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DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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November 24, 2000

TO: [REDACTED]

FROM:

Wayne H. Western, Senior Reclamation Specialist *with mjd*  
Michael J. Suflita, Senior Reclamation Hydrologist  
Peter H. Hess, Senior Reclamation Specialist, Team Lead *SM for photo*

RE:

Response to Division Order DO00A, Surface Facility As-Built, West Ridge Resources, Inc., West Ridge Mine, CA [REDACTED] DO00A-1

**SUMMARY:**

On July 14, 2000, the UDNR/OGM received the response to Division Order DO00A-1, that dealt with as-built drawings and slope stability analyses for the West Ridge mine. Before a deficiency document could be generated for the first submittal, additional material which was relative to the hydrologic requirements of the R645 coal rules for the site (and contained a substantial amount of revised information as compared to the approved hydrologic information submitted within the permit application package) was received by the Division on September 18, 2000.

In this document, the Division has determined that several deficiencies relative to the as-built maps, the slope stability analysis of the proposed reclamation plan for the highwall area, and the hydrologic requirements for the site exist and must be addressed before Division approval of the "As- Built" for the new mine can be recommended.

**TECHNICAL ANALYSIS:**

**OPERATION PLAN**

**MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS**

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

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**Analysis:**

**Mining Facilities Maps**

On July 27, 2000, Pete Hess, from the Division of Oil, Gas, and Mining, field-checked Map 5-5, which is an as-built map for the surface facilities. Mr. Hess found several deficiencies are listed in the findings section of this memo.

Plate 5-5 shows the entire disturbed area boundaries. Other maps submitted in the response do not show the complete disturbed area boundaries. The Division considers Plate 5-5 to be the disturbed area boundary map and that map is adequate. If the permittee changes the disturbed area boundaries then they must be changed on all relevant maps including Plate 5-5.

**Findings:**

The information in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the permittee must provide the following in accordance with:

**R645-301-512;** The following deficiencies need to be corrected on Map 5-5, Revision #7: (1) The Mary Jean Mitchell Green memorial flagpole area that lies south of the main conveyor belt drive must be shown. (2) Area 21, which is designated as a "rock dust storage area" needs to be shown as a bulk rock dust storage tank. (3) The high voltage cable access way from the electrical substation to the belt portal must be shown. (4) The machinery wash down pad next to UPDES discharge point #2 must be shown. (5) The area depicted as #22 on Map5-5 is designated as a "diesel fuel storage" area must be labeled as a shed, since the structure is a maintenance shop used to service mine equipment and is on either side of the fuel storage containment. (6) The high wall safety bench above the portals must be labeled on Map 5-6, Map 5-6a, Map5-6b, and Map5-6c. (7) Upper left-hand fork of "C" Canyon. The area above the "coal storage pile" (area is 320 feet long by approximately 100 feet wide or .73 acres) immediately northwest of the coal storage pile has already been used as a coal storage area. The same must be designated as such to meet the requirements of R645-301-521.164. (8) The diesel fuel storage tank (1,000 gallons) northwest of area 10, Reclaim Tunnel Inlet/Head Wall, must be shown. (9) The electrical building by the belt portal must be labeled. (10) The temporary waste rock storage site designated in the upper right fork between areas 19 and 20 must be relocated. Its present position shows that waste rock will be stored on the slope northeast of the fan diffuser.

## HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

### Analysis:

Based on the first technical analysis which was performed relative to hydrology, the UDNR/OGM expected to receive two maps relative to the "as-built" hydrology requirements of the mine site. Instead, an entirely new Appendix 7-4, West Ridge Mine Sedimentation and Drainage Control Plan was submitted on September 18, 2000 prior to the generation of the first deficiency response. The new Appendix 7-4 included one of the two anticipated maps. The permittee indicated that there were so many changes from what had been approved pre-Mine to what had been constructed that the whole appendix 7-4 had to be redone. This technical memo analysis compares the permit application package approved, Appendix 7-4 to the new, "as-built" version. The new appendix was also reviewed on its own merits. All maps, design calculations, and as-built construction in the new submittal are certified by a professional engineer. It is worth noting that the text is clearly written, understandable, and any explanations which were necessary are understandable.

The size of the mine site disturbance is actually smaller than the acreage approved in the permit application package. Also, the configuration of the disturbed area is different. This disturbed area acreage reduction needs to be reflected throughout the text of the mining and reclamation plan.

In order to be consistent with the existing text in the MRP, and especially in Appendix 7-4 itself, all the maps in the original Appendix 7-4 will need to be included in this new version. Maps missing in this new submittal include:

- Map 5-8, Undisturbed Drainage Culvert Profile,
- Map 5-9, Mine Site Reclamation,
- Map 7-4A, Sediment Pond Cross Sections. The new Map 7-4 (received 9/18/2000) is labeled as "Rev 5" which is the same number as the original map in the MRP. There are numerous significant changes to the map. The revision number should be revised to reflect these changes.

### Diversions

Comparing the old Map 7-2, Mine Site Drainage Map, to the new, several changes were noted that appear necessary due to the revised configuration of the site. These configuration

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changes included changing the right fork of the site from five levels to four levels. The road configuration was changed accordingly. These changes appear to have little hydrologic impact.

- DC-8 was moved from under the road to the coal storage pile.
- DD-4A and DC-4A were added.  
DC-5 designation was changed to DC-6 ; DC-5 is now at a new location across the canyon.
- DD-8 goes around the base of the “nose” instead of above the lower road.
- UC-DD and UC-FF have different alignments. These culverts direct undisturbed drainage flows from the channel outside the site to the main culvert under the site. The three main culverts under the site follow the originally approved alignment. This is important to reclamation and was essential to retain.
- DD-11 goes directly to upper Cell A of the Sediment Pond instead of to DC-12 and into the lower Cell B.
- DD-8A was added between two roads.
- Snow storage sites were reduced from 18 to 15, but the overall site is smaller too.
- UD-15, which drains the County road, remains the same. The County road segment also remained the same near the site.
- The roads to the “nose” and to the portals are less steep, but are longer.

Several discrepancies were noted on Map 7-2, Mine Site Drainage Map. These drafting errors will need to be corrected.

- DD-13, in blue, is OK, but DD-13, in pink, located near culvert DC-13 needs to be changed.
- There are two culverts, in different locations, labeled DC-10.
- There is no riprap shown below culverts DC-10 (both), DC-8, DC-8A, DC-4A, and DC-5. Most of them appear to flow down long unprotected slopes. Properly designed riprap needs to be provided. Riprap designs need to be included in the Appendix.
- There is no riprap shown below culverts DC-9, DC-12, and DC-13. There is no riprap shown below the spillway between the two sediment pond cells. Riprap was shown before and is definitely needed. Riprap designs need to be included in the Appendix.
- The upper and lower cells, Cell A and Cell B, are not labeled. The “Sediment Pond” is not labeled. They were labeled before and need to be labeled to match the MRP text.
- UPDES #1 is not labeled as it was before and the Emergency Spillway is not labeled.
- The disturbed area boundary has changed significantly. This was to

accommodate the larger highwall and revised road locations. The new boundary location will have to be staked in the field to delineate the new boundary.

- Page 11 of the text indicates ASCA-X, the test plot, is labeled on Map 7-2. Although the Test Plot is labeled, it is NOT designated as ASCA-X, and needs to be so designated.
- No elevations are given for any contour lines. These were provided on the approved maps and need to be provided on the new edition. An indication of contour intervals would be helpful.

All disturbed area diversions, ditches and culverts, have been designed to a 10-year, 24-hour design per the Division Position Paper. This exceeds the 10-year, 6-hour regulatory design, but is consistent with the 10-year, 24-hour design of the sediment pond and the ASCA areas. The design storm is an SCS Type II. The runoff curve numbers were decided using Division inputs. Nearly all runoff numbers remained the same with some increasing and one decreasing. This is important since the design runoff flows are sensitive to the runoff curve numbers.

Ditches, disturbed and undisturbed, have a minimum freeboard of 0.5 feet, which is at least 20% of the flow depth. This is good engineering design. All ditches having flows greater than 5 feet per second are concrete lined. The number of undisturbed drainage ditches was reduced from seven to two.

With one exception, the bypass culvert sizes remained the same. Culvert UC-HH was reduced from 3 feet to 2 feet. The design calculations appear appropriate and there is 10 feet of headwater available at the inlet, should that be needed.

<b>Bypass Culvert</b>	<b>Old Design Flow (CFS)</b>	<b>New Design Flow (CFS)</b>
UC-AA	45.5	45.5
UC-HH	28	25
UC-JJ	2.14	2.16
UC-DD	0.91	0.91
UC-MM	0.50	0.52
UC-FF	0.95	0.95

The three main bypass culvert lengths were reduced. These are the three legs of the "Y" formed by the left, right, and main channels. The reduction was from 5007.2 feet to 4329.2 feet, a reduction of 677.7 feet.

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All undisturbed area culverts are equipped with ramped trash-racks to reduce culvert plugging. The trash-racks are 3/4 inch bars, six inches on center. Riprap extends to six inches above the elevation head required for the design flow. Although not a regulatory requirement, this is good design and will enhance performance and reduce maintenance. Culverts diverting undisturbed areas have all been designed using a 100-year, 6-hour storm which exceeds regulatory requirements.

The parking lot/office pad area which lies SW of the dual cell sediment was originally permitted as an alternate sediment control area (designated as ASCA-Z in the permit application package). Through proper permitting action (C/007/041-AM00E), the area was re-permitted as a sediment trap with the ability to discharge to the undisturbed bypass culvert (discharge inlet is about 320 feet NW of the undisturbed bypass outlet). As of the date of this document, the permittee has not performed the field changes necessary to incorporate the approved design, therefore inclusion of an "as-built" is not possible at this time. However, it is recommended that the permittee include with the next submittal the following:

- why?
- 1) The permittee needs to update all necessary maps and the MRP text by removing any reference to ASCA "Z". A new designation (perhaps this has already been done in AM00E) should be given to the area.
  - 2) All of the design calculations which were submitted and approved within AM00E should be resubmitted with the permittee's response to this document, such that a "complete" hydrologic appendix will exist upon approval.
  - 3) If, upon the field implementation of the AM00E design, field changes were necessary, those changes must be documented with revised drawings and/or text to complete the "As Built" requirements for this Mine site.

**Discharge Structures**

The riprap at the outlet of the main mine site culvert is appropriately designed. It remains the same as originally approved with a correctly designed filter bed below the riprap. The water exit velocity is 5 feet per second while the natural stream velocity is 10 feet per second. This should prevent any stream channel scouring.

**Sedimentation Ponds**

Comparing the old and new Map 7-4, Sediment Pond Plan and Profile, some changes were noted that appear necessary due to the revised configuration of the site. These changes appear to have little hydrologic impact. Other elements remained the same.

- DD-11 flows to DC-13 and into upper Cell A, instead of into DC-12 and lower Cell B.
- The roads are in basically the same location.
- Both cells of the sediment pond are very close to the original design. The

cells do not cut into the hillside and are positioned right next to one another as originally approved.

Some discrepancies were noted on Map 7-4, Sediment Pond Plan and Profile. These drafting errors need to be corrected.

- DD-9, which feeds DC-9 is not labeled.
- DD-13, which feeds DC-13 is not labeled.
- DD-13, in pink, should be labeled DC-13.
- According to the legend, the main bypass culvert is symbolized by a pair of parallel dashed red lines. The bottom dashed line is missing on the Profile. Similarly, in the Plan View, the two dashed red lines are of different weight or thickness.

The disturbed area drainages flowing to the pond were all designed with the appropriate 10-year, 24-hour storm. The volume of flows reporting to the pond remained the same from the approved plan to the as-built plan. The sum of the runoff from the Disturbed Area, Undisturbed Area, Direct Precipitation, and 3-years of sediment is 7.051 acre-feet. The combined capacity of the two cells of the pond is 8.170 acre-feet, or about 16% greater than design calculations.

The Open-Channel Spillway between cells was designed to meet the appropriate 25-year, 6-hour storm. There is only about one foot of freeboard at that flow, but that would probably be adequate. The Principal and Emergency Spillways are designed to independently pass the required 25-year, 6-hour design event. This conservative design means either spillway could be plugged and the design flow would still flow out of the lower cell. Similar to the upper cell, the freeboard at that flow would be a little over one foot.

All culverts leading to both cells of the sediment pond were checked for capacity and appear to be adequate. In addition, the flows into and through the pond cells showed the following:

- 1) Total inflow into the upper cell, Cell A, is 27.52 cfs. Total flow into the lower cell, Cell B, is 13.51 cfs. This means slightly more than two times the flow enters the upper cell and can flow out the Open-Channel Spillway. The upper cell has a 4.667 acre-feet volume while the lower cell has a 3.482 acre-feet volume. It's preferable that the greater volume flows to the larger (upper) cell.
- 2) The Open-Channel Spillway can pass the flows from the upper cell to the lower cell. That spillway can accommodate the 27.52 cfs with about 1 foot of freeboard.
- 3) The total inflow to the lower cell is 41.03 cfs (27.52 + 13.51) and the outflow from the lower cell is at least 48 cfs. The Principal and Emergency Spillways can function without the other to provide this capacity. This means there appears to be no restriction to flow through the multi-cell sediment pond and its associated

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inlet culverts, open spillway, and two outlet spillways.

Review of the new Table 17 and the original MRP Table 17, Sediment Pond Stage-Volume Data, showed some differences. The MRP table shows the Crest Elevations for both cells (A & B), while there are no corresponding As-Built elevations. The new Table 17 needs to have included the crest elevations for both ponds. This is necessary to have complete information in the plan and to show that there is adequate freeboard on the ponds.

One intent of the submittal was to compare the constructed highwalls to the one approved in the MRP. Hydrologically there are really no changes at the highwalls. The approved highwall was about 40 feet high while the constructed one is about 90 feet high. Additionally, there is a safety bench at the base of the highwalls that was not in the original submittal. The drainage area remains the same and no added runoff would result.

**Findings:**

In its present form the submittal does not meet minimum regulatory requirements. Accordingly, the Permittee must address those deficiencies as found within this Technical Memo and provide the following, prior to approval, in accordance with the requirements of:

**R645-301-721, and -733**, provide the following, as detailed above. **1)** Revise sections of the MRP that refer to the disturbed area size to reflect the correct acreage number. **2)** Submit maps missing from Appendix 7-4, namely: Map 5-8, Map 5-9, and Map 7-4A. Update the revision number of Map 7-4 and submit a new map. **3)** Revise the nine drafting changes to Map 7-2 as itemized above. In the case of riprap, include riprap designs. **4)** Revise the four drafting changes to Map 7-4, as itemized above. **5)** Provide a new Table 17 showing crest elevations for both sediment pond cells. **6)** Redefine the revised disturbed area boundary on the ground to accurately delineate the mine site.

## **RECLAMATION PLAN**

### **BACKFILLING AND GRADING**

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

**Analysis:**

The permittee originally proposed to create highwalls that were smaller than those constructed. During construction, the permittee discovered that the coal near the outcrop had been burned much more than was originally anticipated. The permittee could not follow the approved mine plan because of the unanticipated extent of the burned coal and constructed larger highwalls. The permittee also constructed a safety bench to protect employees and machinery in this area from falling debris. The as-builts for the cut slopes/highwalls are shown on Map 5-5, Map 5-6A, Map 5-6B, and Map 5-6C.

The Division reviewed the as-built maps to determine if reclamation could go as outlined in the MRP. The Division's primary concern is that the cut slopes and highwalls can be reclaimed as required by the Utah Coal Rules. The Division's secondary concern is that the area could be reclaimed without interfering with reclamation of the experimental practice area. The as-built drawings do not adequately address all the reclamation issues associated with the cut slopes/highwalls. Issues in the submittal that have not been addressed are as follows:

- The proposed reclamation slopes are as steep as  $40^\circ$ . Utah Coal Rule R645-301-553.130 requires that reclaimed slopes do not exceed the angle of repose. The angle of repose for most soils is between  $35^\circ$  to  $45^\circ$ . The permittee must state what the angle of repose is for the materials that will be used to backfill the cut slopes/highwalls. If the slope angle exceeds the angle of repose then the permittee must modify the reclamation plan.
- The Division is concerned about the long term slope stability of the reclaimed cut slopes/highwalls. On page 2 of the slope stability analysis dated May 23, 2000 the height of the slope analyzed is 58 feet and has a safety factor of 1.3. On Map 5-6B the cut slope/highwall on Station 24 + 00 has a height of 105 feet. Since slopes become less stable as the height increases, the permittee must calculate the safety factor for the worst case, highest slope.
- The slope stability analysis was done under the assumption that the material in the slopes would be unsaturated during and after construction. The only reason given for why the engineer that calculated the slope's analysis assumed unsaturated condition is a discussion he had with Andalex personnel. The engineer then states that if saturated conditions did exist then the stability analysis would not be valid. See page 3 of the slope stability analysis.

The permittee must give the Division supporting information about why the reclaimed slopes will not become saturated. The Division is concerned that during the snow melt or a heavy rain fall the soils could become saturated. If the soils can become saturated then the permittee must calculate the slope stability analysis using saturated conditions.

- The Division is concerned that the soils that will be used to reclaim the cut slopes/highwalls have not been identified in the reclamation plan. The permittee needs to show that the soils will come from sources that meet or exceed the material properties

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outlined in the slope stability analysis.

- The permittee must give the Division a detailed reclamation plan for the cut slopes/highwalls. The Division needs to know what construction methods will be used to backfill a 40° slope and how vegetation will be established.

**Findings:**

The information in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the permittee must provide the following in accordance with:

**R645-301-553.130**, The permittee must show that the soils that will be used to reclaim the cut slope/highwall area will have an angle of repose that is greater than the reclaimed slope angle. The proposed reclaimed slopes have angles as steep as 40°. The angle of repose for many soils is between 35° to 45°.

**R645-301-553.130**, The permittee must show that the reclaimed slopes associated with the highwalls will have a safety factor of at least 1.3. On page 2 of the slope stability analysis dated May 23, 2000 the height of the slope analyzed is 58 feet. On Map 5-6B the cut slope/highwall on Station 24 + 00 has a height of 105 feet. **Since slopes become less stable as the height increases, the permittee must calculate the safety factor for the worst case, highest slope scenario.**

**R645-301-553.130**, The permittee must show that the assumption that the reclaimed cut slope/highwall slope will not become saturated after construction is valid. The slope stability analysis is based on the assumption of unsaturated conditions but the justification which was given is not felt to be adequate. In the slope stability analysis, the engineer states that the study would be void if a saturated condition occurred.

**R645-301-542.200**, The permittee must give the Division a detailed reclamation plan for the cut slope/highwall area. The plan must include information about where the backfill material will come from. That information is needed to insure that the slopes can be properly reclaimed. The permittee must show that the soils used to reclaim the cut slopes/highwalls have the physical properties needed to achieve a safety factor of 1.3.

**R645-301-542.200**, The permittee must give the Division a detailed reclamation plan that describes how the cut slopes/highwalls areas will be reclaimed. The Division needs to know the construction methods that will be used to

reclaim the cut slopes/highwalls areas. Reclaiming steep slopes can require special equipment and techniques that can effect the reclamation bond.

## HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

### Analysis:

It needs to be noted in this reclamation section that the Map 5-9, Mine Site Reclamation was not included in this submittal. As such, this portion of the review may not be complete and will be re-reviewed upon receipt of that map. Still, the submitted material was reviewed and comments made accordingly. In the originally approved MRP, there was an Optional Reduction of Mine Yard Extent. This option was exercised during construction and the As-Built yard is less than originally approved. As indicated previously, the reduced area needs to be quantified.

### Diversions

Comparison of original Fig. 10 and new Fig. 12, Restored Channel Typical Sections, shows that the reclaimed main channel and the side channels remained essentially the same. Flow depth, freeboard, and velocity were checked. Reclaimed channels RC-GG and RC-KK have slightly reduced velocities of flow. These reductions are probably the result of the reduced mine site area. All designs were and are based on the required 100-year, 6-hour storm.

Other Hydrologic aspects of the Reclamation Plan remained essentially the same. The sediment calculations are the same. The roughening and mulching reclamation method will still be used and result in less sediment than natural conditions. The series of silt fences used to minimize sediment contribution to the stream will still be used. That includes those at the lowest point in the stream at the southernmost end of the site.

On page 54, paragraph 4.3 there is the following sentence. "Sediment traps will be dug into the main channel bottoms as previously described." This concept was discussed early in the site design, but was eventually decided against. This sentence needs to be removed.

### Findings:

In its present form the submittal does not meet minimum regulatory requirements. Accordingly, the Permittee must address those deficiencies as found within this Technical Memo

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analysis and provide the following, prior to approval, in accordance with the requirements of:

**R645-301-721**, Remove the reference to sediment traps on page 54.

**RECOMMENDATION AND CONCLUSION:**

As noted previously in the combined technical memo, the permittee's response to DO00A contains a great many deficiencies which must be corrected before a re-review can be initiated. It is recommended that the submittal be returned to the permittee, with the deficiencies listed within this memo.

A 90-day period to allow the permittee to address the deficiencies aired is probably reasonable.

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