

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

**CHANGE TO  
APPENDIX 7-65  
MINE DISCHARGE WATER  
IRON TREATMENT FACILITY**

**TO ALLOW TEMPORARY STORAGE OF  
IRON TREATMENT SLUDGE IN  
CRANDALL CYN MINE SEDIMENT POND**

**SUBMITTAL OF CLEAN COPIES  
TASK #3582**

**SUBMITTED: JULY15, 2010**

File in:  
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 Expandable  
Date Folder 071510 C0150032  
See: Sullivan For additional



**COPY**

*Submittal*  
C0150032  
# 3582

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

July 15, 2010

Re: Crandall Canyon Mines, C/015/032  
Change to Appendix 7-65  
Mine Water Iron Treatment Facility  
To Allow Temporary Iron Sludge Storage in Crandall Sediment Pond  
Submittal of clean copies, Task #3582

Dear Mr. Haddock:

Enclosed are six (8 ea.) clean copies of change to Appendix 7-65 (Mine Discharge Water Iron Treatment Facility), Task #3582. In incorporating this submittal please note that none of the previous Attachment material to Appendix 7-65 has been re-submitted since none of this information has not changed. The only changes involve the Discussion section , and the addition of Attachment 9.

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

Sincerely,

David Shaver  
Resident Agent

File in:  
 Confidential  
 Shelf  
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See: Submittal For additional

**RECEIVED**  
JUL 15 2010  
DIV. OF OIL, GAS & MINING

## APPLICATION FOR PERMIT PROCESSING

Permit Change  New Permit  Renewal  Transfer  Exploration  Bond Release

Permit Number: 015/032

of Proposal **Change to Appendix 7-65 (water iron treatment facility)**  
 to allow temporary storage of iron sludge in Crandall sediment pond  
 Submittal of clean copies, Task 3582

Mine: Crandall Canyon Mines

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.

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

Signed - Name - Position - Date  
 \_\_\_\_\_ agent 6/15/2010

Subscribed and sworn to before me this 14 day of July, 2010

My Commission Expires: \_\_\_\_\_  
 Attest: STATE OF UTAH  
 COUNTY OF Carbon

Notary Public



**MARY V. KAVA**  
 NOTARY PUBLIC • STATE OF UTAH  
 COMMISSION # 574280  
 COMM. EXP. 05-16-2012

Received by Oil, Gas & Mining

**RECEIVED**

**JUL 15 2010**

**DIV. OF OIL, GAS & MINING**

ASSIGNED TRACKING NUMBER



## **NOTE TO REVIEWERS**

**In reviewing this submittal, please note that none of the previous Attachment material has been re-submitted since none of this information has changed.**

**The only changes involve the Discussion section on pages 10, 11 and 12, and the addition of Attachment 9**

# APPENDIX 7-65

## CRANDALL CANYON MINE MINE DISCHARGE WATER IRON TREATMENT FACILITY

Discussion

Attachment 1

Attachment 2

Attachment 3

Attachment 4

Attachment 5

Attachment 6

Attachment 7

Attachment 8

Attachment 9

Maelstrom Oxidizer Unit

Iron Treatment Bench Test Results, and  
Settling Basin Volume Determination

Pit Liner Information

Wildcat Sediment Pond C Volume Determination

Settling Basin Clean-up Volume Estimation

Drainage Information

Safety Factor Determination

Construction Specifications and Drawings

Temporary Use of Crandall Sediment Pond

## 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 two basic components; 1) an aeration device which allows atmospheric oxygen to chemically react with the dissolved iron in the water, thereby creating iron particulates, and 2) 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.)

### CONSTRUCTION

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.

## **OPERATION**

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. 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 treated water from the oxidizer unit is then sent to a settling basin. This basin is constructed within a compacted earthen berm. Iron precipitates generated in the oxidizer unit will drop out of suspension and accumulate 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 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 will be 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.

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. 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.

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 will be incorporated into the revised reclamation plan referenced above. This data will include: 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 the revised final reclamation plan (see discussion below) 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 reclamation, 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 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 30<sup>th</sup>, 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 30<sup>th</sup>, 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.

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:  
$$5.5 \text{ hrs} \times 500 \text{ gal/min} \times 60 \text{ min/hr} = 165,000 \text{ gal}$$
- 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.

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

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 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)



05/10/2010 09:17

Exhibit 1

1 03 76748 0326

**Shaver, Dave**

---

**From:** Pete Hess [petehess@utah.gov]  
**Sent:** Thursday, May 13, 2010 2:22 PM  
**To:** Shaver, Dave  
**Cc:** Jim Smith; Kevin Lundmark; Steve Christensen  
**Subject:** Wildcat Pond "C"

Dave...

Steve Christensen and Kevin Lundmark were down from SL and were headed to Wildcat to look at Pond "C" and the iron sludge/effluent. I went with them.

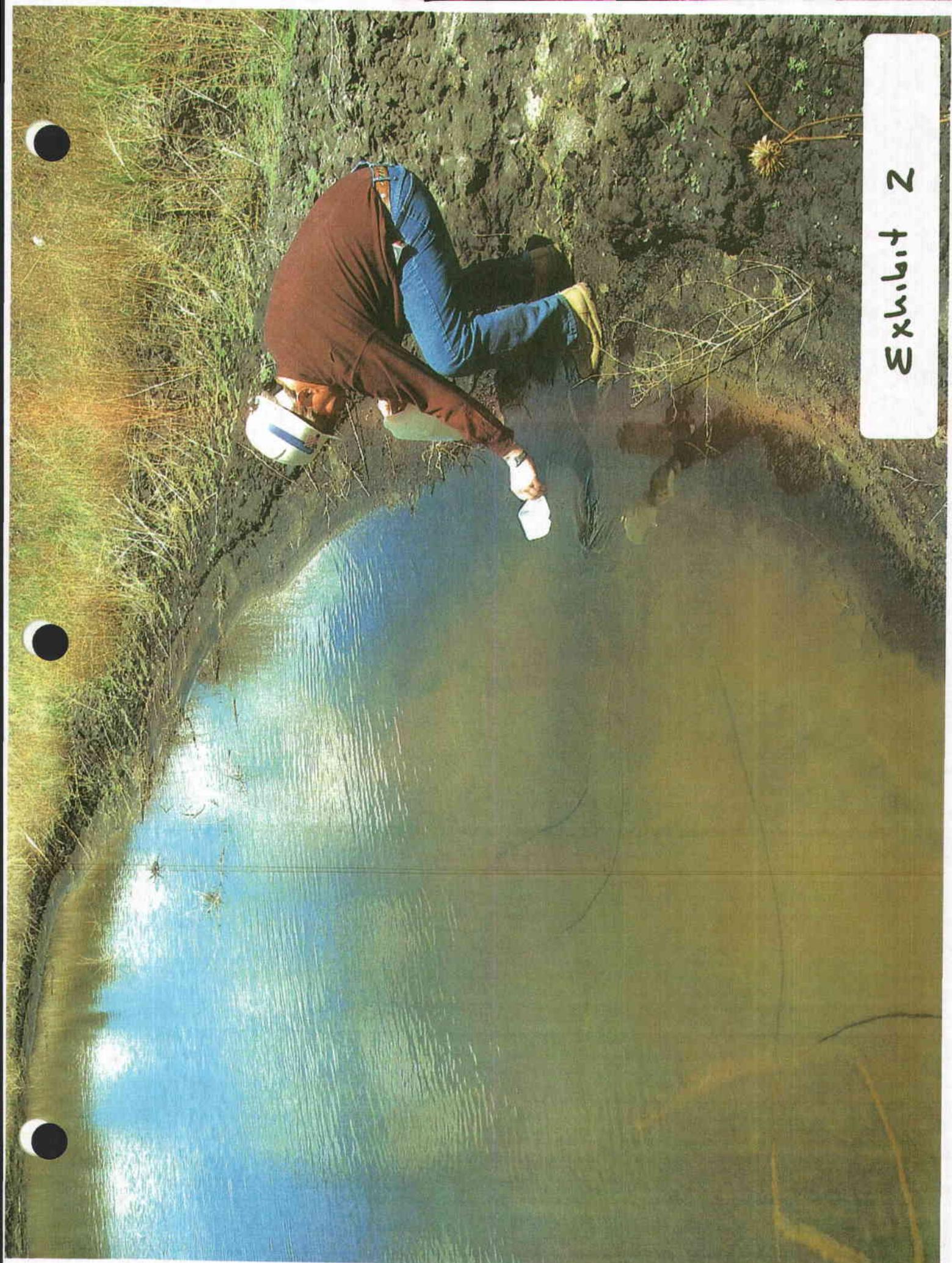
The sludge level / water level is still well below the 60% cleanout elevation (which is 4.5 feet below the primary spillway discharge elevation). I took two quart samples of effluent, with the intent of giving you one. The effluent looks really good, but an analysis for UPDES parameters should be performed if you intend to, and prior to decanting the effluent.

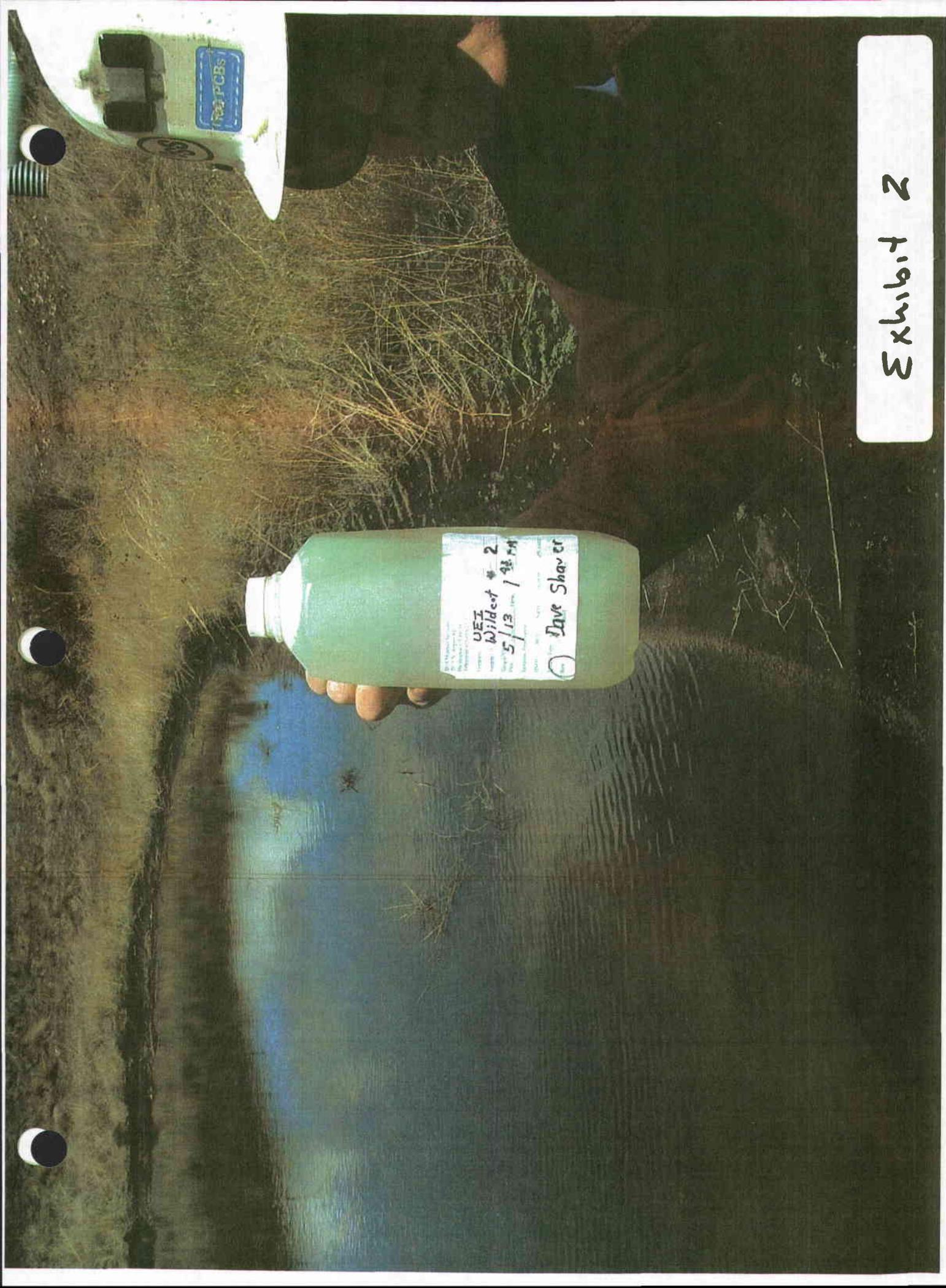
If you still want to go out there next week, we can still go.

Exhibit 2

6/25/2010

Exhibit 2





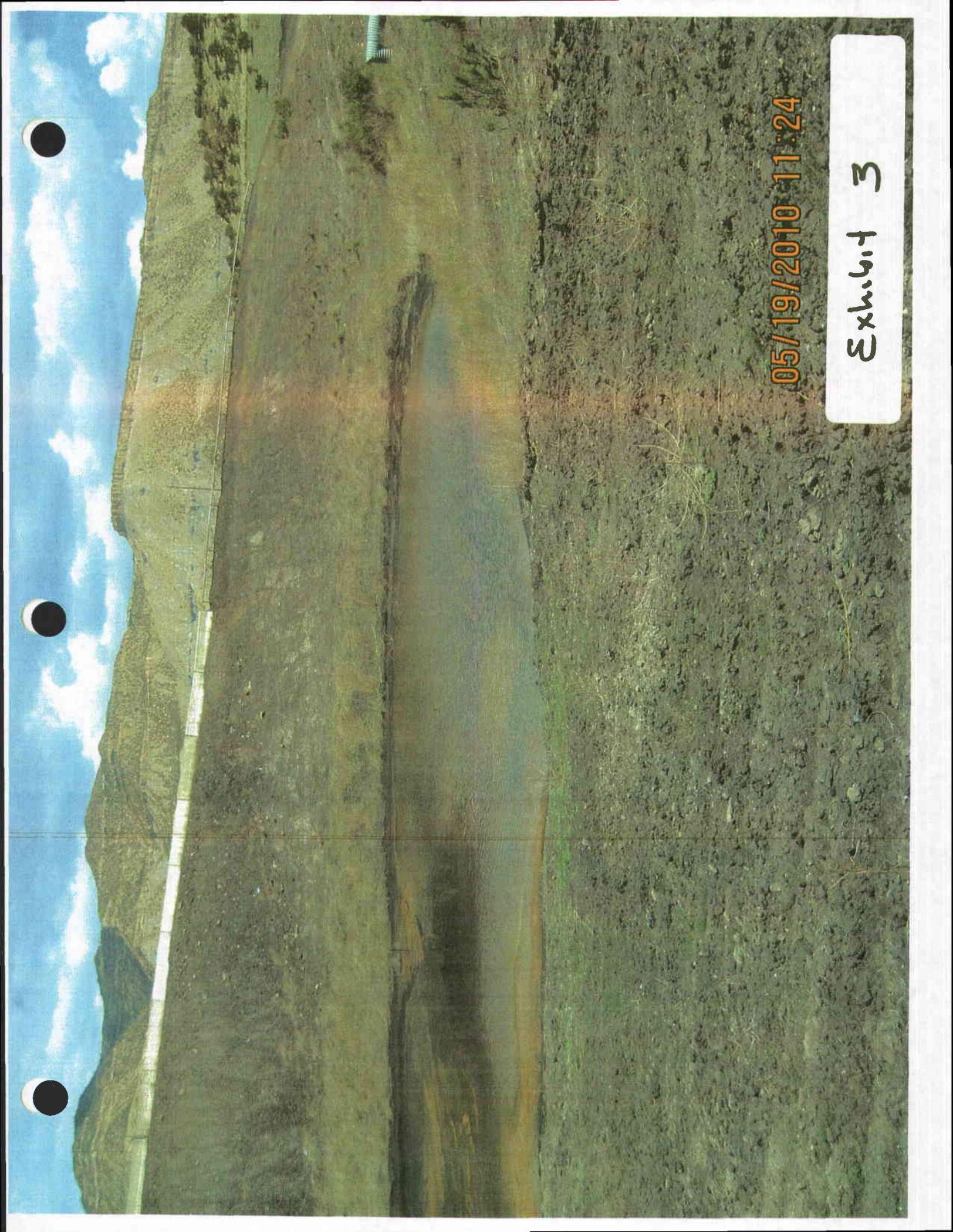
UEZ  
Wildcat # 2  
5/13  
Dave Shaver

Exhibit 2



05/19/2010 11:24

Exhibit 3



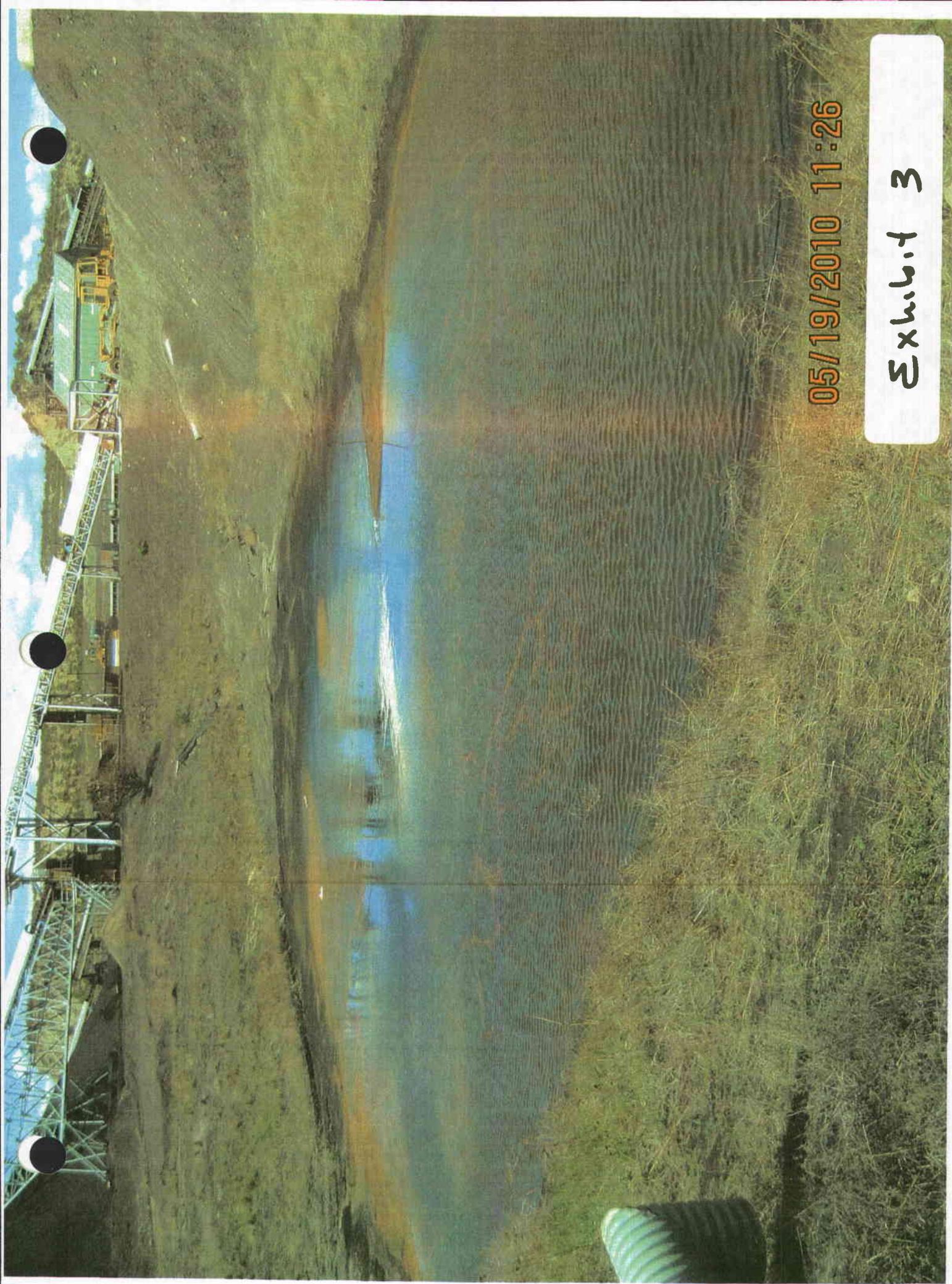
05/19/2010 11:24

Exhibit 3



05/19/2010 11:25

Exhibit 3



05/19/2010 11:26

Exhibit 3



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  
 Utah American 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

Exhibit 4

  
 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  
5/17/2010

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

Sample I.D.

Sludge 1

Sampled By: D.M.

Date: 5/7/2010  
Time: 10:45

Received  
Date: 5/7/2010  
Time: 12:59

Field Measurements

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

Notes:

Sample density is 993 g/L  
Total Solids = 5.88% w/w

Lab I.D. #: 1014

Mine Code 8

Site Code

Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<b>Wet Chem.</b>							
Solids, Total Dissolved	710	mg/L	20	SM 2540 C-97	5/14/2010	15:10	BLP
Solids, Total Suspended	5140	mg/L	4	SM 2540 D-97	5/14/2010	15:10	BLP

Exhibit 5

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  
 6/3/2010

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

Sample I.D.  
 Pond "C" SE Inlet  
 Sampled By: Peter Hess  
Date: 5/13/2010 Time: 13:43  
 Received  
Date: 5/17/2010 Time: 14:07

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

Notes:  
 Sample Taken at Wildcat Loadout / Pond "C" / SE Inlet.  
 Sample is effluent from Crandall Mine Iron Sludge Treatment Pond.  
 \*pH expired when received.

Lab I.D. #: 1022

Mine Code

Site Code

### Certificate of Analysis

Analyte	Results	Units	MRL	Method	Date	Time	Analyst
<u>Wet Chem.</u>							
pH*	8.48	pH Units	N/A	SM 4500 -H+ B-00	5/19/2010	14:25	BLP
Solids, Total Dissolved	772	mg/L	20	SM 2540 C-97	5/20/2010	14:03	BLP
Solids, Total Suspended	11	mg/L	4	SM 2540 D-97	5/20/2010	14:03	BLP
<u>Metals by ICP</u>							
Aluminum, Dissolved	0.05	mg/L	0.02	EPA 200.7	6/2/2010	15:36	BLP
Aluminum, Total	0.25	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	0.078	mg/L	0.010	EPA 200.7	6/2/2010	9:02	BLP
Manganese, Dissolved	0.008	mg/L	0.001	EPA 200.7	6/2/2010	15:36	BLP
Manganese, Total	0.016	mg/L	0.001	EPA 200.7	6/2/2010	9:02	BLP

Exhibit 6

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.

**Utah American Energy, Inc.**  
**2009 Crandall Canyon Mines**  
**2008 Annual Pond Certification Report**

SUPPLEMENTAL POND CERTIFICATION - POST CLEANING

POND: Sediment Pond

LOCATION: Crandall Canyon Mines

<b>IMPOUNDMENTS</b>	
(1) Stability	Slopes Stable.
(2) Structural Weakness / Erosion	None Noted.
(3) Potential Safety Hazards	None Noted.
(4) Depth of Impounded Water	0' (pond recently cleaned)
(5) Existing Storage Capacity	3.5 ac-ft (100%)
(6) Monitoring Process	U.P.D.E.S. discharge. Quarterly Inspection.
<b>SEDIMENT PONDS ONLY</b>	
(7) Sediment Accumulation (Elevation)	7763.75 (lowest point)
(8) Sediment Cleanout Level (Elevation)	7769.00'
(9) Principle Spillway (Elevation)	7780.81'
(10) Emergency Spillway (Elevation)	7781.81'
(11) Existing Sediment Capacity (To Cleanout)	0.30 acre-ft based on survey of 12/16/2008
<b>GENERAL</b>	
(12) Comments / Recommendations	Pond cleaned December, 2009 No Discharge.

**STATEMENT**

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meets or exceeds the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearance of instability, structural weakness or other hazardous conditions of the structure affecting stability.

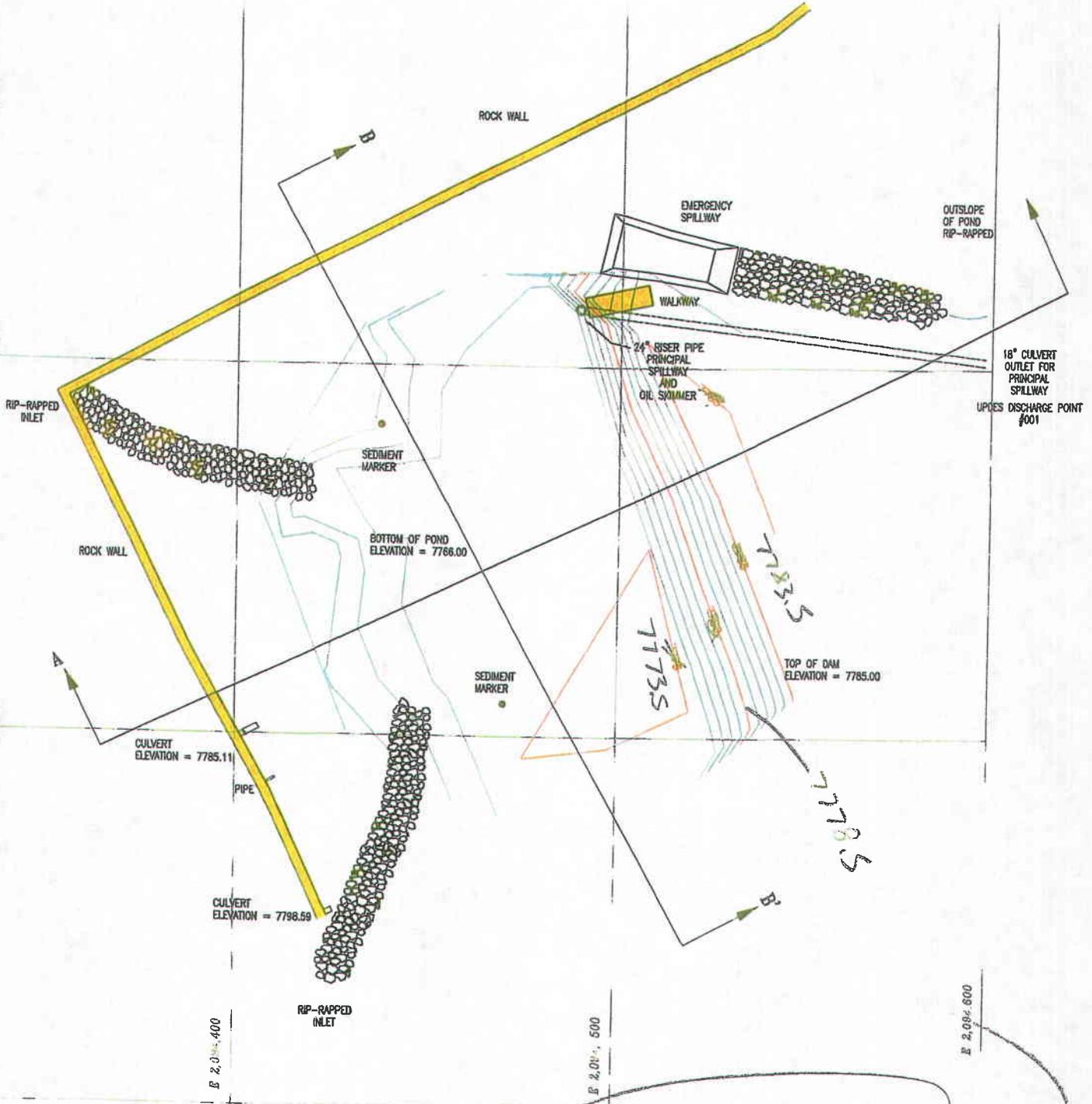
David W. Hibbs  
 (Signature)  
12/18/09  
 (Date)



Exhibit 7

N 410,800

N 410,800



**AS-BUILT SEDIMENT POND:**

LOCATION:	ELEVATION:	VOLUME:
BOTTOM OF POND:	7768.00	0.000 AC. FT.
SEDIMENT CLEANOUT LEVEL:	7769.00	0.290 AC. FT.
MAXIMUM SEDIMENT LEVEL:	7770.00	0.437 AC. FT.
PRINCIPAL SPILLWAY:	7780.81	3.513 AC. FT.
EMERGENCY SPILLWAY:	7781.81	3.936 AC. FT.

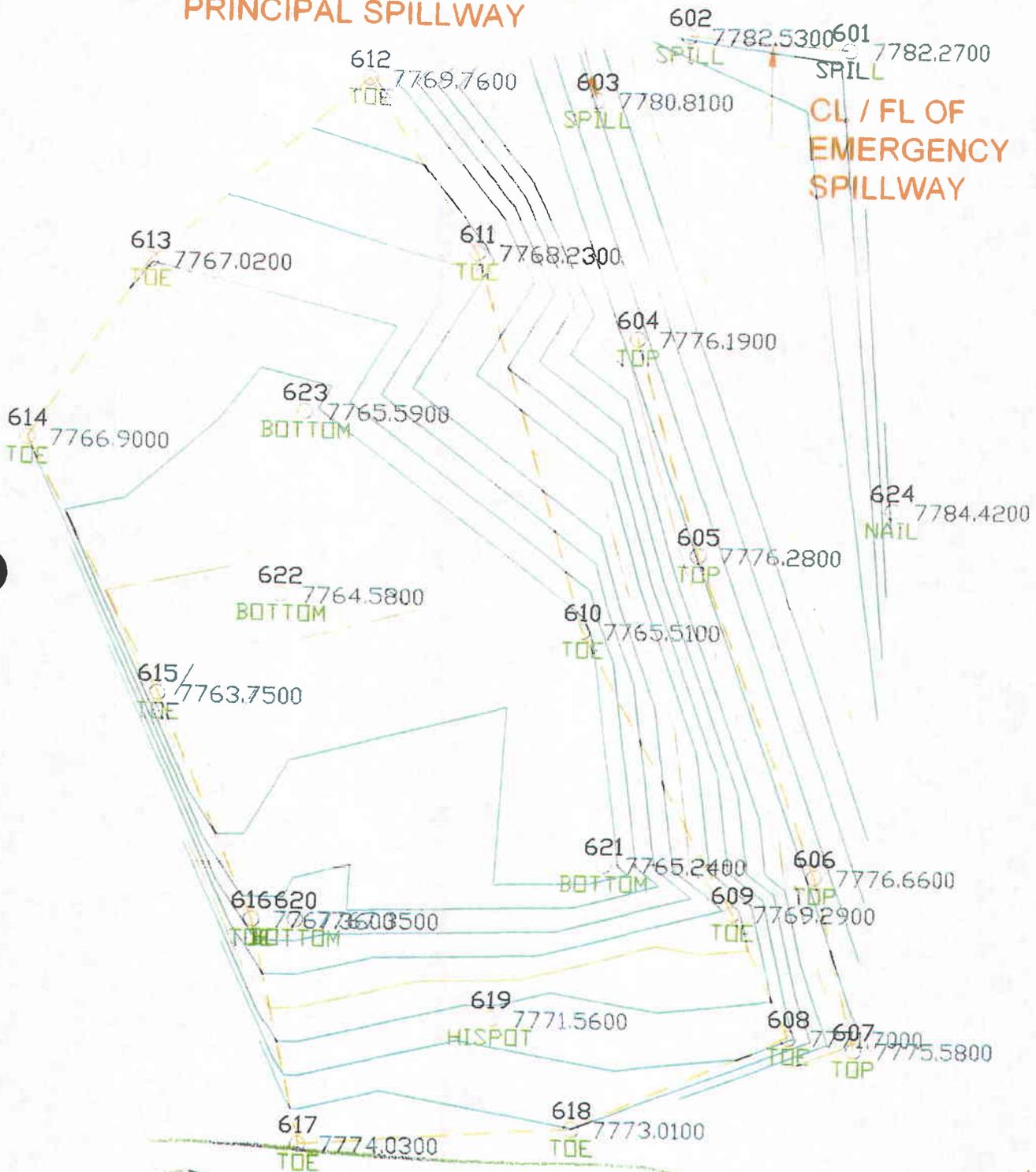
pre-cleaning contours  
July 2009



CONTOUR INTERVAL = 1'  
SCALE: 1" = 40'

TOP OF 24" RISER  
PRINCIPAL SPILLWAY

CL / FL OF  
EMERGENCY  
SPILLWAY



Post cleaning contours  
Dec 16, 2009

CRANDALL CANYON  
SEDIMENT POND SURVEY  
DATE: 12/10/09  
SCALE: 1" = 20'

7763.75



**SEDIMENT POND  
CROSS SECTION**

**Crandall Canyon Mines**  
Crandall Canyon  
P.O. BOX 1077  
PRICE, UTAH  
MSHA ID #42-01715

DRAWN BY	PJ	SCALE	NONE
APPROVED BY	DS	DATE	18 DEC. 2009
SHEET			1 of 1

**UtahAmerican Energy, Inc.**

794 NORTH "C" CANYON ROAD, EAST CARBON, UTAH 84520  
P.O. BOX 1077, PRICE, UTAH 84501  
PHONE: (435) 888-4000 FAX: (435) 888-4002

Comparing Grid: G:/Current Drawings/MRP Maps/Crandall Canyon/Current/Final Recla  
and Grid: G:/Current Drawings/MRP Maps/Crandall Canyon/Current/Final Recla  
corner locations: 2095225.07,411260.66 to 2095399.07,411434.66  
Resolution X: 174, Y: 174 Grid cell size X: 1.00, Y: 1.00  
Area in Cut : 10,691.8 S.F., 0.25 Acres  
Area in Fill: 1,554.2 S.F., 0.04 Acres  
Total inclusion area: 12,246.0 S.F., 0.28 Acres  
Cut to Fill ratio: 55.68  
Average Cut Depth: 5.39 Average Fill Depth: 0.67  
Max Cut Depth: 10.77 Max Fill Depth: 1.99  
Cut (C.Y.) / Area (acres): 7592.33  
Fill (C.Y.) / Area (acres): 136.35  
Cut volume: 57,629.5 C.F., 2,134.43 C.Y.  
Fill volume: 1,035.0 C.F., 38.33 C.Y.

Computer generated  
Volume difference  
(amount cleaned out)  
based on pre and post  
cleaning surveys

2,134 cubic yards  
material cleaned out

Comparing Grid: G:/Current Drawings/MRP Maps/Crandall Canyon/Current/Final Recla  
 and Grid: G:/Current Drawings/MRP Maps/Crandall Canyon/Current/Final Recla  
 corner locations: 2095225.07,411260.66 to 2095399.07,411434.66  
 resolution X: 174, Y: 174 Grid cell size X: 1.00, Y: 1.00  
 Area in Cut : 5,021.9 S.F., 0.12 Acres  
 Area in Fill: 335.1 S.F., 0.01 Acres  
 Total inclusion area: 5,357.0 S.F., 0.12 Acres  
 Cut to Fill ratio: 35.35  
 Average Cut Depth: 2.61 Average Fill Depth: 1.11  
 Max Cut Depth: 5.00 Max Fill Depth: 3.60  
 Cut (C.Y.) / Area (acres): 3944.10  
 Fill (C.Y.) / Area (acres): 111.56  
 Cut volume: 13,096.2 C.F., 485.04 C.Y. = 0.30 acre-ft  
 Fill volume: 370.4 C.F., 13.72 C.Y.

To 7769' constant level

