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State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Norman H. Bangertter
Governor

Dee C. Hansen
Executive Director

Dianne R. Nielson, Ph.D.
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

April 14, 1992

Mr. Richard H. Allison, Jr.
AMAX Coal Company
Belle Ayr Mine
273 Bishop Road
P. O. Box 3005
Gillette, Wyoming 82717-3005

Dear Mr. Allison:

Re: Division Order #92A, AMAX Coal Company, Castle Gate Mine, ACT/007/004,
Folder #3, Carbon County, Utah

The Division has completed a review of as-built designs for sediment ponds at the Castle Gate Mine Complex. During the course of the review it was determined that your Mining and Reclamation Plans do not adequately address sediment pond construction. A Division Order is enclosed which requires AMAX Coal Company to submit an application for permit change to correct the problems. A technical review memo is also enclosed which further explains the problems with the ponds. You should note that section R645-301-731.520 of the review memo regarding gravity discharges is not included in the Division Order but is being handled through separate enforcement action which you will be receiving from the Price Field Office.

Please review the Division Order, noting the requirements, and submit the required permit changes by the specified due date. If you have questions regarding this order, please contact myself, Daron Haddock, or Sharon Falvey.

Best regards,

A handwritten signature in cursive script that reads "Dianne".

Dianne R. Nielson
Director

Enclosures

cc: D. Haddock
L. Braxton
S. Falvey
J. Helfrich

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**STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING**

PERMITTEE

**Mr. Richard H. Allison, Jr.
AMAX Coal Company
Belle Ayr Mine
273 Bishop Road
P. O. Box 3005
Gillette, Wyoming 82717-3005**

**Castle Gate Mine
Carbon County, Utah**

**Permit Number ACT/007/004
Division Order #92A**

**DIVISION ORDER AND FINDINGS
of
PERMIT DEFICIENCY**

PURSUANT to R645-303-212, the DIVISION hereby ORDERS the PERMITTEE, AMAX Coal Company, to make the permit changes enumerated in the FINDINGS OF PERMIT DEFICIENCY in order to be in compliance with the State Coal Program. These Findings of Permit Deficiency are to be remedied in accordance with the requirements of R645-303-220.

FINDINGS OF PERMIT DEFICIENCY

Review of the submitted As-Built designs for modified Ponds 007, 008, 009, 010, 011, 012, and 013 shows the Operator has not adequately addressed the regulatory

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**ORDERS AND FINDINGS
ACT/007/004**

requirements of R645-301-120, R645-301-713, R645-301-733.210, R645-301-734, R645-301-742-221.31, R645-301-742-221.34, R645-301-742.221.36, R645-301-742.221.37, R645-301-742-221.39, R645-301-742.233, R645-301-742.233.1, and R645-301-742.300(2) (See the attached April 6, 1992 Technical Review Memo by Sharon Falvey). AMAX Coal Company will be required to correct the permit defects and demonstrate compliance.

ORDER

AMAX Coal Company is ORDERED to make the requisite permit changes in accordance with R645-303-220, as set forth above, and to submit a complete application for permit change addressing the FINDINGS OF PERMIT DEFICIENCY by no later than June 5, 1992.

So ORDERED, this 14th day of April, 1992, by the Division of Oil, Gas and Mining.



Dianne R. Nielson, Director
Division of Oil, Gas and Mining



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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355 West North Temple
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Salt Lake City, Utah 84180-1203
801-538-5340

April 6, 1992

TO: Daron Haddock, Permit Supervisor
FROM: Sharon Falvey, Reclamation Specialist *SKF*
RE: Castle Gate Ponds Amendment, AMAX Coal Company, Castle Gate Mine, ACT/007/004, Folder #2, Carbon County, Utah

SUMMARY AND RECOMMENDATION

On December 4, 1991 AMAX Coal Industries submitted the as-built designs for modified Ponds 007, 008, 009, 010, 011, 012, and 015. The following review analyzes the constructed ponds, identifies deficiencies, and variances from the proposed design.

The Operator has submitted the as-built designs. These designs vary somewhat from the proposed design, and conditions of the proposed design. Various deficiencies also exist. I recommend the following deficiencies be handled as a Division Order: R645-301-120, R645-301-713, R645-301-733.210, R645-301-734, R645-301-742-221.31, R645-301-742-221.34, R645-301-742.221.36, R645-301-742.221.37, R645-301-742-221.39, R645-301-742.233, R645-301-742.233.1, R645-301-742.300(2),. The following requires enforcement action: R645-301-731, R645-301-731.520, R645-301-742.300(1).

R645-301-120 Application Format

Operator's Proposal:

The Operator submitted as-built designs and text changes.

Analysis:

The Operator has not indicated the pages to be removed for replacement with the new designs. All changes submitted by the Applicant must come in the form of an amendment to be inserted into the MRP identifying the pages to be removed and replaced in a summarized table.

Conflicting information is presented in the permit application. The following lists those observed conflicts:

1. Information on the primary spillway drawing for Pond 007, pg. 12, Appendix 3.3 A conflicts with information on Exhibit 11.4.
2. The stage volume curve on pg. 13, Appendix 3.3 A incorrectly indicates containment of 2 yr sediment volume.
3. The riser diameter for the primary spillway and height between inlet and outlet of the primary spillway on Pond 008 (drawing pg. 22, Appendix 3.3A, and associated design calculations) conflict with Exhibit 11.
4. The spillway cross-section for Pond 012B is designed for a 6' width. Exhibit 11 shows 5'-6' width. The limiting design width must be used for routing flow. Text conflicts with the certified as-built.
5. The text page 31, Chapter 3, Sec. 3.7, for Pond 015 conflicts with the maximum sediment containment volume on the Table 3.7-8, pg. 52.
6. The pond volume curve page 30-31, Appendix 3.3A, for Pond 009A does not correspond with the pond volume containment totals for sediment storage on pg. 34.
7. Pond 012A has an existing decant. The text indicates the decant used will be a portable pump.

Deficiencies:

1. Provide a list indicating the intended replacement pages for the amendment addressing this memo in a table with the amendment. Identify pages to be removed and inserted in a cover letter.
2. Correct conflicting information presented in the application including items 1-7 above.

R645-301-713. Inspection. Impoundments will be inspected as described under R645-301-514.300.

Operator's Proposal:

The Operator has submitted certified as-built design maps, calculations and text.

Analysis:

R645-301-514.312 requires the qualified registered professional engineer to promptly, after each inspection, provide to the Division, a certified report that the impoundment has been constructed as designed and in accordance with the approved plan and the R645 Rules. The report is to include discussion of any appearances of instability, structural weakness or other hazardous conditions, depth and elevation of any impounded waters, existing storage capacity, any existing or required monitoring procedures and instrumentation and any other aspects of the structure affecting stability

Deficiency:

1. Include a certified report addressing R645-301-514.312 for the impoundments following construction changes.

R645-301-731. General Requirements.

Operator's Proposal:

The Operator sized all ponds for detention of the 10-year 24-hour runoff event, and proposed containment of a determined sediment volume. The Operator also sized inlets, outlets, and freeboard based solely on the runoff event.

Analysis:

The Operator has not identified the specific hydrologic conditions regarding mine drainage to Pond 010. The Applicant has not demonstrated that it meets the applicable water laws specifically NPDES for the discharge point as required by R645-731.222.2.

Deficiencies:

1. Address all applicable R645-700 regulations for mine drainage including R645-731.222.2.

R645-301-731.520. Gravity Discharges

*Not included in Division
order #92A*

Operator's Proposal:

No proposal is made for the gravity discharge which exists at the mine site.

Analysis:

The operations for Utah Fuel #1 area portal has gravity discharged to Pond 01D following portal closure. The Division was not informed of the discharge in the proposed operations. The Operator has not demonstrated that the discharge complies with the performance standards of R645-301 and R645-302 and any additional NPDES permit requirements as identified in R614(645)-301-731.521.

Deficiencies:

1. The Operator must meet all regulations regarding gravity discharge and provide information to insert into the MRP.

R645-301-733.210. Permanent and temporary impoundments will be designed to meet the requirements of 533.100.

Operator's Proposal:

Through field visits and discussion with the contractor, I learned that compaction was achieved on embankments, by compression with the bucket of the front end loader, the surface was then roughened to approximately 6" for vegetation establishment on ponds where embankment construction occurred.

Analysis:

The Operator has increased the height of embankments and embankment fill using

non-standard construction methods. The methods employed in construction of the impoundments potentially decreased the stability of the impoundments. Some construction methods and potential instability observations included:

1. Raising the embankment height on Pond 009B by placing metal sheeting against the existing railroad tie and log retaining structures. The sheeting did not appear to have a stable connection to that structure. Additionally the log retaining structure on Pond 009B leans into the pond at an obtuse angle at its southwest end.
2. The cross bars previously located at Pond 009A were removed for pond clean out. The cross bars provided additional support to the vertical railroad ties and log retaining wall.
3. The embankment adjacent to the road on Pond 007 was steepened during construction because existing structural limits did not allow for deepening the pond. Removal of the previous Primary Spillway on Pond 012B was also compacted with the bucket of a front end loader.

Deficiency:

1. Supply information to demonstrate the safety factor and meet the requirements of R645-301-533.100, include all engineering reports containing information methods of pond construction.

R645-301-734. Discharge Structures. Discharge structures will be constructed and maintained to comply with R645-301-744.

Operator's Proposal:

The outlets were evaluated to determine suitability of existing riprap.

Analysis:

The Operator has not provided for adequate design of the exit channel for the primary spillways on Ponds 008, 012, and 015. Outlet controls terminate 1-2ft from the base of the structure outlet.

The Operator did not provide adequate design calculations for the emergency exit channel on Pond 011. The approved plan suggested there was no need for an exit channel (e.g. there was freeboard between the maximum stage and primary in the proposed pond).

Deficiencies:

1. Demonstrate adequacy of discharge structures on ponds that do not discharge to a designed drainage channel.

R645-301-742.221.31. Provide adequate sediment storage volume

Operator's Proposal:

The Operator proposes all sediment ponds will have adequate sediment storage volume and will have periodic sediment removal sufficient to maintain adequate volume for the design event in regards to R614(645)-301-742.221.307 and R614(645)-301-742.221.36 (pg. 7, Chapter 3, Section 3.3).

Analysis:

The Operator has, in some cases, significantly changed the proposed sediment volume pond containment. The Operator has decreased the proposed maximum sediment level volume for most ponds due to failure to meet the total proposed pond volume during construction.

In some cases values of sediment containment at the proposed maximum sediment elevation vary from the Divisions values. A significant volume difference occurs in ponds 009A and 009B, and Pond 010.

The Operator has failed to include values for areas coinciding to the elevation used for creating the stage discharge curve. This makes it difficult to assess differences in pond volume values. The elevations and corresponding volumes used to create the curve are unknown.

I consider the Operators sediment control, in some cases, to be minimal at best. The Operator has adjusted sediment volumes, rather than supply conservative designed ponds. The Operator does meet the undefined requirement of adequate sediment volume, and is working with pre-existing ponds.

Pond 007

The total pond capacity at primary spillway was decreased by 1,887 ft³. The Operator proposed to provide storage for 1.6 years sediment volume. The as-built provides storage for 1.3 years. The constructed volume is decreased by 1,887 ft³ from the proposed volume. The volume is decreased from the standard 3 yr storage volume (14,900 ft³) by 4,960 ft³. The available sediment volume and elevation values are in close agreement with Division values.

Pond 008

The total pond capacity at primary spillway was decreased by 4,573 ft³. The Operator proposed to provide sediment storage for 3 years (7,785 ft³). The as-built provides storage for 1.3 years. The as-built volume decreased by 4,585 ft³ from the proposed volume. The Operator's values for sediment volume and elevations closely correlates with Division values.

Pond 009A and 009B

The total pond capacity at primary spillways for Pond 009A and 009B was decreased by 1,566 ft³. Pond 009A capacity increased by 1,602 ft³ while Pond 009B decreased 3,168 ft³.

The Applicant has increased the sediment volume for Pond 009A from 2,650 ft³ to 3,032 ft³. At Pond 009B the sediment volume was decreased to 1,500 ft³. The total sediment storage is 4,532 ft³, 68% of the proposed 6,650 ft³.

The Operator's pond volumes deviate from Division values. Available sediment volume is significantly lower than the volumes indicated by the Operator.

Pond 010

The total pond capacity at primary spillway was approximately the same as proposed 9,894 ft³. The Operator proposed to provide sediment storage volume of 1,488 ft³ equal to approximately 37% of the 3 year sediment volume or approximately 1.1 year storage. The operators pond volume is less than Division value. The variance is approximately 776 ft³ this value could be considered insignificant in an oversized pond. Because the Operator has

not included sizing for the mine water drainage entering the pond and because of the low storage volume, the Operator should take this factor into consideration when re-sizing the pond for minewater drainage.

Pond 011

The total pond capacity at primary spillway was decreased by 2,995 ft³. The Operator proposed to provide storage for 3 years sediment volume. The as-built provides storage for approximately 1 year. The constructed volume is decreased by 2,941.4 ft³ from the proposed volume. Although Division analysis indicates a slightly larger sediment volume at the proposed elevation, the runoff volume is maintained at this elevation according to Division analysis.

Pond 012A and 012B

The total pond capacity at primary spillway for Ponds A and B was decreased by 1,067 ft³. Pond 012A decreased the total primary spillway capacity by 3,797 ft³. Pond 012B increased the primary spillway capacity by 2,730 ft³.

The Operator proposed to provide sediment storage for more than 3 years in Pond 012A. The as-built provides storage for 3 years. The asbuilt volume has decreased by 4,157 ft³.

The Operator proposed to provide sediment storage for Pond 012B with a 3 yr sediment volume of 7,216 ft³. This volume has not changed.

The Operator's values for sediment volume at the proposed elevation are in close agreement. There is additional storage volume available.

Pond 015

The total pond capacity at primary spillway was increased by 8,287 ft³. The Operator has increased the proposed sediment volume from 14,000 ft³ to 18,796 ft³ according to the submitted pond volume curve (Appendix 3.7 G, pg 1). The text incorrectly states a value of 22,446 ft³. The Division's calculations show sediment volume at the proposed elevation is less than the Applicant's value.

Although Division analysis indicates a lower sediment volume at the proposed

elevation, the pond allows for adequate runoff volume at this elevation.

Deficiencies:

1. Provide areas and elevations used to determine the pond volume curve. Include methods and programs used to develop the curves.
2. Re-evaluate method used to determine pond volume on Ponds 009A and 009B, consideration needs to be given to the volume of sediment contained in the ponds. see R645-734-221.36.

R645-301-742.221.33. Contain or treat the 10-year, 24-hour precipitation event

Operator's Proposal:

The Operator maintained the proposed containment as a minimum for the runoff volume in the constructed ponds. The Operator demonstrated containment of the 10 yr-24hr event for Pond 010.

Analysis:

The Applicant has not included the discharge from the closed mine workings at the site. This discharge was found to drain directly to the pond, but was not sighted anywhere in the mine plan and was not included in the sizing of the sediment pond for containment.

The Division's calculation for total pond volume of Pond 010 is 9.5% of the Applicant's volume. Pond 009A also has a large variance. Additionally, no pond stage volume curve was found for the as-built, although there was a table.

Deficiencies:

1. Demonstrated containment or treatment for the design runoff event in Pond 010. Include the mine water in the sizing of the pond, as well as the inflow for the spillway. The variance between the Operator's pond volume and Divisions volume is a concern. The volumes should be in close agreement. Because there is a minimal design for sediment volume containment (1 year) this variance becomes more critical.

R645-301-742.221.34. Provide a non-clogging dewatering device adequate to maintain the detention time required under R645-301-742.221.32.

Operator's Proposal:

Ponds 008, 009B, 010, 012A, 012B were provided with decant systems at the maximum sediment elevation level. Pond 015 was provided with a decant above the maximum sediment elevation level. Ponds 009A, 011, 013, 014, 015 are provided with portable pumps and will decant to the maximum sediment level.

Analysis:

The Operator has provided dewatering devices for the sediment ponds, but has not demonstrated adequacy to maintain detention time. Adequacy can be met through a dewatering plan that details the steps to be taken following an event. Details should include a method of demonstration to show the discharge meets effluent limitations.

Deficiencies:

1. Provide a detailed dewatering plan for the ponds and description of the inlet to portable pumps. Include methods used to insure discharged water meets effluent limitations.

R645-301-742.221.36. Provide periodic sediment removal sufficient to maintain adequate volume for the design event;

Operator's Proposal:

The Operator proposes all sediment ponds will have adequate sediment storage volume and will have periodic sediment removal sufficient to maintain adequate volume for the design event in regards to R614(645)-742.221.307 and R614(645)-742.221.36 (pg. 7, Chapter 3, Section 3.3).

Analysis:

The Operator removed the commitment to maintain the pond at a 60% clean out level. The commitment for the 60% clean out level was a condition to accepting the sediment

volumes with less than 3 yrs containment, as was identified in the August 26, 1991 memo. "Because the Operator has committed to clean out at the 60% level the ponds should be able to maintain adequate detention volume." "... Operator's response received by the Division on August 5, 1991 the Operator indicated that all ponds would be cleaned out at the 60% level."

Deficiencies:

1. Provide a specific description of when the ponds will be cleaned and how the Operator will maintain the 60% clean out level commitment.

R645-301-742.221.37. Ensure against excessive settlement;

Operator's Proposal:

None.

Analysis:

During field investigations it was noted that the construction of the pond did not include a surge berm for protection against excessive settlement. The contractor indicated the method of compaction was to use the backhoe to compact the materials added to the embankment. Following the compaction the contractor used the serrated bucket to roughen the surface of the heightened embankments on Ponds 007, 008, 009 for vegetation establishment. These methods do not ensure against excessive settlement.

Because there was no evidence that the Operator provided for settlement in the design. Any excessive settlement noted in the field will result in enforcement action.

Deficiencies:

1. Indicate how the construction method ensures against excessive settlement since, standard engineering practices were not used.

R645-301-742.221.39. Be compacted properly.

Operator's Proposal:

Through field visits and discussion with the contractor, I learned that compaction was achieved on embankments by compression with the bucket of the front end loader, the surface was then roughened to approximately 6" for vegetation establishment. Pond 012B was compacted by the contractor using the shovel of the backhoe where the previous primary spillway is removed. Ponds 007, 008, 009A, 009B, 010, 011, and 12B proposed embankment construction.

Analysis:

Standard engineering methods require compaction in 2 ft lifts.

Deficiencies:

1. Demonstrate adequate compaction.

R645-301-742.223. Sedimentation ponds provide a combination of principal and emergency spillways that will safely discharge a 25-year, 6-hour precipitation event

Operator's Proposal:

The Operator relies on the proposed submittal to provide the demonstration for safely discharging the 25-year 6-hour precipitation event. The ability of the ponds to pass the event is based on routing with the SEDIMENT program through the proposed structures, assuming maximum sediment is contained in the pond and, in most cases, that the pond is full of water at the start of the event.

The Operator routes the 25-year 6-hour event through the emergency spillway using conventional channel design methods and using wier flow.

Analysis:

The Operator has not adjusted the pond volume curve used in SEDIMENT when determining maximum stage and attenuation of the peak. Should the effective volume or

effective stage elevation change, the calculations become invalid.

In determining the ability of the emergency spillway to pass the event the Operator ignores wiew flow except in the case of single open channel spillways. The method for wiew flow can result in a greater maximum stage than the depth of channel flow proposed by the Operator.

The Operator has increased the effective stage without changing the effective volume on Pond 008. Therefore the Operator has potentially affected the maximum stage in the proposed design. The potential outflow rate after routing through the new pond may vary from the proposed design, thus changing the inflow to Pond 009, since they are hydraulically connected. The runoff volume for Pond 009A was increased, while the runoff volume for Pond 009B was decreased. Since the previous routing provided that the full run off volume was contained in Pond 009B, the maximum stage is affected. Therefore the effective potential stage and the peak outflows could change.

The Operator has changed the effective head for Pond 012A, by increasing the runoff volume contained, and therefore changed the validity of the maximum stage calculation and freeboard (changes are expected to be clarified following NOV 91-28-1-1 abatement).

The SEDIMENT program run on Pond 015 assumes the water in the pond is empty and is determined full to the sediment volume of 10,500 ft³. A volume less than the proposed maximum sediment volume. The constructed pond has decreased the effective volume used to route the 25yr-6hr event and has decreased the effective stage height. Therefore invalidating the proposed design routing.

The Operator commonly has less than 1 ft. of freeboard between the Primary Spillway maximum stage and the Emergency Spillway and between the Emergency Spillway maximum stage and the minimum embankment height and less than 1 ft. between the maximum stage of the primary spillway and the embankment. The embankment height identified on many of the maps does not recognize the actual minimum embankment height therefore results in incorrect freeboard heights.

The Applicant has submitted conflicting information on the primary inlets for ponds 008 and 012 between drawings and certified as-builts.

Assuming the emergency spillway would flow during some malfunction of the primary the emergency spillway on Pond 008 would be spilling against the utility pole located adjacent to the spillway.

According to the text on page 12, Pond 011, the primary spillway maximum stage is at 98.0'. The elevation of the emergency spillway. Therefore it is likely that the emergency spillway will spill at the same time as the primary spillway. The Operator has not provided designs for flow down the spillway discharge structure.

The Operator has not included minewater drainage in the pond designs for the spillway as well as inlet designs for Pond 010.

Deficiencies:

1. Provide text or design calculations clarifying the SEDIMENT volume curve for ponds with discrepancies in runoff volume, spillway elevation, and freeboard changes. Ponds that do not match the values of the proposed design volume curves used to run the SEDIMENT program, should have text identifying why the values are acceptable.
2. Indicate the maximum stage for the principle and emergency spillways for all ponds on as constructed maps and in text. Correct maps identifying existing freeboard using the elevation between the maximum stage and minimum embankment height.
3. Demonstrate that freeboard meets the requirements of **R645-301-512.240** and **R645-301-743.120**.
4. The Operator must demonstrate the flow through the emergency spillway using weir flow for reservoirs for all emergency spillways that flow during the design event.
5. Include minewater drainage in demonstrating passing the design event.

R645-301-742.233.1 A single open channel spillway of non-erodible construction and designed to carry sustained flows

Operator's Proposal:

Typical cross-sections are used to demonstrate design.

Analysis:

The Applicant uses typical spillway cross-sections. In many of the cross-sections the depth indicated from the spillway elevation to the channel embankment is greater than the depth to the freeboard at the level of the spillway. The Operator should realize the typical design sets the minimum design criteria therefore any design less accommodating than the certified design will result in enforcement actions.

Deficiencies:

1. Correct the as-built cross-sections and spillway designs to the existing minimum design existing at each modified pond.

R645-301-742.300. Diversions.

Operator's Proposal:

All pond inlets and outlets were sized for the design event.

Analysis:

The Operator has not included minewater drainage in the pond designs for the spillway and inlet designs. At Pond 011 it appears that the inlet adjacent to the road, according to the as-built, has the potential to fail before reaching the pond. The as-built at the inlet to Pond 012B visually appears lower than the spillway flowline, the pond survey does not extend far enough to determine adequacy of design.

Deficiencies:

1. Provide for mine water discharge in diversion designs.
2. Correct and clarify areas of discrepancy for pond inlet ditches either by including more contours on the as-builts or other verification method.