

C/007/041 Incoming  
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P.O. Box 910, East Carbon, Utah 84520  
Telephone (435) 888-4000 Fax (435) 888-4002

Utah Division of Oil, Gas & Mining  
Utah Coal Program  
1594 West North Temple, Suite 1210  
P.O.Box 145801  
Salt Lake City, UT 84114-5801

December 16, 2010

Attn: Daron Haddock  
Permit Supervisor

Re: West Ridge Mine C/007/041  
Permit Change to the Water Monitoring Schedule

Dear Mr. Haddock:

Enclosed are six copies of an amendment to the West Ridge MRP to eliminate and/or reduce the schedule of the operational Water Monitoring Points.

If you have any questions or need any additional information, please contact me at (435) 888-4026.

Sincerely,

Dana Marrelli

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## APPLICATION FOR COAL PERMIT PROCESSING

Permit Change  New Permit  Renewal  Exploration  Bond Release  Transfer

Permittee: West Ridge Resources, Inc  
 Mine: West Ridge Mine Permit Number: C/007/041  
 Title: Change to Water Monitoring Points and Schedule

Description, Include reason for application and timing required to implement:

Response to

**Instructions:** If you answer yes to any of the first eight questions, this application may require Public Notice publication.

- Yes  No 1. Change in the size of the Permit Area? Acres: \_\_\_\_\_ Disturbed Area: \_\_\_\_\_  increase  decrease.
- Yes  No 2. Is the application submitted as a result of a Division Order? DO# \_\_\_\_\_
- Yes  No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes  No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes  No 5. Does the 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? NOV # \_\_\_\_\_
- 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? (Modification of R2P2)
- 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 the 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 calculation?
- Yes  No 20. Does the application require or include subsidence control or monitoring?
- Yes  No 21. Have reclamation costs for bonding been provided?
- Yes  No 22. Does the 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?
- Yes  No 24. Does the application include confidential information and is it clearly marked and separated in the plan?

**Please attach three (3) review copies of the application. If the mine is on or adjacent to Forest Service land please submit four (4) copies, thank you.** (These numbers include a copy for the Price Field Office)

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.

David W. Hobbs President 12/16/10 David W. Hobbs  
 Print Name Position Date Signature (Right-click above choose certify then have notary sign below)

Subscribed and sworn to before me this 16<sup>th</sup> day of December, 2010

Notary Public: Linda Kerns, state of Utah.

My commission Expires: March 27, 2013

Commission Number: 578211

Address: 345 North 700 East  
 City: Price State: Utah Zip: 84501

ss:



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| <b>For Office Use Only:</b><br><br><br> | <b>Assigned Tracking Number:</b><br><br> | <b>Received by Oil, Gas &amp; Mining</b><br><br><div style="text-align: center; border: 1px solid red; padding: 5px; color: red; font-weight: bold;">                 RECEIVED<br/>                 DEC 21 2010<br/>                 DIV. OF OIL, GAS &amp; MINING             </div> |
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~~Office Copy~~

# WEST RIDGE MINE

007/041

## CHANGE OF WATER MONITORING PLAN

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**CHAPTER 7**  
**REPLACEMENT PAGES**

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**TABLE OF CONTENTS- APPENDICES  
R645-301-700 CHAPTER 7**

| <b>APPENDIX NUMBER</b> | <b>DESCRIPTION</b>   |
|------------------------|--|
| APPENDIX 7-1           | Investigation of Surface-Water and Groundwater Systems in the West Ridge Area, Carbon County, Utah |
| APPENDIX 7-1A          | Investing of surface-Water and Groundwater Systems in the Whitmore LBA Area, Carbon County, Utah   |
| APPENDIX 7-2           | Baseline Ground Water Monitoring & Analyses  |
| APPENDIX 7-3           | Baseline Surface Water Monitoring & Analyses   |
| APPENDIX 7-4           | West Ridge Mine Sedimentation and Drainage Control Plan  |
| APPENDIX 7-5           | Water Rights Summary   |
| APPENDIX 7-6           | 1985 & 1986 Seep and Spring Inventory Data   |
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| APPENDIX 7-8           | Creamer and Noble Engineers<br>C Canyon Road Station 406+70 - Culvert Design                       |
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| APPENDIX 7-13          | WR-2 Subsidence Information  |

material will be loosely piled and have an irregular, pitted surface or contour furrows to help retain runoff from precipitation events and to reduce erosion until vegetation becomes reestablished. A diversion ditch will be constructed at the edge of the stockpile to divert undisturbed drainage away from the stockpile. Silt fencing will be placed around the perimeter of the stockpile to treat any runoff from the pile.

The topsoil stockpile and test plots will be designated as Alternate Sediment Control Areas (ASCAs).

Refer to Appendix 5-5 for a complete discussion on the construction of the topsoil stockpiles. Refer to Appendix 7-4 for details of the drainage control designs. Map 2-4 depicts the drainage controls of the topsoil stockpile areas.

731.200

#### Water Monitoring

This section describes the hydrologic monitoring plan. Locations of surface-water and groundwater monitoring sites are indicated on Map 7-6. Hydrologic monitoring protocols, sampling frequencies, and sampling sites are described in Table 7-1 through 7-6. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in Table 7-2, and for groundwater in Table 7-3. The hydrologic monitoring parameters have been selected in consultation with the DOGM's directive Tech-004, *Water Monitoring Programs for Coal Mines*.

Operational field and laboratory parameters were measured quarterly for the first ten years of mine operation, rather than for only the first two years as originally proposed in the MRP. The original MRP stated that after a two-year period of quarterly monitoring, if sampling has adequately characterized the hydrology in the area, a request would be made to reduce monitoring to field parameters and one operational analytical sample collected during low flow (August or September). It also stated, the physical parameters and chemical composition of springs and streams in and around the permit area should be adequately characterized following the collection of three years of baseline laboratory data (in progress) and two years of operational laboratory data. (The first year of field data was collected in 1985-1986. ~~Two additional years of monitoring are being conducted in 1997 and 1998~~). The original MRP further stated that, thereafter, continued quarterly monitoring for laboratory parameters would probably not enhance the scientific understanding of hydrologic systems in the mine permit area. Beginning in 2<sup>nd</sup> Quarter of 2011, WEST RIDGE Resources, Inc. will implement this reduced schedule for collection of analytical samples at most sites, as discussed below by individual site.

However, in order to identify mining-related impacts to the discharge and chemical

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characteristics of streams and springs in the permit and adjacent area, **quarterly** monitoring of field parameters will continue during mine operation. If field parameters (pH, specific conductance, and temperature) at any sampling site deviate significantly from historical values, monitoring of **quarterly** operational laboratory water quality will resume at that site. Water monitoring reports will be submitted on a quarterly basis to UDOGM. Should any ground water or surface water samples indicate noncompliance with the permit conditions, the operator will promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and will provide the results of the sampling to the Division.

WEST RIDGE Resources, Inc. believes that discontinuance of **quarterly** laboratory parameters ~~after two years of operation will be~~ **at many of the monitoring sites** is approvable for two reasons. First, there are no mechanisms whereby the chemical composition of springs and streams that are above the mine workings can be adversely impacted by mining activities. Second, this type of groundwater monitoring program has been approved for the Alkali Creek and Dugout Canyon tracts at the Soldier Creek Mine, 10 miles north of the West Ridge area.

Each of the sampling locations and their hydrologic significance are described below. However, in order to comply with UDOGM directive Tech-004, baseline samples will be collected from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring site during low flow every five years beginning with the first mid-term review. The five year baseline samples will be repeated every five years until reclamation is complete.

~~Two years of~~ baseline monitoring ~~has been~~ ~~will be performed on the specified~~ ~~at all~~ monitoring sites ~~until construction of the mine and mine facilities begins.~~ ~~Once construction is initiated;~~ **subsequently,** the **quarterly** operational monitoring schedule ~~will be~~ **was** utilized **through 2010.** Monitoring **as specified herein** will continue through reclamation until bond release unless otherwise modified.

## Streams

Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. Four sites on Grassy Trail Creek ~~have been~~ ~~will be~~ monitored.

Stream site ST-3 is located below the confluence with Hanging Rock Canyon. ~~and is upstream of the permit area.~~ Stream site ST-8 is located just above the confluence with Water Canyon, downstream of the permit area. ~~Two additional monitoring sites will be established on upper Grassy Trail Creek. One site (ST-10) will be~~ ~~is~~ located on the north end of our mining panels. ~~immediately above the northern permit boundary.~~ The other (ST-9) ~~will be~~ ~~is~~ located on upper Grassy Trail Creek at the inlet to Grassy Trail Reservoir. These latter two monitoring sites are intended to monitor for potential impacts from the undermining of upper Grassy Trail Creek.

Beginning in 2<sup>nd</sup> quarter of 2011, ST-8 will be dropped from the monitoring plan. More than 10 years of quarterly monitoring data have been collected at this site, so there is a long record available to characterize Grassy Trail Creek's hydrology at that location. Further, ST-8's location downstream of the reservoir, and well away from the permit area and active mining, renders it unusable to document any potential changes in stream flow or water quality that may be attributable to mining at WEST RIDGE. The three other monitoring sites on Grassy Trail Creek serve adequately for that purpose, so data collection efforts at those three sites will continue, while ST-8 will be dropped. The reduced schedule for analytical sampling, described above, will be implemented at the three remaining Grassy Trail sites (ST-3, ST-9 and ST-10). This can be justified by an analysis of data at these sites. A description of Upper Grassy Trail water quality included above, which was included in the original version of the MRP based upon two years of data, indicates that magnesium, calcium, and bicarbonate are the major ionic components, and that TDS at ST-3 is 350 mg/L. After 10 more years of data collected, analysis indicates that the assessment is still correct: those three ions still represent the majority of the dissolved solids in Upper Grassy Trail Creek, and calculated average TDS at ST-3 is 358 mg/L. Further, quarterly water quality monitoring shows that there is relatively minor temporal variation in water quality at these sites, based upon an assessment of their major ions as represented by Stiff, Piper, and Schoeller Diagrams (see Appendix 7-11). Therefore, reduction in collecting analytical samples from quarterly to annually at ST-3, ST-9, and ST-10 is supported by the record.

One tributary to Grassy Trail Creek within Whitmore Canyon is also monitored. ST-15 is located in at the mouth of Spring Canyon, and has been monitored since 2003. No flows have been reported since that time. It will continue to be monitored quarterly, and operational samples will be collected if flow is occurring during quarterly visits.

On the west side of West Ridge, five stations ~~have been will be~~ monitored for many years on ephemeral drainages contributing to lower Grassy Trail Creek. They are ST-4 (lower Bear Creek), ST-5 (below confluence of B and C Canyons), ST-6A and ST-6 (above and below the mine site, respectively, in C Canyon) and ST-7 (below A Canyon). ST-4 ~~will be~~ was monitored by visual observation of the channel for flowing water. ST-5 ~~will have~~ had a crest gauge and automatic sampler while ST-6A, ST-6 and ST-7 ~~will consist of~~ each had a crest gauge and bottle samplers. ~~The samplers will be checked after precipitation events. The west side of West Ridge stream monitoring stations, used for baseline collection and proposed for operational monitoring beginning in 1999, are equipped~~ are described as follows:

- ST-4 No monitoring equipment ~~is~~ was ever located at this site. The purpose of this station was to conduct baseline observations for two years to determine whether this portion of Bear Creek acted as an ephemeral or intermittent stream channel. Based on monthly monitoring during 1997 and 1998, it has been determined that intermittent flow does not occur in the lower section of Bear Creek and the channel responds only as an ephemeral drainage following substantial rainfall events. ~~This continued to be documented at this site until 2005, when it was officially dropped from the monitoring plan in July 2005.~~
- ST-5 From 1997 through 2008, this location contained the ISCO automatic sampler and a crest gage. ~~The crest gage is a steel pipe concreted into the channel bottom. The pipe has a hole near the bottom so that water can rise in the pipe and record the maximum flow height on a stick inside of the pipe.~~ This station monitored drainage from both the B and C Canyon drainages. However, based on field observations, virtually all of the flow comes from the B Canyon drainage, primarily the lower side drainages and adjacent Mancos slopes. Both the B and C Canyon drainages respond as ephemeral drainages. ~~No drainage has been recorded in C Canyon.~~ In recent years, this site typically continued flows that were 100 percent comprised of mine discharge. While originally intended to cover both B and C Canyon drainages because surface facilities were contemplated in both of these canyons, its locations below the confluence is no longer important since surface facilities are contained within C Canyon, and not in B Canyon. Because the site has served its primary purpose (to document the ephemeral nature of flows) and because it represents essentially the same data as is also collected upstream at ST-6, this site will be dropped from the monitoring beginning 2<sup>nd</sup> quarter of 2011.

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## ST-6 and ST-6A

These two stations are located below and above the proposed mine site in C Canyon, respectively. A crest gage (as described above) and bottle samplers were installed at these sites in 1997, with only partial success at registering flows or collecting samples. Once operations began at the mine, improving access and communications, these structures were less important. The long record of data at ST-6A indicated very little, if any, flow at this site even during severe precipitation events; snow melt runoff often appears to consist of underflow through the heavy organic matter in the channel bottom. Further, once mine discharge began, ST-6 generally receives continuous flow comprised of 100 percent mine discharge. Therefore, there is no correlation between flows at ST-6A and ST-6. The area below ST-6A was last mined in February 2007. Beginning 2<sup>nd</sup> quarter of 2011 ST-6A will be dropped while ST-6 will continue to be monitored. Additionally, the reduced monitoring for analytical parameters will be implemented at ST-6. Although there have been some changes in ionic strength of this water over the years, as shown by Stiff, Piper, and Schoeller Diagrams (see Appendix 7-11), the basic ionic makeup of the water remains fairly constant. Thus, a reduction to annual analytical sampling (maintaining quarterly field parameters) is warranted. Further, this water is also sampled for UPDES samples just a short distance upstream from ST-6 on a monthly basis, which provides analytical data for compliance purposes. ~~are cemented in the channel at each location. The bottles consist of one liter plastic bottles which are strapped to the pipe at specific heights. The bottle cap has two copper tubes which would allow a sample to fill the bottle when the flow height reaches the inlet level. The crest gages have not recorded any flow in the channel in 1997 or 1998 even though the rain gage in C Canyon has recorded 1-2" precipitation events.~~

ST-7 A crest gage and sampler bottles ~~are~~ have been located in the A Canyon drainage since 1997, however equipment functionality in this very flashy and sediment-laden stream has been minimal. Originally established to document drainage, it has not served any purpose in the monitoring plan for many years, since the haul road was constructed elsewhere. Further, there are no surface facilities planned for this drainage and underground mining has been progressing in the opposite direction. This site will no longer be monitored after 2<sup>nd</sup> quarter of 2011. ~~It measures the maximum height of the flow down the A Canyon drainage as well as collecting a sample should the flow height reach the bottle inlet.~~

~~Sites ST-5, ST-6, ST-6A, and ST-7 all have crest gauges installed. Calculated flows, based on the crest gauge measurement and the channel configuration will be included in the surface water monitoring data.~~

~~If it becomes necessary to discharge water from the proposed mine, this water will discharge into the ephemeral C Canyon drainage. Discharge water will be subject to monthly monitoring stipulated by a UPDES permit. Because the monitoring required under the UPDES permit is more stringent and more frequent than that proposed in this permit application, discharge samples will be collected from the UPDES discharge monitoring point rather than at the drainage monitoring station.~~

ST-11 This site, located in Bear Canyon, was added to the monitoring plan in 2005, for reasons described above in Section 728. It has been monitored since that time, but no flows have ever been reported. The area below ST-11 was mined out in November, 2006. This site will be dropped beginning 2<sup>nd</sup> quarter of 2011.

ST-12 This site, also located in Bear Canyon and described above in Section 728, has similarly been monitored since 2005. The area below ST-12 was mined out in October 2007. No flows have been reported since that time. It will be dropped from the monitoring plan beginning in 2<sup>nd</sup> quarter 2011 as there is no longer any reason to document flow regime in this reach of Bear Canyon.

ST-13 Similarly, this site is located in Bear Canyon, and was added to the monitoring plan in 2005, for reasons described above in Section 728. It has been monitored since that time, but no flows have been reported. This site will be dropped from the monitoring plan beginning in 2<sup>nd</sup> quarter 2011.

### Springs

Eight springs in the permit and adjacent areas ~~will be~~ have been monitored since at least 1999; some of these have been monitored by WEST RIDGE since 1997, and some even earlier by other entities. Two other springs, SP-101 and SP-102 have been monitored since 2003. Four of these springs (SP-12, SP-13, SP-15, and SP-16) discharge from the lower slopes of West Ridge in Whitmore Canyon. Two springs, WR-1 and WR-2, discharge from the upper slope of West Ridge in Whitmore Canyon. Refer to Map 7-6. One spring (SP-8) discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80), SP-101 and SP-102 are located near the northeast corner of the permit area and discharges from the east slopes of Whitmore Canyon.

Most of the monitoring stations in this monitoring program are located on the east slope of West Ridge. This is because, with the exception of SP-8, there are no springs that are suitable for monitoring on the west side of West Ridge. ~~SP-8 will be monitored according to the operational schedule beginning in 1999.~~

Beginning in 2<sup>nd</sup> Quarter of 2011, monitoring at SP-15, SP-16, WR-1 and WR-2 will be discontinued. These sites are away from the direction that mining is occurring or will occur in the future, a long record is in place to document that no impacts have occurred, and any past subsidence activities have long ceased. WR-1 is located outside the West Ridge Mine permit area. It was undermined by the adjacent Sunnyside Mine workings at a depth of more than 2000' below the surface as shown on Plate 7-7. This area was undermined at least fifteen years ago. WR-2 is located 2400' above the underlying coal seam and was undermined in June, 2004 as part of the West Ridge mining operation. Subsidence monitoring has been conducted by Ware Surveying as a part of the continuing monitoring program for the Grassy Trail Reservoir located not far away. Several of the subsidence points were located above longwall panel 7 and are less than 1700' feet from WR-2. These points were undermined in March, 2006. This survey shows that mining-induced subsidence in these areas has been completely stabilized for the past three years (see Appendix 7-13). Since WR-2 was undermined by longwall panel 5 nearly two years prior to the Grassy Trails subsidence points, this provides strong assurance that the area around WR-2 has now been similarly stabilized for an even longer time period.

At sites SP-12, SP-13, SP-101, SP-102, S-80 and SP-8, monitoring will continue, but at the reduced analytical schedule described above. The existing long term quarterly record is sufficient to document trends and variation over time, and the basic makeup of this water is well-established, as shown by Stiff, Piper, and Schoeller Diagrams (see Appendix 7-11). Thus, continuing to collect field data on a quarterly basis, but reducing analytical sampling to once a year is warranted.

### Wells

Only one groundwater monitoring well (DH86-2) exists in the permit area. This well monitors the Sunnyside Sandstone Member of the Blackhawk Formation, which is below the coal seam that will be mined. In addition to field parameters and operational water quality parameters, water level will be measured in this well. Because data collected at this site since 1997 exhibits more variability than at the other monitoring sites, quarterly analytical sampling will continue.

### Underground Sampling

UG-1 Starting in the fall of 2010, West Ridge Resources will begin an underground monitoring program on the pre-treatment mine-water. A monthly sample of the in-mine water will be collected prior to treatment and analyzed for operational field and laboratory parameters. Parameters will include total and dissolved iron, sulfate, alkalinity, total and dissolved solids, field conductivity, field temperature, field dissolved oxygen and field pH. The sample will be collected

in 9<sup>th</sup> right between the seal and treatment area. This sample point will be called UG-1. Please refer to Appendix 5-15, Attachment 10 for a description and location of UG-1.

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**Table 7-1 Hydrologic monitoring protocols and locations**

**MONITORING PROTOCOLS**

*Discharge and water level measurements*

| Protocol | Applies to       | Parameter   | Frequency |
|----------|------------------|-------------|-----------|
| A        | Streams          | discharge   | quarterly |
| B        | Springs          | discharge   | quarterly |
| C        | Monitoring wells | water level | quarterly |

*Water quality*

| Protocol | Applies to  | Parameters and Frequency   | Table                               | Frequency  |
|----------|---|--|-------------------------------------|------------|
| 1        | Streams and Springs, as noted below                 | operational field and laboratory for two years, then field only with DOGM concurrence Beginning in 2 <sup>nd</sup> Quarter of 2011, field parameters quarterly, analytical parameters annually in August or September. | 7-2 for ST sites and 7-3 for others | *quarterly |
| 2        | Springs Certain Streams as noted below              | operational field and laboratory for two years, then field only with DOGM concurrence Field parameters only on quarterly schedule.   | 7-3<br>N/A                          | quarterly  |
| 3        | Monitoring wells and certain streams as noted below | operational field and laboratory for two years, then field only with DOGM concurrence on a quarterly schedule.   | 7-2 for ST sites and 7-3 for wells  | quarterly  |

\*samplers will be checked following precipitation events

**MONITORING LOCATIONS**

| Site           | Protocols | Comments   |
|----------------|-----------|--|
| <i>Streams</i> |           |  |
| ST-3           | A, 1      | Grassy Trail Creek upstream of permit area         |
| ST-4           | A, 1      | Bear Creek downstream of permit area (Note 1)      |
| ST-5           | A, 1      | B and C Canyon downstream of permit area           |
| ST-6A          | A, 1      | C Canyon upstream of mine site area                |
| ST-6           | A, 1      | C Canyon downstream of mine site area              |
| ST-7           | A, 1      | A Canyon downstream of permit area                 |
| ST-8           | A, 1      | Grassy Trail Creek downstream of permit area       |
| ST-9           | A, 1      | Grassy Trail Creek at Grassy Trail Reservoir inlet |
| ST-10          | A, 1      | Grassy Trail Creek above permit area               |
| ST-11          | A, 1      | Bear Canyon Shallow Point (Note 2)                 |
| ST-12          | A, 1      | Bear Canyon Falls (Note 3)                         |
| ST-13          | A, 1      | Bear Canyon Below Forks                            |
| ST-15          | A, 1, 3   | Spring Canyon Stream (Note 4)                      |

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*Springs*

|        |                  |  |
|--------|------------------|--|
| SP-12  | B,2 <sup>1</sup> | Colton Fm. upper Whitmore Canyon             |
| SP-13  | B,2 <sup>1</sup> | Colton Fm. upper Whitmore Canyon             |
| SP-15  | B,2              | Colton Fm. near Grassy Trail Reservoir       |
| WR-1   | B,2              | <del>Colton Fm. on West Ridge</del>          |
| WR-2   | B,2              | <del>Colton Fm. on West Ridge</del>          |
| SP-16  | B,2              | <del>North Horn Fm. in Whitmore Canyon</del> |
| SP-8   | B,2 <sup>1</sup> | North Horn Fm. in C Canyon                   |
| SP-101 | B,2 <sup>1</sup> | Little Spring Bottom (Note 5)                |
| SP-102 | B,2 <sup>1</sup> | Spring Canyon Hillside (Note 5)              |
| S-80   | B,2 <sup>1</sup> | Hanging Rock Spring                          |

*Wells*

|        |     |                                 |
|--------|-----|---------------------------------|
| DH86-2 | C-3 | Sunnyside Sandstone in C Canyon |
|--------|-----|---------------------------------|

*Underground*

|      |   |                 |
|------|---|-----------------|
| UG-1 | D | West Ridge Mine |
|------|---|-----------------|

Note 1: ST-4 was discontinued in the third quarter of 2005 and replaced with ST-13.

Note 2: ST-11 will be monitored monthly from May 15 through September 15 as long as flow is present during the flow season of 2005 and 2006 and quarterly throughout the remainder of the year. Thereafter, monitoring will be done on a quarterly basis.

Note 3: ST-12 will be monitored twice a year (late spring/early summer and late summer/early fall) during 2005 and 2006. Based on the results of this monitoring, the plan will be reassessed to determine if this site should be included in the permanent monitoring plan.

Note 4: ST-15 will be monitored for baseline data for the first two years (starting third quarter 2005) according to the surface water monitoring parameters outlined in Table 7-2.

Note 5: SP-101 and SP-102 will be monitored for baseline data for the first two years (starting third quarter 2005) according to the ground water monitoring parameters outlined in Table 7-3.

**Table 7-2 Surface water operational water quality monitoring**

| <u>FIELD MEASUREMENTS</u>          | <u>REPORTED AS</u> |
|------------------------------------|--------------------|
| flow*                              | gpm                |
| pH                                 | pH units           |
| Specific Conductivity              | µs/cm @ 25°C       |
| Dissolved Oxygen                   | mg/l               |
| Temperature                        | °C                 |
| <br><u>LABORATORY MEASUREMENTS</u> |                    |
| Total Dissolved Solids             | mg/l               |
| Total Suspended Solids             | mg/l               |
| Carbonate                          | mg/l               |
| Bicarbonate                        | mg/l               |
| Alkalinity, total                  | mg/l               |
| Hardness,                          | mg/l               |
| Calcium (dissolved)                | mg/l               |
| Chloride                           | mg/l               |
| Iron (dissolved)                   | mg/l               |
| Iron (total)                       | mg/l               |
| Magnesium (dissolved)              | mg/l               |
| Manganese (dissolved)              | mg/l               |
| Manganese (total)                  | mg/l               |
| Potassium (dissolved)              | mg/l               |
| Sodium (dissolved)                 | mg/l               |
| Sulfate                            | mg/l               |
| <br>Oil and grease                 | <br>mg/l           |
| Cations                            | meq/l              |
| Anions                             | meq/l              |
| Cation/Anion Balance               | %                  |

\*For those sites with crest gauges-

**Table 7-3 Groundwater operational water quality monitoring**

| <u>FIELD MEASUREMENTS</u>          | <u>REPORTED AS</u> |
|------------------------------------|--------------------|
| pH                                 | pH units           |
| Specific Conductivity              | µs/cm @ 25°C       |
| Temperature                        | °C                 |
| <br><u>LABORATORY MEASUREMENTS</u> |                    |
| Total Dissolved Solids             | mg/l               |
| Carbonate                          | mg/l               |
| Bicarbonate                        | mg/l               |
| Alkalinity, total                  | mg/l               |
| Hardness,                          | mg/l               |
| Calcium (dissolved)                | mg/l               |
| Chloride                           | mg/l               |
| Iron (dissolved)                   | mg/l               |
| Iron (total)                       | mg/l               |
| Magnesium (dissolved)              | mg/l               |
| Manganese (dissolved)              | mg/l               |
| Manganese (total)                  | mg/l               |
| Potassium (dissolved)              | mg/l               |
| Sodium (dissolved)                 | mg/l               |
| Sulfate                            | mg/l               |
| Cations                            | meq/l              |
| Anions                             | meq/l              |
| Cation/Anion Balance               | %                  |

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**Table 7-4 UPDES Discharge Point Monitoring**

**MONITORING POINTS**

D001

**FREQUENCY**

Monthly

D002

Monthly

**FIELD MEASUREMENTS**

**REPORTED AS**

Flow  
pH  
Specific Conductivity  
Temperature

gpd  
pH units  
 $\mu\text{s/cm @ } 25^{\circ}\text{C}$   
 $^{\circ}\text{C}$

**LABORATORY MEASUREMENTS**

**MAXIMUM**

Oil and grease (if sheen is visible)  
Total Suspended Solids  
Total Iron  
Total Dissolved Solids

10 mg/l  
70 mg/l  
1.0 mg/l  
one ton/day

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WEST RIDGE MINE

WATER MONITORING SCHEDULE 2002 - 2003

TABLE 7-5 SURFACE WATER OPERATIONAL MONITORING LIST

| STREAMS | MONITORING PARAMETER LIST                                      | MONITORING SCHEDULE                                     |
|---------|--|---|
| ST-3    | Operational List + Field Parameters including dissolved oxygen | Quarterly   |
| ST-4    | no sample collected  | channel will be checked following precipitation events  |
| ST-5    | Operational List + pH  | samplers will be checked following precipitation events |
| ST-6    | Operational List + pH  | samplers will be checked following precipitation events |
| ST-6A   | Operational List + pH  | samplers will be checked following precipitation events |
| ST-7    | Operational List + pH  | samplers will be checked following precipitation events |
| ST-8    | Operational List + Field Parameters including dissolved oxygen | Quarterly   |
| ST-9    | Operational List + Field Parameters including dissolved oxygen | Quarterly   |
| ST-10   | Operational List + Field Parameters including dissolved oxygen | Quarterly   |

Operational List includes: Total Dissolved Solids, Total Suspended Solids, Total Hardness, Bicarbonate, Carbonate, Calcium, Chloride, Iron\*, Magnesium, Manganese\*, Potassium, Sodium, Total Alkalinity, Sulfate, Oil and Grease (if surface sheen is present); Cations, Anions, Cation/Anion Balance

(\* analyzed for total and dissolved)

Field parameters include: flow rate, water temperature, pH and conductivity.

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WEST RIDGE MINE

WATER MONITORING SCHEDULE 2002 - 2003

TABLE 7-6 GROUNDWATER OPERATIONAL MONITORING LIST

| SPRINGS | MONITORING PARAMETER LIST           | MONITORING SCHEDULE |
|---------|-------------------------------------|---------------------|
| SP-8    | Operational List + Field Parameters | Quarterly           |
| SP-12   | Operational List + Field Parameters | Quarterly           |
| SP-13   | Operational List + Field Parameters | Quarterly           |
| SP-15   | Operational List + Field Parameters | Quarterly           |
| SP-16   | Operational List + Field Parameters | Quarterly           |
| WR-1    | Operational List + Field Parameters | Quarterly           |
| WR-2    | Operational List + Field Parameters | Quarterly           |
| S-80    | Operational List + Field Parameters | Quarterly           |
| DH-86-2 | Operational List + Field Parameters | Quarterly           |

Operational List includes: Total Dissolved Solids, Total Hardness, Bicarbonate, Carbonate, Calcium, Chloride, Iron\*, Magnesium, Manganese\*, Potassium, Sodium, Sulfate, Total Alkalinity, Cations, Anions, Cation/Anion Balance  
 (\* analyzed for total and dissolved)

Field parameters include: flow rate, water temperature, pH and conductivity.

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APPENDIX 7-13

WR-2 SUBSIDENCE INFORMATION

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**WEST GE RESOURCES, INC.**  
GRASSY TRAIL RESERVOIR SUBSIDENCE SURVEY

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| STATION                    | NORTHING | EASTING  | ELEVATION | NORTHING | EASTING  | ELEVATION | NORTHING | EASTING  | ELEVATION |
|----------------------------|----------|----------|-----------|----------|----------|-----------|----------|----------|-----------|
| <b>CALIBRATION CONTROL</b> |          |          |           |          |          |           |          |          |           |
| 1                          | 38880.51 | 37416.3  | 7591.25   |          |          |           |          |          |           |
| 24                         | 37041.51 | 39338.42 | 7453.47   |          |          |           |          |          |           |
| 2                          | 40772.17 | 37689.12 | 7645.98   |          |          |           |          |          |           |
| <b>MEASURED</b>            |          |          |           |          |          |           |          |          |           |
| <b>SEPT 2004</b>           |          |          |           |          |          |           |          |          |           |
| 1                          | 38219.95 | 36571.37 | 8172.50   | 38220.06 | 36571.39 | 8172.74   | 38218.83 | 36572.19 | 8172.48   |
| 2                          | 38252.72 | 36617.52 | 8129.70   | 38252.61 | 36617.46 | 8129.79   | 38252.84 | 36617.76 | 8129.43   |
| 3                          | 38263.93 | 36653.34 | 8094.67   | 38263.95 | 36653.36 | 8094.74   | 38264.06 | 36653.59 | 8094.52   |
| 4                          | 38299.57 | 36688.08 | 8059.73   | 38299.59 | 36687.98 | 8059.67   | 38299.65 | 36688.16 | 8059.50   |
| 5                          | 38301.95 | 36730.52 | 8023.64   | 38301.94 | 36730.42 | 8023.62   | 38302.04 | 36730.77 | 8023.47   |
| 6                          | 38325.65 | 36774.39 | 7987.63   | 38325.68 | 36774.33 | 7987.66   | 38325.78 | 36774.54 | 7987.57   |
| 7                          | 38331.28 | 36827.08 | 7949.99   | 38331.37 | 36827.10 | 7950.15   | 38331.43 | 36827.41 | 7949.84   |
| 8                          | 38313.55 | 36858.96 | 7935.33   | 38313.53 | 36858.92 | 7935.29   | 38313.75 | 36859.28 | 7935.07   |
| 9                          | 38319.30 | 36949.35 | 7883.24   | 38319.22 | 36949.28 | 7883.21   | 38319.37 | 36949.70 | 7883.16   |
| 10                         | 38440.86 | 36972.65 | 7844.41   | 38440.87 | 36972.67 | 7844.42   | 38440.95 | 36973.01 | 7844.41   |
| 11                         | 38476.43 | 37003.67 | 7816.06   | 38476.50 | 37003.71 | 7816.13   | 38476.43 | 37003.82 | 7816.01   |
| 12                         | 38509.85 | 37047.46 | 7789.87   | 38509.77 | 37047.37 | 7789.84   | 38509.90 | 37047.63 | 7789.75   |
| 13                         | 38555.42 | 37064.56 | 7771.43   | 38555.45 | 37064.60 | 7771.39   | 38555.51 | 37064.70 | 7771.30   |
| 14                         | 38610.87 | 37099.85 | 7739.26   | 38610.90 | 37099.90 | 7739.21   | 38610.90 | 37099.98 | 7739.13   |
| 30                         | 39908.69 | 35492.67 | 8123.71   | 39908.79 | 35492.68 | 8123.68   | 39908.67 | 35492.63 | 8123.62   |
| 31                         | 40040.26 | 35537.78 | 8074.27   | 40040.36 | 35537.75 | 8074.25   | 40040.27 | 35537.64 | 8074.14   |
| 32                         | 40101.53 | 35681.63 | 8079.63   | 40101.61 | 35681.70 | 8079.68   | 40101.53 | 35681.60 | 8079.54   |
| 33                         | 40180.47 | 35799.59 | 8075.64   | 40180.55 | 35799.62 | 8075.62   | 40180.37 | 35799.56 | 8075.47   |
| 34                         | 40271.72 | 35871.88 | 8066.59   | 40271.76 | 35871.89 | 8066.59   | 40271.50 | 35871.81 | 8066.29   |
| 35                         | 40342.59 | 35936.99 | 8042.84   | 40342.59 | 35937.05 | 8042.83   | 40342.42 | 35936.98 | 8042.64   |
| 36                         | 40401.33 | 35978.12 | 8013.00   | 40401.43 | 35978.06 | 8012.93   | 40401.29 | 35978.09 | 8012.85   |
| 37                         | 40483.53 | 36033.85 | 7961.94   | 40483.65 | 36033.83 | 7961.94   | 40483.47 | 36033.73 | 7961.81   |
| 38                         | 40457.48 | 36107.51 | 7911.64   | 40457.59 | 36107.55 | 7911.76   | 40457.46 | 36107.54 | 7911.50   |
| 39                         | 40384.66 | 36157.60 | 7870.68   | 40384.85 | 36157.61 | 7870.78   | 40384.53 | 36157.45 | 7870.28   |
| 40                         | 40369.45 | 36207.99 | 7835.48   | 40369.60 | 36208.01 | 7835.58   | 40369.37 | 36207.98 | 7835.12   |
| 41                         | 40412.36 | 36328.47 | 7786.41   | 40412.52 | 36328.41 | 7786.57   | 40412.33 | 36328.35 | 7786.31   |
| 42                         | 40486.98 | 36430.80 | 7766.77   | 40487.11 | 36430.79 | 7766.91   | 40486.87 | 36430.73 | 7766.64   |
| 43                         | 40456.36 | 36547.60 | 7739.37   | 40456.51 | 36547.56 | 7739.55   | 40456.34 | 36547.59 | 7739.41   |
| 44                         | 40495.04 | 36677.03 | 7720.64   | 40495.16 | 36676.98 | 7720.75   | 40495.05 | 36676.94 | 7720.69   |
| 45                         | 40539.96 | 36788.54 | 7710.28   | 40540.10 | 36788.58 | 7710.37   | 40539.93 | 36788.54 | 7710.27   |
| 46                         | --       | --       | --        | 39499.87 | 35025.50 | 8431.39   | 39499.78 | 35025.57 | 8431.30   |
| 47                         | --       | --       | --        | 39614.25 | 35140.80 | 8369.35   | 39614.13 | 35140.76 | 8369.16   |
| 48                         | --       | --       | --        | 39708.67 | 35258.00 | 8284.45   | 39708.56 | 35257.99 | 8284.30   |
| 49                         | --       | --       | --        | 39797.85 | 35379.02 | 8203.46   | 39797.67 | 35378.99 | 8203.35   |

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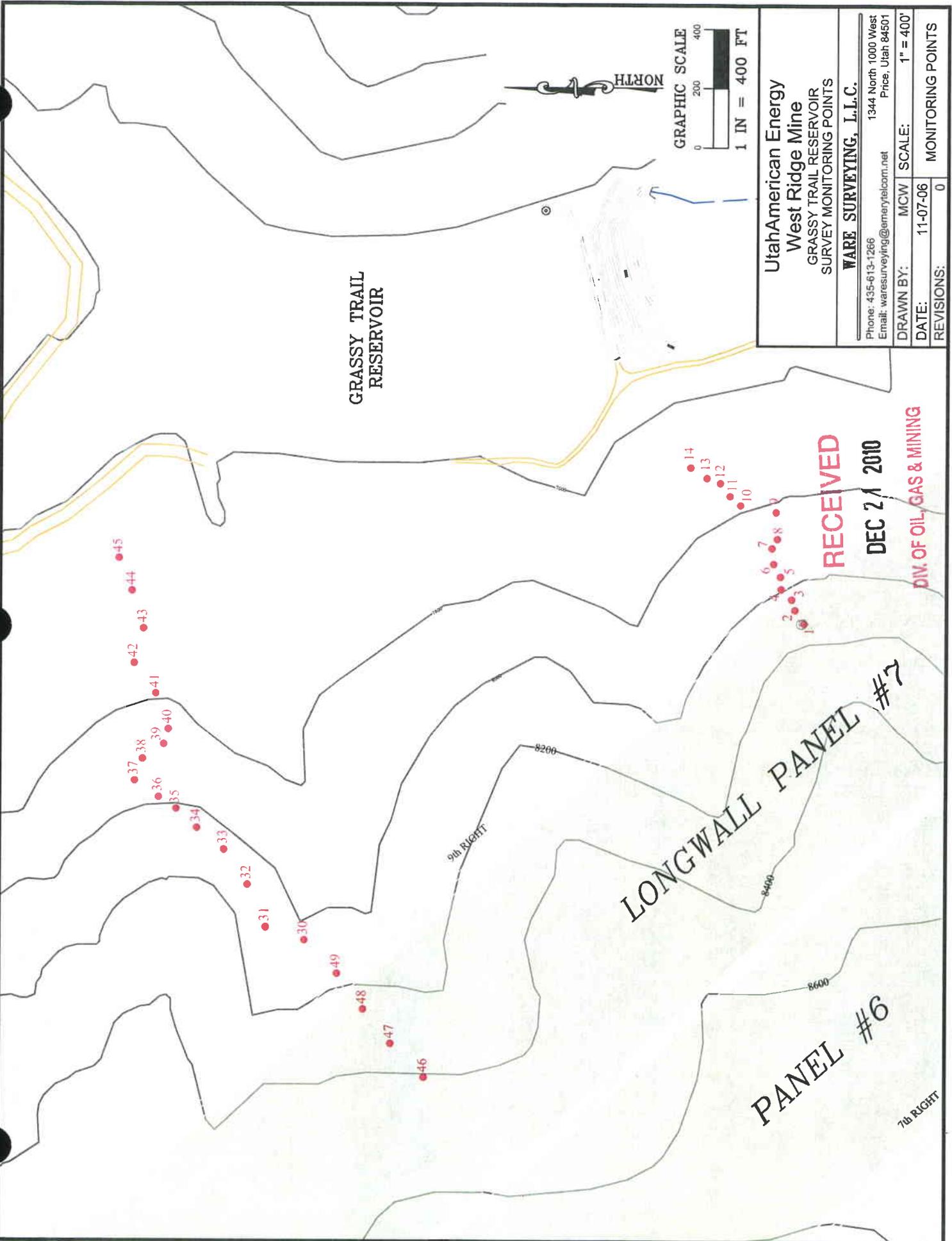
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| EASTING          | ELEVATION | NORTHING | EASTING  | ELEVATION | DESCRIPTION         | 2007-2008 | 2004-2008 | 2008-2010 |
|------------------|-----------|----------|----------|-----------|---------------------|-----------|-----------|-----------|
| <b>JUNE 2008</b> |           |          |          |           |                     |           |           |           |
|                  |           |          |          |           | drill hole in stone |           |           |           |
|                  |           |          |          |           | aerial              |           |           |           |
|                  |           |          |          |           | aerial              |           |           |           |
| <b>JULY 2010</b> |           |          |          |           |                     |           |           |           |
| 36572.49         | 8170.04   | 38219.97 | 36572.55 | 8170.06   | 1/2" rebar w/cap    | 0.62      | 2.46      | -0.02     |
| 36618.21         | 8127.47   | 38252.57 | 36618.36 | 8127.51   | 1/2" rebar w/cap    | 0.57      | 2.23      | -0.04     |
| 36654.26         | 8092.81   | 38263.87 | 36654.19 | 8092.78   | 1/2" rebar w/cap    | 0.56      | 1.86      | 0.03      |
| 36688.91         | 8058.01   | 38299.63 | 36688.96 | 8057.97   | 1/2" rebar w/cap    | 0.52      | 1.72      | 0.04      |
| 36731.48         | 8022.18   | 38302.04 | 36731.50 | 8022.14   | 1/2" rebar w/cap    | 0.46      | 1.46      | 0.04      |
| 36775.38         | 7986.37   | 38325.77 | 36775.37 | 7986.35   | 1/2" rebar w/cap    | 0.39      | 1.26      | 0.02      |
| 36828.16         | 7948.97   | 38331.48 | 36828.14 | 7948.92   | 1/2" rebar w/cap    | 0.36      | 1.02      | 0.05      |
| 36860.01         | 7934.66   | 38313.68 | 36860.00 | 7934.58   | 1/2" rebar w/cap    | 0.05      | 0.67      | 0.08      |
| 36950.44         | 7882.58   | 38319.50 | 36950.53 | 7882.61   | 1/2" rebar w/cap    | 0.02      | 0.66      | -0.03     |
| 36973.78         | 7843.97   | 38441.27 | 36973.79 | 7843.92   | 1/2" rebar w/cap    | -0.02     | 0.44      | 0.05      |
| 37004.90         | 7815.71   | 38476.76 | 37004.93 | 7815.66   | 1/2" rebar w/cap    | -0.02     | 0.35      | 0.05      |
| 37048.59         | 7789.57   | 38510.25 | 37048.61 | 7789.49   | 1/2" rebar w/cap    | -0.12     | 0.30      | 0.08      |
| 37065.79         | 7771.10   | 38555.96 | 37065.75 | 7771.03   | 1/2" rebar w/cap    | -0.10     | 0.33      | 0.07      |
| 37100.83         | 7738.78   | 38611.35 | 37100.81 | 7738.74   | 1/2" rebar w/cap    | -0.01     | 0.48      | 0.04      |
| 35493.00         | 8122.74   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.31      | 0.97      | NA        |
| 35538.29         | 8072.81   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.73      | 1.46      | NA        |
| 35682.12         | 8079.00   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.07      | 0.63      | NA        |
| 35800.16         | 8075.04   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.09      | 0.60      | NA        |
| 35872.38         | 8066.05   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.12      | 0.54      | NA        |
| 35937.60         | 8042.32   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.13      | 0.52      | NA        |
| 35978.69         | 8012.41   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.16      | 0.59      | NA        |
| 36034.45         | 7961.52   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.13      | 0.42      | NA        |
| 36108.17         | 7911.21   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.11      | 0.43      | NA        |
| 36158.25         | 7870.31   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.04      | 0.37      | NA        |
| 36208.63         | 7835.06   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.05      | 0.42      | NA        |
| 36328.92         | 7786.12   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.06      | 0.29      | NA        |
| 36431.19         | 7766.57   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.04      | 0.20      | NA        |
| 36547.83         | 7739.17   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.05      | 0.20      | NA        |
| 36676.90         | 7720.45   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.07      | 0.19      | NA        |
| 36788.35         | 7710.10   | NA       | NA       | NA        | 1/2" rebar w/cap    | 0.07      | 0.18      | NA        |
| 35025.95         | 8429.22   | 39499.89 | 35025.80 | 8428.84   | 1/2" rebar w/cap    | 1.44      | 2.17      | NA        |
| 35141.14         | 8367.35   | 39614.16 | 35141.06 | 8366.99   | 1/2" rebar w/cap    | 1.30      | 2.00      | NA        |
| 35258.11         | 8282.44   | 39708.69 | 35258.43 | 8282.66   | 1/2" rebar w/cap    | 1.06      | 2.01      | NA        |
| NA               | LOST      | NA       | NA       | LOST      | 1/2" rebar w/cap    | NA        | NA        | NA        |



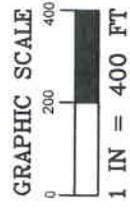
GRASSY TRAIL  
RESERVOIR

LONGWALL PANEL #7

PANEL #6

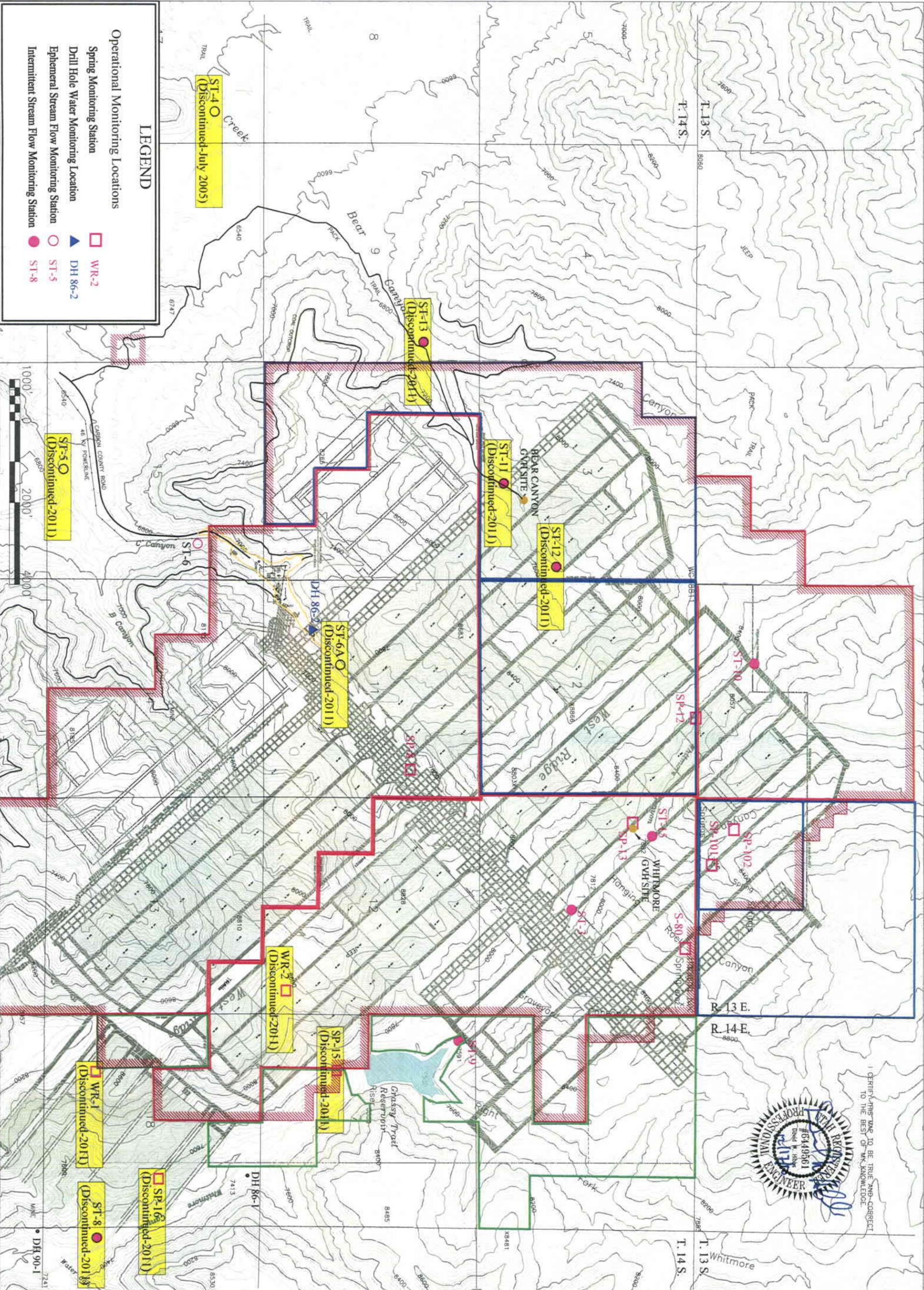
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|   |                   |
|---|-------------------|
| Utah American Energy<br>West Ridge Mine<br>GRASSY TRAIL RESERVOIR<br>SURVEY MONITORING POINTS |                   |
| WARE SURVEYING, L.L.C.<br>1344 North 1000 West<br>Price, Utah 84501                           |                   |
| Phone: 435-613-1266<br>Email: waresurveying@amerystelcorn.net                                 |                   |
| DRAWN BY: MCW   | SCALE: 1" = 400'  |
| DATE: 11-07-06  | MONITORING POINTS |
| REVISIONS: 0  |                   |



**MAP 7-7**

**OPERATIONAL MONITORING LOCATIONS**



**LEGEND**

Operational Monitoring Locations

- Spring Monitoring Station □ WR-2
- Drill Hole Water Monitoring Location ▲ DH 86-2
- Epithermal Stream Flow Monitoring Station ○ ST-5
- Intermittent Stream Flow Monitoring Station ● ST-8



I CERTIFY THIS MAP TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

**WEST RIDGE MINE**  
**Map 7-7**  
**Operational Monitoring Locations**

DATE: 11-12-10    REV: 18    ACAD REF: MAP7-7 MONITOR-OP REV17

**LEGEND:**

- Permit Boundary ▨
- Federal Lease ▬
- State Lease ▬
- Penta Creek Fee ▬
- Surface Facility Area ▬
- GVH Site ●

N

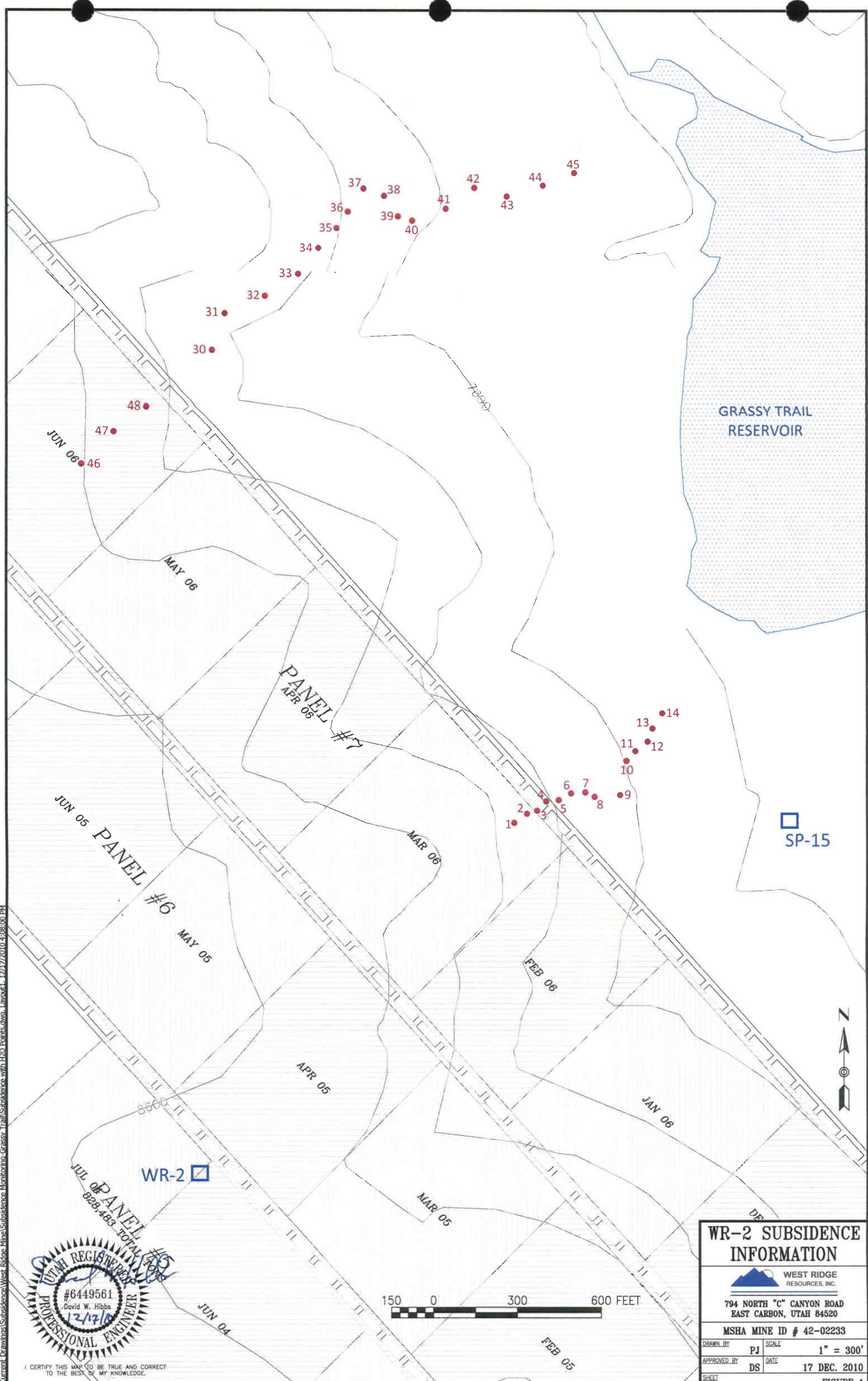
**WEST RIDGE RESOURCES, INC.**

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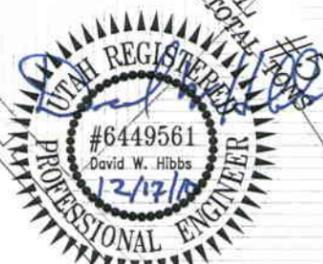
DEC 21 2010

SCALE: AS SHOWN

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I:\Current Drawings\Subsidence\West Ridge Mine\Subsidence Monitoring\Grassy Trail\Subsidence with H2O Points.dwg, Layout1, 12/17/2010 4:08:00 PM



I CERTIFY THIS MAP TO BE TRUE AND CORRECT  
 TO THE BEST OF MY KNOWLEDGE.

|  |    |                            |              |
|--|----|----------------------------|--------------|
| <b>WR-2 SUBSIDENCE INFORMATION</b>                   |    |                            |              |
|  |    | WEST RIDGE RESOURCES, INC. |              |
| 794 NORTH "C" CANYON ROAD<br>EAST CARBON, UTAH 84520 |    |                            |              |
| MSHA MINE ID # 42-02233                              |    |                            |              |
| DRAWN BY   | PJ | SCALE                      | 1" = 300'    |
| APPROVED BY  | DS | DATE                       | 17 DEC. 2010 |
| SHEET  |    |                            | FIGURE 1     |