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November 16, 1998

TO: File

THRU: Daron Haddock, Permit Supervisor

FROM: Sharon Falvey, Reclamation Hydrologist

RE: Permit Application Package Round 2, West Ridge Resources, Inc., West Ridge Mine, PRO/007/041, Folder #2, Carbon County, Utah.

SUMMARY:

West Ridge Resources, Inc., has submitted a permit application package to mine in the area southwest of West Ridge and north of East Carbon. Surface facilities are located in C Canyon. The application includes an experimental practice proposal to bury rather than salvage topsoil in portions of the proposed disturbed area. The applicant submitted a second version of the plan to address the issues identified in the July 22, 1998 technical review conducted and compiled into the August 19, 1998 Technical Analyses. Many identified deficiencies were addressed however; the plan is not consistent throughout the document.

ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.18; R645-301-724.

Analysis:

Information on climatic resources can be found in chapters, 2, 4, and 7 and are summarized in the following paragraphs. This site is located within the Region 6 and Region 7, Palmer Hydrologic Drought Index boundaries.

The mean annual air temperature is 45 to 47 degrees F and the average frost free period is 80 to 120 days. Average annual precipitation is 12-14 inches with the majority occurring from October to March (chapter 2, pg. 2-1).

Daily Climatic information is collected at the National Weather Service Station in Sunnyside, Utah. Average annual precipitation is about-13 inches at the Sunnyside, Utah station. Snow accumulations ranged from 0-21 inches at Whitmore Canyon (6,750 ft). Pan evaporation for this site is 0.69 (chapter 4). Average annual wind speed in Dragerton, Utah south east of the site are 6.2 mph and predominately flow from the north-north east (section 724.412).

Findings:

The applicant has met the minimum regulatory requirements for this section. It is recommended that an onsite climatic station be installed for the operational and reclamation period.

OPERATION PLAN

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:

Acid and toxic-forming materials.

Hydrocarbons:

The Spill Prevention and Control Countermeasure Plan is included in the mining and reclamation permit, Appendix 5-6, and, it describes the steps to be taken to minimize disturbance to the hydrologic balance and to meet applicable federal and Utah water quality laws and regulations regarding hydrocarbons.

Other Chemicals

A commitment to handle and properly dispose of all noncoal mine waste defined as "hazardous" Under the Resource Conservation and Recovery act and 40 CFR part 261 was included under section 528.33 in the plan. A plan for longwall mining fluid emergency spills is addressed and a list of chemicals to be used at the mine is included in section 731.300.

Gravel areas will be sprayed with a chemical surface stabilizer such as potassium chloride, or water control (Chapter 4, pg 4-8).

Gravity discharges.

No gravity discharges are expected from the mine. The formation dips to the 3 to 8 degrees to the north northeast.

Diversions.

Design Information

In the previous analyses the Division noted the permittee used smaller CN's than the Division felt was acceptable. Apparently, this resulted from differences in the Soil Hydrologic Group used in their analyses. In this submittal the applicant did not adjusted the Soil Hydrologic Group used to determine the CN but, did adjust the CN's. The applicant has included curve numbers that were agreed upon with the Division in a phone conversation. The following table presents the hydrologic group provided from the Soil Conservation Service and the Hydrologic Group used by the permittee.

Soil Hydrologic Group

Soil (unit#)	Components	% Inclusion	SCS Hydrologic Group	Hydrologic Group used
Midfork Comodor Complex (62)	Midfork Bouldery Loam	50%	B	B
	Commodore Bouldery Loam	30%	D	
	Other	30%		
Rock Outcrop (96)	Rubble Land	30%	NA (impervious)	D
	Rock Outcrop	30%	NA (impervious)	
	Travessilla	25%	D	
	Other	10%		
Croydon (21)	Croydon Loam	100%	B	B
Beje-Trag Complex Plateaus (7)	Beje Loam	55%	D	C
	Trag Clay Loam	20%	C	
Beje Complex - Mountain Ridge Tops (5)	Beje very gravelly fine sandy loam	45%	D	C

Soil Hydrologic Group

	Beje fine sandy loam	35%	D	
	Other	20%		

Source: Soil Survey of Carbon County Area, Utah, USDA SCS June, 1988

The CN range presented below is determined acceptable by the Division and was determined from TR55 methodology with vegetative information provided in the plan and information from the Soil Survey of Carbon County Area, Utah, USDA SCS June, 1988. The CN range determined by the Division are presented, as well as, the CN provided by the operator.

Soil Hydrologic Group

Soil (unit#)	Divisions CN Acceptable Range	Permittee's CN (previous value)	Comments
Midfork Comodor Complex (62)	64 to 62	64 (59)	
Rock Outcrop (96)	80 to 89	80 (78)	Although this is at the low end of the CN acceptable range the Division agrees with the number provided.
Croydon (21)	50 to 60	59 (59)	
Beje-Trag Complex Plateaus (7)	72 to 80	70 (70)	This soil type is a small percentage of the area contributing to runoff.
Beje Complex - Mountain Ridge Tops (5)	80 to 89	70 (70)	This soil type is a small percentage of the area contributing to runoff.

Source: Soil Survey of Carbon County Area, Utah, USDA SCS June, 1988

Bypass Culvert

The Right Fork Undisturbed Bypass Culvert receives drainage from 687.8 acres and is greater than a square mile, therefore by definition, it is intermittent and it is required to be designed for a 100 yr - 6 hr precipitation event. Not the 10 yr- 6 hr event indicated in the plan in Appendix 7-4, page 9 and section 731.600, page 7-27. The culvert design, presented in the plan, exceeds the minimum design requirement.

The applicant uses the Office of Surface Mining Watershed Model, Storm Version 6.20 by Gary E. McIntosh to determine design flows and flow volumes. The SCS upland Curve is used to develop the time of concentration, and a forested unit hydrograph type is assumed.

Although the Kirpich Method for time of concentration results in a more conservative design for the 100-year, 6-hour event (all other values held constant), the 50-year, 24-hour event used for the bypass culvert design provides an additional capacity exceeding the 100-year, 6-hour event. **The maximum culvert size recommended by the engineer is for a four foot culvert. However, in section 728.331 the permittee commits to placing a five foot diameter culvert The plan again contradicts the commitment to place a five foot culvert in Section 731.100, on page 7-17.**

The plan uses a CN of 0.020 for cmp culverts. According to Barfield, Warner and Haan 1981 minimum values of 0.021 and maximum values of 0.0255 can be used. If all other values provided by the applicant are held constant the 0.025 value for the lower sections for the bypass culvert does not provide the capacity estimated for the 50 year 24 hr event but, it would exceed the peak flow estimated from the 100 year - 6 hour event. In addition, the head created by up-gradient water will increase the volume that can move through the culvert and adequately pass the estimated peak flow. When reviewing for storms exceeding the design the Division may use 0.025 unless another value is determined appropriate. The design provided in the plan exceeds the minimum regulatory requirements.

The outlet to the Bypass Culvert will be equipped with a rip-rap apron. Designs are included in Appendix 7-4. Undisturbed drainage culverts will have trash racks and, inlets will be protected with riprap.

Road Drainage

The drainage from area UAZ-b shows the road culvert in the disturbed area as c-county culvert and provided a letter from the county on culvert design size. Other road drainage designs are included in the plan.

Disturbed Area Drainage

Diversions are sized for the 10-year, 24-hour event using the SCS - TR55 method for Type II storms. The constructed ditch design depth will include 0.5 foot of freeboard.

A Manning's n equal to 0.035 is used for all ditch designs. This roughness factor is generally the value used for earthen channels that are small drainage ditches, stony beds with weeds on banks, earth bottom and rubble sides, or large drainage ditches with 4.0-5.0 hydraulic radius. Inspecting the channels under field conditions will ultimately determine design adequacy.

Drainage associated with ASCA's

Watershed map, watershed areas, calculations and associated drainage plans were

corrected at ASCA's X and Y. The ASCA-Z needs to incorporate drainage from the undisturbed area that will combine with the disturbed area drainage.

Stream buffer zones.

A commitment to provide buffer zone signs at the upstream and downstream end of the right fork drainage at the mine pad boundaries is found under Section 521.260. Approval or, a letter indicating requirements for Section 404 of the Clean Water act are fulfilled, needs to be provided.

Sediment control measures.

General Construction plan

Information related to hydrology and sediment control issues identified in the construction plan are:

- Initially the trees will be removed. During this activity removal will occur from the existing road surface and slash will be buried away from the channel culvert location. It is not clear whether the sediment control measures were proposed to be in place at this time.

- The first phase of construction will place a silt fences across the stream using the UDOT post and mesh method. A discussion is included but, a reference to construction methods and a drawing are needed. Concerns for proper use of silt fences are raised when they are placed in drainages. First, silt fences placed in drainages tend to fail when substantial flows are observed and, second, in order to minimize the chance of failure a notched spillway needs to be included. Additionally, the silt fence should not be extended above the elevation of the bank or water tends to erode around the fence.

  A temporary series of two low elevation check dams constructed with compacted, well graded material, anchored into the embankment (3-5 feet) with spillways may be a better temporary solution and would require fewer materials. Either structure should be removed from directly in front of the culvert when flow is allowed to pass through the culvert.

- Sediment control measures and drainage control for the early phases of construction are described in item 8b, Appendix 5-5. The channel will first be culverted through the office pad/lower cell area. A temporary sedimentation pond will be installed prior to other construction activities. The dam embankment will be constructed 10 feet heigh and the culvert will be fitted with an open riser, per attachment 3 of Appendix 5-5.

This structure is estimated to be in place for approximately two months. A silt fence will be placed at the bottom of the temporary sedimentation pond structure.

The existing plan contains most of the information needed to provide a design for the temporary sedimentation structure. Information from the culverted, disturbed and undisturbed sections can be combined to show a maximum runoff volume. The 36" spillway information is already in the plan and could pass a maximum of 47 cfs if 2 feet are provided above the inlet. A quick calculation shows this flow rate would pass peak flow from a 10-year 24-hour event. A commitment to construct the pond under direction of a P.E. and, P.E. certification are necessary. Due to the temporary nature size criteria can be approved by the division according to 742.231.

- Once the culvert is constructed 500 feet up canyon from the temporary pond the permanent ponds can be constructed and the temporary pond can be removed (filled). A short discussion on how this will be achieved should be included.

- When installing the Bypass Culvert the plan proposes using two methods to place fill. One, in Channel, Rock, Fill (CRF) areas, fill will simply be placed in the existing channel. Second, in Channel, Topsoil, Fill (CTF) areas, geotextile will be placed over the topsoil prior to placing the fill. The culvert will closely follow the existing channel alignment and grade.

  In Channel, Rock, Fill (CRF) areas the plan commits to the following in Appendix 5-5, "The channel bottom will not be graded or bulldozed, however." and "...small irregularities of less than 12 inches will be modified to accommodate the culvert alignment." Also, "Imported bedding material (borrow) will be used to fill minor depressions within the channel prior to installing the culvert." Large bolders will be moved away from the culvert alignment.

  Natural abrupt vertical gradient changes occur in the channel and were designated with the name "Rock Block" by the permittee. The plan commits to ramp the fill to the upstream gradient until the channel becomes level in order to retain these features for reclamation. This is an admirable effort to promote retaining the natural geomorphology of this canyon for channel reclamation.

  In Channel, Topsoil, Fill (CTF) areas the same techniques will be used as for the (CRF) areas. However, the channel banks and sides containing topsoil will be draped with the geotextile material before other construction occurs and the culvert bedding will be placed over the geotextile material followed by culvert placement.

- Geotextile manufacturing specifications and specifications for construction must be supplied for all fabrics to be used.

Top Soil Substitute Area.

This area is proposed to be utilized only if needed during final reclamation. No further discussion on proposed configuration and sediment controls is provided. Calculations and quantities for bond estimations assuming the worst case scenario are available in the plan.

Alternate Sediment Control Measures

Topsoil stockpiles ASCA X and Y will use the following sediment control measures; contour furrows, pocking (also referred to as irregular pitted surfaces), silt fencing around the perimeter, seeding(following placement and after September 15), and ditches at the base of the pile to convey runoff away from the topsoil stockpile (section 732.100).

ASCA-Z needs to incorporate the runoff from the undisturbed area to the sediment control measure design. Additionally, grading of the crest of the road entering this site will be critical to ensure the road drainage not included in the design does not enter the pad area.

Siltation structures.

The siltation structures are sedimentation ponds. See the following discussion.

Sedimentation ponds.

Three sedimentation ponds in series will be constructed at this site. The two upper ponds have open channel spillways. The lower pond has two drop inlet spillways that will lead to the bypass culvert, the primary spillway has a riser with an oil skimmer. The lower pond will have an emergency spillway and a primary spillway that pass the 25-year, 6-hour storm event. There are 2 feet of freeboard above the emergency spillway in the lower cell. No spillway designs are presented for the upper cells.

The UPDES sampling provided in the plan does not allow for gathering a sample during a non-decanting discharge from the pond. A method must be available to obtain a discharge sample from the pond outlet when discharge occurs but, prior to discharge to the bypass culvert.

Most of Chapter 5 and part of Chapter 7 need to be updated to reflect changes made in Appendix 7-4 and Map 7-4. Appendix 5-5 states that all open channel spillways will be constructed to pass the 10 year-24 hour storm event and have a freeboard depth of 2 feet. Two feet of freeboard is a standard engineering practice. However, Map 7-5 shows the freeboard to

be 1.5 in the two upper cells, and has an incorrect elevation presented for the primary spillway. Additionally, portions in chapter 7 do not reflect information presented on the map. The plan needs to be made consistent.

Decanting the pond will consist of a portable pump with an inverted inlet. And a 100 gpm pumping capacity (Appendix 7-4). Section R645-301-742 and Appendix 7-4 should be made consistent.

The sedimentation pond is designed so that the upper cell can be used to collect most of the sediment. The sedimentation marker is provided only in the upper cell. Although most sediment will be contained in the upper cells, sediment will be contributed to the lower cells from the county road and overflow. The design provided should minimize accumulations in the lower cells and the annual report survey will track accumulations in the lower two ponds.

The lower pond has 1 foot of freeboard between the primary spillway 6902 ft and the emergency spillway 6903 ft. However the text (pg. 7-25) indicates the primary spillway will carry the peak flow with 1.05 ft of head over the pipe but, this is not constant with Appendix 7-4.

Other treatment facilities.

No other treatment facilities are proposed for this site.

Exemptions for siltation structures.

No exemptions for siltation structures were requested or granted with this application.

Discharge structures.

Designs for the spillways in the upper cells should be shown to be adequate to pass the greater of the 25-year, 6-hour peak flow or, the peak flow from 10- year, 24- hour event to the lower ponds because the total pond volume relies on the spillways to pass the water associated with the 10-year, 24-hour event to the lower pond.

Impoundments.

All impoundments are sedimentation ponds. See the discussion above.

Findings:

R645-301-731.220. A method must be provided to obtain a discharge sample from the pond outlet prior to discharge to the bypass culvert. It is recommended a

walkway be constructed for access.

R645-301-731. The UPDES permit should be issued and incorporated into this plan prior to PAP approval. Approval for construction through the stream channel or, a letter indicating the requirements for Section 404 of the Clean Water act are fulfilled needs to be provided from the regulating agency.

R645-301-731.513. The mine plan needs to contemplate the potential for intercepting water potentially accumulating in the old Sunnyside Mine workings.

R645-301-742.400. Geotextile manufacturing specifications and specifications for construction must be supplied for all fabrics to be used.

R645-301-742. The sequence proposed for placing temporary sediment control measures needs to be clear and need to be in place prior any disturbance to the site including timber removal and vegetation removal at the site.

R645-301-742. A reference to construction methods and a drawing are needed for the silt fence proposed across the stream using the UDOT post and mesh method. In general silt fences placed in drainages fail when substantial flows are observed therefore; BTCA includes designs for a notched spillway and construction so the silt fence is not extended above the bank elevation to prevent water from eroding around the structure. [A temporary series of two low elevation check dams constructed with compacted, well graded material, anchored into the embankment (3-5 feet) with spillways may be a better temporary solution and would require fewer materials]. Either structure should be removed from directly in front of the culvert when flow is allowed to pass through the culvert.

R645-301-742. 1) Include a short discussion on how the sediment control measures will transition from the temporary sedimentation pond to the permanent pond, 2) A commitment to construct the temporary pond under direction of a P.E. and, P.E. certification designs are necessary. Due to the ponds temporary nature, size criteria can reduced through division approval according to 742.231. With minor additional information and existing information from the culverted, disturbed and undisturbed sections a maximum runoff volume and peak flows for the structure can be presented.

R645-301-742.220. The sediment pond spillway designs for the upper and middle cells are needed show they adequately pass **the greater peak flow** from a 25-year, 6-hour event or, the peak flow from 10-year, 24-hour event to the lower ponds since, the total pond volume relies on the spillways to pass the water associated

with the 10 year- 24 hour event to the lower pond.

R645-301-740. The ASCA-Z needs to incorporate drainage from the undisturbed area that will combine with the disturbed area drainage.

R645-301-120. The emergency spillway on Pond C discharges into the bypass culvert. Chapter 5 and Chapter 7 and Map 7-4 need to be made consistent. **(Some examples** of inconsistencies are: 1) Appendix 5-5 states that all open channel spillways will be constructed to pass the 10-year, 24-hour storm event and have a freeboard depth of 2 feet but, Map 7-5 shows the freeboard to be 1.5 in the two upper cells, 2) The lower cell has an incorrect elevation for the primary spillway on Map 7-5, 3) Discussions on decanting in Appendix 7-4 and Section R645-301-742 should be made consistent, 4) The maximum culvert size recommended by the engineer is for a four foot culvert. However, in section 728.331 the permittee commits to placing a five foot diameter culvert. The plan again contradicts the commitment to place a five foot culvert on page 7-17, 5) Sediment storage volume in section R645-301-733 does not match the volume provided in Appendix 7-4, etc.

Recommendation:

It is recommended the deficiencies in this TA be addressed prior to approval of this plan.