved/Checked at Bench: Y
 6 Received Within Holding Times: Y

COC Tape Was:
 1 Present on Outer Package: Y
 2 Unbroken on Outer Package: Y
 3 Present on Sample: Y
 4 Unbroken on Sample: Y

Discrepancies Between Sample Labels and COC Record? Y

Date/Time Collected	Matrix	Number of Containers (Total)	TESTS REQUIRED				COMMENTS	QC LEVEL
			Fe	As	Pb	Cd		
2/23/09 1433	A	3	X	X	X	X	2+	
2/23/09 1515	A	3	X	X	X	X	3+	
							4	

Special Instructions: * Field Filtered

Relinquished By: Signature <u>Jamey Sage</u>	Received By: Signature <u>Salvatore Braddada</u>	Date <u>2/23/09</u>	Date <u>2/23/09</u>
PRINT NAME <u>Jamey Sage</u>	PRINT NAME <u>Salvatore Braddada</u>	Time <u>1809</u>	Time <u>1809</u>
Relinquished By: Signature	Received By: Signature	Date	Date
PRINT NAME	PRINT NAME	Time	Time
Relinquished By: Signature	Received By: Signature	Date	Date
PRINT NAME	PRINT NAME	Time	Time
Relinquished By: Signature	Received By: Signature	Date	Date
PRINT NAME	PRINT NAME	Time	Time



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 4/20/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002 Pre-Treatment
Sampled By: DM
Date: 3/26/2010 Time: 15:00
Received
Date: 3/26/2010 Time: 16:37

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
1030	10.9	7.27	6.31	

Notes:

Lab I.D. #: 987 Mine Code 8 Site Code

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
Wet Chem.							
Alkalinity, Bicarbonate	374	mg/L as CaCO ₃	10	SM2320-B-97	4/7/2010	10:09	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	4/7/2010	10:09	BLP
Alkalinity, Total	374	mg/L as CaCO ₃	20	SM2320-B-97	4/7/2010	10:09	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	4/19/2010	8:04	BLP
Solids, Total Dissolved	625	mg/L	20	SM 2540 C-97	3/30/2010	13:55	BLP
Solids, Total Suspended	6	mg/L	4	SM 2540 D-97	3/30/2010	13:55	BLP
I.C./F.I.A.							
Sulfate	174	mg/L	1	EPA 300.0	4/9/2010	15:56	BLP
Metals by ICP							
Aluminum, Dissolved	0.11	mg/L	0.02	EPA 200.7	3/30/2010	17:45	BLP
Aluminum, Total	0.13	mg/L	0.02	EPA 200.7	3/30/2010	11:35	BLP
Iron, Dissolved	1.531	mg/L	0.010	EPA 200.7	3/30/2010	17:45	BLP
Iron, Total	3.709	mg/L	0.010	EPA 200.7	3/30/2010	11:35	BLP
Manganese, Dissolved	0.130	mg/L	0.001	EPA 200.7	3/30/2010	17:45	BLP
Manganese, Total	0.130	mg/L	0.001	EPA 200.7	3/30/2010	11:35	BLP


 Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
Laboratory: 65 North 300 East Price, UT. 84501

Report Date
3/23/2010

Client
UtahAmerican Energy Inc.
Genwal Resources, Inc.
PO Box 1077
Price, UT. 84501
Dave Shaver
(435)888-4017

Sample I.D.
002
Sampled By: D.M.
Date: 3/18/2010 Time: 14:30
Received
Date: 3/18/2010 Time: 15:29

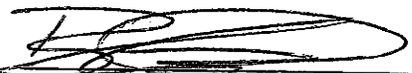
Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU

Notes:

Lab I.D. #: 971 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Metals by ICP</u> Iron, Total	0.323	mg/L	0.010	EPA 200.7	3/23/2010	8:17	BLP


Brandon Pierce
Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 4/20/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002
Sampled By: DM
Date: 3/26/2010 Time: 15:25
Received
Date: 3/26/2010 Time: 16:37

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
990	9.7	7.76	8.51	

Notes:

Lab I.D. #: 986 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
Wet Chem.							
Alkalinity, Bicarbonate	360	mg/L as CaCO ₃	10	SM2320-B-97	4/7/2010	10:09	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	4/7/2010	10:09	BLP
Alkalinity, Total	360	mg/L as CaCO ₃	20	SM2320-B-97	4/7/2010	10:09	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	4/19/2010	8:04	BLP
Solids, Total Dissolved	620	mg/L	20	SM 2540 C-97	3/30/2010	13:55	BLP
Solids, Total Suspended	7	mg/L	4	SM 2540 D-97	3/30/2010	13:55	BLP
I.C./F.I.A.							
Sulfate	173.00	mg/L	1	EPA 300.0	4/9/2010	15:56	BLP
Metals by ICP							
Aluminum, Dissolved	0.12	mg/L	0.02	EPA 200.7	3/30/2010	17:45	BLP
Aluminum, Total	0.68	mg/L	0.02	EPA 200.7	3/30/2010	11:35	BLP
Iron, Dissolved	0.011	mg/L	0.010	EPA 200.7	3/30/2010	17:45	BLP
Manganese, Dissolved	0.117	mg/L	0.001	EPA 200.7	3/30/2010	17:45	BLP
Manganese, Total	0.117	mg/L	0.001	EPA 200.7	3/30/2010	11:35	BLP


 Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 5/12/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002 - Pretreatment
 Sampled By: KDK
Date: 4/21/2010 Time: 10:15
 Received
Date: 4/21/2010 Time: 14:15

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
1000	10.2	6.91	6.53	

Notes:

Lab I.D. #: 1011 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	380	mg/L as CaCO ₃	10	SM2320-B-97	4/22/2010	9:35	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	4/22/2010	9:35	BLP
Alkalinity, Total	380	mg/L as CaCO ₃	20	SM2320-B-97	4/22/2010	9:35	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	5/11/2010	8:49	BLP
Solids, Total Dissolved	624	mg/L	20	SM 2540 C-97	4/27/2010	14:31	BLP
Solids, Total Suspended	8	mg/L	4	SM 2540 D-97	4/27/2010	14:31	BLP
<u>I.C./F.I.A.</u>							
Sulfate	182.2	mg/L	1	EPA 300.0	5/7/2010	14:35	BLP
<u>Metals by ICP</u>							
Aluminum, Dissolved	<0.02	mg/L	0.02	EPA 200.7	4/23/2010	10:59	BLP
Aluminum, Total	<0.02	mg/L	0.02	EPA 200.7	4/23/2010	9:44	BLP
Iron, Dissolved	1.110	mg/L	0.010	EPA 200.7	4/21/2010	14:31	BLP
Iron, Total	4.268	mg/L	0.010	EPA 200.7	4/23/2010	9:44	BLP
Manganese, Dissolved	0.124	mg/L	0.001	EPA 200.7	4/21/2010	14:31	BLP
Manganese, Total	0.114	mg/L	0.001	EPA 200.7	4/23/2010	9:44	BLP


 Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 5/12/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002
Sampled By: KDK
Date: 4/21/2010 Time: 9:45
Received
Date: 4/21/2010 Time: 14:15

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
970	10.4	7.06	8.37	

Notes:

Lab I.D. #: 1010 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	365	mg/L as CaCO ₃	10	SM2320-B-97	4/22/2010	9:35	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	4/22/2010	9:35	BLP
Alkalinity, Total	365	mg/L as CaCO ₃	20	SM2320-B-97	4/22/2010	9:35	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	5/11/2010	8:49	BLP
Solids, Total Dissolved	616	mg/L	20	SM 2540 C-97	4/27/2010	14:31	BLP
Solids, Total Suspended	7	mg/L	4	SM 2540 D-97	4/27/2010	14:31	BLP
<u>I.C./F.I.A.</u>							
Sulfate	179.8	mg/L	1	EPA 300.0	5/7/2010	14:35	BLP
<u>Metals by ICP</u>							
Aluminum, Dissolved	0.16	mg/L	0.02	EPA 200.7	4/23/2010	10:59	BLP
Aluminum, Total	1.31	mg/L	0.02	EPA 200.7	4/23/2010	9:44	BLP
Iron, Dissolved	0.064	mg/L	0.010	EPA 200.7	4/21/2010	14:31	BLP
Iron, Total	0.497	mg/L	0.010	EPA 200.7	4/23/2010	9:44	BLP
Manganese, Dissolved	0.106	mg/L	0.001	EPA 200.7	4/21/2010	14:31	BLP
Manganese, Total	0.106	mg/L	0.001	EPA 200.7	4/23/2010	9:44	BLP


 Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 6/11/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002 Pre Treatment
Sampled By: DM KK
Date: 5/18/2010 Time: 12:05
Received
Date: 5/18/2010 Time: 13:33

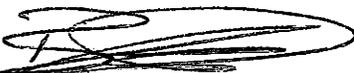
Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
1000	11.0	6.93	5.23	

Notes:

Lab I.D. #: 1024 Mine Code 8 Site Code 0

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	382	mg/L as CaCO ₃	10	SM2320-B-97	5/20/2010	10:22	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	5/20/2010	10:22	BLP
Alkalinity, Total	382	mg/L as CaCO ₃	20	SM2320-B-97	5/20/2010	10:22	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	6/10/2010	8:28	BLP
Solids, Total Dissolved	630	mg/L	20	SM 2540 C-97	5/20/2010	14:03	BLP
Solids, Total Suspended	6	mg/L	4	SM 2540 D-97	5/20/2010	14:03	BLP
<u>I.C./F.I.A.</u>							
Sulfate	183.60	mg/L	1	EPA 300.0	6/7/2010	9:06	BLP
<u>Metals by ICP</u>							
Aluminum, Dissolved	<0.02	mg/L	0.02	EPA 200.7	6/2/2010	15:36	BLP
Aluminum, Total	0.04	mg/L	0.02	EPA 200.7	6/2/2010	9:02	BLP
Iron, Dissolved	0.965	mg/L	0.010	EPA 200.7	6/2/2010	15:36	BLP
Iron, Total	3.119	mg/L	0.010	EPA 200.7	6/2/2010	9:02	BLP
Manganese, Dissolved	0.126	mg/L	0.001	EPA 200.7	6/2/2010	15:36	BLP
Manganese, Total	0.126	mg/L	0.001	EPA 200.7	6/2/2010	9:02	BLP


 Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 6/11/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002
Sampled By: DM KK
Date: 5/18/2010
Time: 11:30
Received
Date: 5/18/2010
Time: 13:33

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
980	10.5	7.14	9.8	

Notes:

Lab I.D. #: 1023 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	373	mg/L as CaCO ₃	10	SM2320-B-97	5/20/2010	10:22	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	5/20/2010	10:22	BLP
Alkalinity, Total	373	mg/L as CaCO ₃	20	SM2320-B-97	5/20/2010	10:22	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	6/10/2010	8:28	BLP
Solids, Total Dissolved	628	mg/L	20	SM 2540 C-97	5/20/2010	14:03	BLP
Solids, Total Suspended	4	mg/L	4	SM 2540 D-97	5/20/2010	14:03	BLP
<u>I.C./F.I.A.</u>							
Sulfate	185.20	mg/L	1	EPA 300.0	6/7/2010	9:06	BLP
<u>Metals by ICP</u>							
Aluminum, Dissolved	<0.02	mg/L	0.02	EPA 200.7	6/2/2010	15:36	BLP
Aluminum, Total	1.00	mg/L	0.02	EPA 200.7	6/2/2010	9:02	BLP
Iron, Dissolved	<0.010	mg/L	0.010	EPA 200.7	6/2/2010	15:36	BLP
Iron, Total	0.502	mg/L	0.010	EPA 200.7	6/2/2010	9:02	BLP
Manganese, Dissolved	0.108	mg/L	0.001	EPA 200.7	6/2/2010	15:36	BLP
Manganese, Total	0.103	mg/L	0.001	EPA 200.7	6/2/2010	9:02	BLP


 Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 7/22/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 Pre 002
Sampled By: DM
Date: 6/23/2010 **Time:** 13:40
Received
Date: 6/23/2010 **Time:** 15:33

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
981	13.5	7.26	4.3	

Notes:

Lab I.D. #: 1048 Mine Code 8 Site Code 0

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
Wet Chem.							
Alkalinity, Bicarbonate	380	mg/L as CaCO ₃	10	SM2320-B-97	6/30/2010	9:34	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	6/30/2010	9:34	BLP
Alkalinity, Total	380	mg/L as CaCO ₃	20	SM2320-B-97	6/30/2010	9:34	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	7/13/2010	8:56	BLP
Solids, Total Dissolved	646	mg/L	20	SM 2540 C-97	6/29/2010	14:38	BLP
Solids, Total Suspended	8	mg/L	4	SM 2540 D-97	6/29/2010	14:38	BLP
I.C./F.I.A.							
Sulfate	170	mg/L	1	EPA 300.0	7/5/2010	18:33	BLP
Metals by ICP							
Aluminum, Dissolved	<0.02	mg/L	0.02	EPA 200.7	7/14/2010	13:42	BLP
Aluminum, Total	0.06	mg/L	0.02	EPA 200.7	7/21/2010	15:38	BLP
Iron, Dissolved	0.689	mg/L	0.010	EPA 200.7	7/14/2010	13:42	BLP
Iron, Total	5.312	mg/L	0.010	EPA 200.7	7/21/2010	15:38	BLP
Manganese, Dissolved	0.114	mg/L	0.001	EPA 200.7	7/14/2010	13:42	BLP
Manganese, Total	0.134	mg/L	0.001	EPA 200.7	7/21/2010	15:38	BLP

Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



General Offices: P.O. Box 995 Price, UT. 84501 (435)637-8855
 Laboratory: 65 North 300 East Price, UT. 84501

Report Date
 7/22/2010

Client
 UtahAmerican Energy Inc.
 Genwal Resources, Inc.
 PO Box 1077
 Price, UT. 84501
 Dave Shaver
 (435)888-4017

Sample I.D.
 002
Sampled By: DM
Date: 6/23/2010 Time: 13:05
Received
Date: 6/23/2010 Time: 15:33

Field Measurements				
Cond. uS	Temp. C	pH	D.O. ppm	Turbidity NTU
983	13.7	8.07	8.67	

Notes:

Lab I.D. #: 1047 Mine Code 8 Site Code 40

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
Alkalinity, Bicarbonate	373	mg/L as CaCO ₃	10	SM2320-B-97	6/30/2010	9:34	BLP
Alkalinity, Carbonate	<10	mg/L as CaCO ₃	10	SM2320-B-97	6/30/2010	9:34	BLP
Alkalinity, Total	373	mg/L as CaCO ₃	20	SM2320-B-97	6/30/2010	9:34	BLP
Oil & Grease (HEM)	<5	mg/L	5	EPA 1664 A	7/13/2010	8:56	BLP
Solids, Total Dissolved	628	mg/L	20	SM 2540 C-97	6/29/2010	14:38	BLP
Solids, Total Suspended	<4	mg/L	4	SM 2540 D-97	6/29/2010	14:38	BLP
<u>I.C./F.I.A.</u>							
Sulfate	171	mg/L	1	EPA 300.0	7/5/2010	18:33	BLP
<u>Metals by ICP</u>							
Aluminum, Dissolved	0.02	mg/L	0.02	EPA 200.7	7/14/2010	13:42	BLP
Aluminum, Total	1.04	mg/L	0.02	EPA 200.7	7/21/2010	15:38	BLP
Iron, Dissolved	<0.010	mg/L	0.010	EPA 200.7	7/14/2010	13:42	BLP
Iron, Total	0.427	mg/L	0.010	EPA 200.7	7/21/2010	15:38	BLP
Manganese, Dissolved	0.100	mg/L	0.001	EPA 200.7	7/14/2010	13:42	BLP
Manganese, Total	0.119	mg/L	0.001	EPA 200.7	7/21/2010	15:38	BLP

Brandon Pierce
 Technical Director

All reported results meet the requirements of NELAC, except for Balance and Hardness.
 Balance and Hardness are calculated from certified results.



Analysis Report

August 02, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 1

Client Sample ID: PRE-002
Date Sampled: Jul 21, 2010
Date Received: Jul 21, 2010
Product Description: WATER

Sample ID By: Genwal Resources Inc.
Sample Taken At: PRE-002
Sample Taken By: D.M.
Time Received: 1540
Time Sampled: 1150
Mine: 8
Field - pH: 7.27 pH
Field - Dis. Oxygen: 4.48 MG/L
Field - Conductivity: 956 UMHOS/CM
Field - Temperature: 16 DEG. C

Comments: Dissolved metals field filtered

SGS Minerals Sample ID: 782-1003640-002

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Oil and Grease, Sulfate, SO4, Total Dissolved Solids, Total Suspended Solids, Alkalinity, Carbonate Alkalinity, Bicarbonate Alkalinity, and METALS BY ICP (Aluminum, Iron, Manganese).

Handwritten signature of Allen Ludington

Allen Ludington
Water Lab Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



Analysis Report

August 02, 2010

GENVAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 1

Client Sample ID: UPDES 002
Date Sampled: Jul 21, 2010
Date Received: Jul 21, 2010
Product Description: WATER

Sample ID By: Genval Resources Inc.
Sample Taken At: UPDES 002
Sample Taken By: D. M.
Time Received: 1540
Time Sampled: 1105
Mine: 8
Site: 40
Field - pH: 7.98 pH
Field - Dis. Oxygen: 8.46 MG/L
Field - Conductivity: 929 UMHOS/CM
Field - Temperature: 13 DEG. C

Comments: Dissolved metals field filtered

SGS Minerals Sample ID: 782-1003640-001

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Oil and Grease, Sulfate, Total Dissolved Solids, Total Suspended Solids, Alkalinity, Carbonate Alkalinity, Bicarbonate Alkalinity, and METALS BY ICP (Aluminum, Iron, Manganese).

Handwritten signature of Allen Ludington

Allen Ludington
Water Lab Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



Analysis Report

September 22, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 1

Client Sample ID: PRE-002
Date Sampled: Aug 27, 2010
Date Received: Aug 27, 2010
Product Description: WATER
Sample ID By: Genwal
Time Received: 1505
Time Sampled: 1335
Field - pH: 7.10 pH
Field - Dis. Oxygen: 4.53 mg/L
Field - Conductivity: 554 umhos/cm
Field - Temperature: 11 deg C

Comments: Dissolved metals field filtered
SiO2 analyzed at Chemtech Ford

SGS Minerals Sample ID: 782-1004108-002

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Oil and Grease, Sulfate, Acidity, Total Dissolved Solids, etc.

Handwritten signature of Domenic Ibanez

Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Analysis Report

September 22, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 1

Client Sample ID: 002
Date Sampled: Aug 27, 2010
Date Received: Aug 27, 2010
Product Description: WATER

Sample ID By: Genwal
Sample Taken At: UPDES 002
Time Received: 1505
Time Sampled: 1300
Mine: 8
Site: 40
Field - pH: 7.60 pH
Field - Dis. Oxygen: 9.43 mg/L
Field - Conductivity: 877 umhos/cm
Field - Temperature: 12 deg C

Comments: Dissolved metals field filtered

SGS Minerals Sample ID: 782-1004108-001

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Oil and Grease, Sulfate, Total Dissolved Solids, etc.

Handwritten signature of Domenic Ibanez

Lab Supervisor

Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



Analysis Report

October 08, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 2

Client Sample ID: Genwal Resources Inc. Sample ID By: Genwal Resources Inc.
Date Sampled: Sep 29, 2010 Sample Taken At: PRE-002
Date Received: Sep 29, 2010 Sample Taken By: DANA
Product Description: WATER Time Received: 1615
Time Sampled: 1425
Mine: 8
Field - pH: 7.05 pH
Field - Dis. Oxygen: 4.58 MG/L
Field - Conductivity: 950 UMHOS/CM
Field - Temperature: 12 DEG. C

Comments: Dissolved Silica analyzed at American West Laboratory
Acidity Digested
Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1004568-002

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Oil and Grease, Sulfate, Acidity, Total Dissolved Solids, Total Suspended Solids, Chloride, Alkalinity, Carbonate Alkalinity, Bicarbonate Alkalinity, METALS BY ICP (Silica, Aluminum, Calcium, Iron, Magnesium).

Handwritten signature of Domenic Ibanez

Lab Supervisor

Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



Analysis Report

October 08, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 2 of 2

Client Sample ID: Genwal Resources Inc. Sample ID By: Genwal Resources Inc.
Date Sampled: Sep 29, 2010 Sample Taken At: PRE-002
Date Received: Sep 29, 2010 Sample Taken By: DANA
Product Description: WATER Time Received: 1615
Time Sampled: 1425
Mine: 8
Field - pH: 7.05 pH
Field - Dis. Oxygen: 4.58 MG/L
Field - Conductivity: 950 UMHOS/CM
Field - Temperature: 12 DEG. C

Comments: Dissolved Silica analyzed at American West Laboratory
Acidity Digested
Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1004568-002

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include METALS BY ICP (continued) with values for Manganese, Potassium, and Sodium.

Handwritten signature of Domenic Ibanez

Lab Supervisor
Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



Analysis Report

October 08, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 1

Client Sample ID: Genwal Resources Inc. Sample ID By: Genwal Resources Inc.
Date Sampled: Sep 29, 2010 Sample Taken At: UPDES 002
Date Received: Sep 29, 2010 Sample Taken By: DANA
Product Description: WATER Time Received: 1615
Time Sampled: 1500
Mine: 8
Site: 40
Field - pH: 7.53 pH
Field - Dis. Oxygen: 10.67 MG/L
Field - Conductivity: 939 UMHOS/CM
Field - Temperature: 13 DEG. C

Comments: Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1004568-001

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Oil and Grease, Sulfate, Total Dissolved Solids, Total Suspended Solids, Alkalinity, Carbonate Alkalinity, Bicarbonate Alkalinity, and METALS BY ICP (Aluminum, Iron, Manganese).

Handwritten signature of Domenic Ibanez

Lab Supervisor

Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Analysis Report

November 12, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 2

Client Sample ID:	Genwal Resources Inc.	Sample ID By:	Genwal Resources Inc.
Date Sampled:	Oct 29, 2010	Sample Taken At:	Pre-002
Date Received:	Oct 29, 2010	Sample Taken By:	Dana
Product Description:	WATER	Time Received:	1500
		Time Sampled:	1230
		Mine:	8
		Site:	000
		Field - pH:	6.97 pH
		Field - Dis. Oxygen:	4.35 MG/L
		Field - Conductivity:	937 UMHOS/CM
		Field - Temperature:	11 DEG. C

Comments: Acidity Digested by request; Silica Analyzed at AWAL
Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1005025-002

TESTS	RESULT	UNIT	METHOD	REPORTING	ANALYZED		
				LIMIT	DATE	TIME	ANALYST
Oil and Grease, (HEM)	<5	mg/L	EPA 1664-A	5.000	2010-11-05	08:30:00	DI
Sulfate, SO4	167	mg/L	EPA 300.0	1.000	2010-11-03	19:35:00	DI
Acidity	-368	mg/L	D1067	-500.000	2010-11-09	13:30:00	AL
Total Dissolved Solids	600	mg/L	SM2540-C	30.000	2010-11-02	14:30:00	AL
Total Suspended Solids	<5	mg/L	SM2540-D	5.000	2010-11-02	14:30:00	AL
Chloride, Cl	11	mg/L	EPA 300.0	1.000	2010-11-03	19:35:00	DI
Alkalinity, mg CaCO3/L (pH 4.5)	380	mg/L	SM2320-B	5.000	2010-11-04	12:15:00	AL
Carbonate Alkalinity as CaCO3	<5	mg/L	SM2320-B	5.000	2010-11-04	12:15:00	AL
Bicarbonate Alkalinity as CaCO3	380	mg/L	SM2320-B	5.000	2010-11-04	12:15:00	AL
METALS BY ICP							
Silica, SiO2 - Dissolved	8.66	mg/L	EPA 200.7	0.010	2010-11-08	10:37:00	DI
Aluminum, Al - Dissolved	<0.03	mg/L	EPA 200.7	0.030	2010-11-03	13:52:00	DI
Aluminum, Al - Total	0.06	mg/L	EPA 200.7	0.030	2010-11-02	15:10:00	DI
Calcium, Ca - Dissolved	100.20	mg/L	EPA 200.7	0.030	2010-11-03	13:52:00	DI
Iron, Fe - Dissolved	0.61	mg/L	EPA 200.7	0.030	2010-11-03	13:52:00	DI
Iron, Fe - Total	2.81	mg/L	EPA 200.7	0.050	2010-11-02	15:10:00	DI
Magnesium, Mg - Dissolved	55.17	mg/L	EPA 200.7	0.010	2010-11-03	13:52:00	DI



Lab Supervisor

Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Analysis Report

November 12, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 2 of 2

Client Sample ID: Genwal Resources Inc. Sample ID By: Genwal Resources Inc.
Date Sampled: Oct 29, 2010 Sample Taken At: Pre-002
Date Received: Oct 29, 2010 Sample Taken By: Dana
Product Description: WATER Time Received: 1500
Time Sampled: 1230
Mine: 8
Site: 000
Field - pH: 6.97 pH
Field - Dis. Oxygen: 4.35 MG/L
Field - Conductivity: 937 UMHOS/CM
Field - Temperature: 11 DEG. C

Comments: Acidity Digested by request; Silica Analyzed at AWAL
Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1005025-002

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Manganese, Potassium, and Sodium tests.

Handwritten signature of Domenic Ibanez

Lab Supervisor

Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Analysis Report

November 12, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

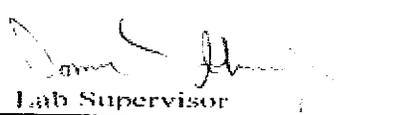
Page 1 of 1

Client Sample ID:	Genwal Resources Inc.	Sample ID By:	Genwal Resources Inc.
Date Sampled:	Oct 29, 2010	Sample Taken At:	UPDES-002
Date Received:	Oct 29, 2010	Sample Taken By:	Dana
Product Description:	WATER	Time Received:	1500
		Time Sampled:	0950
		Mine:	8
		Site:	40
		Field - pH:	7.47 pH
		Field - Dis. Oxygen:	11.23 MG/L
		Field - Conductivity:	933 UMHOS/CM
		Field - Temperature:	9 DEG. C

Comments: Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1005025-001

TESTS	RESULT	UNIT	METHOD	REPORTING	ANALYZED		
				LIMIT	DATE	TIME	ANALYST
Oil and Grease, (HEM)	<5	mg/L	EPA 1664-A	5.000	2010-11-05	08:30:00	DI
Sulfate, SO4	166	mg/L	EPA 300.0	1.000	2010-11-03	19:35:00	DI
Total Dissolved Solids	605	mg/L	SM2540-C	30.000	2010-11-02	14:30:00	AL
Total Suspended Solids	<5	mg/L	SM2540-D	5.000	2010-11-02	14:30:00	AL
Alkalinity, mg CaCO3/L (pH 4.5)	380	mg/L	SM2320-B	5.000	2010-11-04	12:15:00	AL
Carbonate Alkalinity as CaCO3	<5	mg/L	SM2320-B	5.000	2010-11-04	12:15:00	AL
Bicarbonate Alkalinity as CaCO3	380	mg/L	SM2320-B	5.000	2010-11-04	12:15:00	AL
METALS BY ICP							
Aluminum, Al - Dissolved	<0.03	mg/L	EPA 200.7	0.030	2010-11-03	13:52:00	DI
Aluminum, Al - Total	0.50	mg/L	EPA 200.7	0.030	2010-11-02	15:10:00	DI
Iron, Fe - Dissolved	0.06	mg/L	EPA 200.7	0.030	2010-11-03	13:52:00	DI
Iron, Fe - Total	0.71	mg/L	EPA 200.7	0.050	2010-11-02	15:10:00	DI
Manganese, Mn - Dissolved	0.109	mg/L	EPA 200.7	0.002	2010-11-03	13:52:00	DI
Manganese, Mn - Total	0.109	mg/L	EPA 200.7	0.002	2010-11-02	15:10:00	DI



Lab Supervisor

Domenic Ibanez
Laboratory Supervisor

SGS North America Inc. | Minerals Services Division
 2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Analysis Report

December 07, 2010

GENVAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 2

Client Sample ID: Genval Resources Inc.
Date Sampled: Nov 22, 2010
Date Received: Nov 22, 2010
Product Description: WATER
Sample ID By: Genval Resources Inc.
Sample Taken At: Pre-002
Sample Taken By: DANA
Time Received: 1550
Time Sampled: 1345
Mine: 8
Site: 000
Field - pH: 7.21 pH
Field - Dis. Oxygen: 6.73 MG/L
Field - Conductivity: 939 UMHOS/CM
Field - Temperature: 11 DEG. C

Comments: Silica Analyzed at A.W.A.L.; Acidity Digested per Request
Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1005351-001

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include tests like Oil and Grease, Sulfate, Acidity, Total Dissolved Solids, etc.

Handwritten signature of Lab Supervisor

Domenic Ibanez
Lab Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



Analysis Report

December 07, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 2 of 2

Client Sample ID: Genwal Resources Inc.
Date Sampled: Nov 22, 2010
Date Received: Nov 22, 2010
Product Description: WATER
Sample ID By: Genwal Resources Inc.
Sample Taken At: Pre-002
Sample Taken By: DANA
Time Received: 1550
Time Sampled: 1345
Mine: 8
Site: 000
Field - pH: 7.21 pH
Field - Dis. Oxygen: 6.73 MG/L
Field - Conductivity: 939 UMHOS/CM
Field - Temperature: 11 DEG. C

Comments: Silica Analyzed at A.W.A.L.; Acidity Digested per Request
Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1005351-001

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Manganese, Potassium, and Sodium test results.

Handwritten signature of Domenic Ibanez
Lab Supervisor
Domenic Ibanez
Lab Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



Analysis Report

December 07, 2010

GENWAL RESOURCES INC
794 "C" CANYON ROAD
EAST CARBON UT 84520

Page 1 of 1

Client Sample ID: Genwal Resources Inc.
Date Sampled: Nov 22, 2010
Date Received: Nov 22, 2010
Product Description: WATER
Sample ID By: Genwal Resources Inc.
Sample Taken At: UPDES 002
Sample Taken By: DANA
Time Received: 1550
Time Sampled: 1410
Mine: 8
Site: 40
Field - pH: 7.67 pH
Field - Dis. Oxygen: 11.71 MG/L
Field - Conductivity: 925 UMHOS/CM
Field - Temperature: 9 DEG. C

Comments: Dissolved Metal Field Filtered

SGS Minerals Sample ID: 782-1005351-002

Table with columns: TESTS, RESULT, UNIT, METHOD, REPORTING LIMIT, DATE, ANALYZED TIME, ANALYST. Rows include Oil and Grease, Sulfate, Total Dissolved Solids, etc.

Handwritten signature of Domenic Ibanez
Lab Supervisor
Domenic Ibanez
Lab Supervisor

SGS North America Inc. Minerals Services Division
2035 North Airport Road Huntington t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.