

January 24, 2003

TO: Internal File

THRU: Daron R. Haddock, Permit Supervisor

FROM: Gregg A. Galecki, Reclamation Hydrologist

RE: Response to Informal Conference – Updating of Chapter 7, Hiawatha Coal Company, Hiawatha Complex, C/007/011-AM02B-1, Carbon County, Utah, Internal File

SUMMARY:

The following review addresses changes made within Chapters 5, 6, and 7 of the approved Mine Reclamation Plan (MRP) for the Hiawatha Complex mine. The changes were in response to a Division Order issued May 1, 2002. The Division of Oil, Gas, and Mining (Division) received the original submittal on June 6, 2002, which was returned to the Hiawatha Coal Company (Operator) with deficiencies on August 8, 2002. On October 10, 2002, the Operator asked for an extension to November 30, 2002, to complete the work. The extension was granted and the amendment was received at the Division on December 3, 2002. The primary focus of this review is to evaluate the effects on groundwater associated with the Bear Canyon Fault as water is encountered during mining, which involved updates/modifications to the Engineering (Ch. 5), Geology (Ch.6), and Hydrology (Ch.7) sections of the MRP. Although engineering information was provided for additional insights related to subsidence, the subsidence information was not evaluated from an engineering perspective; that will be conducted under a different review when an 'official' mine plan is submitted.

It is important to mention that mining has taken place within the permit and surrounding area for almost 100 years. The Hiawatha Mine is currently inactive with all the portals being closed since 1993. All the modifications created by Hiawatha Coal Company for this submittal are based on U.S. Fuel Company's data that could be located. Additional modifications need to be made to the above-mentioned sections prior to Division approval.

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TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

Earlier references in the MRP indicating U.S. Fuel as being the Mine Operator have been corrected. In all instances the MRP now reflects Hiawatha Coal Company as the current Mine Operator and uses U.S. Fuel only in the past tense. Also included in the current application is a copy of the Mayo 2001 report, which was requested. Both the amendment and Mayo 2001 report were submitted electronically. When viewing the amendment in that format, citing to the Mayo 2001 report are electronically linked to the exact page (reference) in the report. This has been very helpful when reviewing the amendment electronically.

The following spelling and pagination errors exist in chapters 6 and 7, which when corrected will help clarify the body of the text:

- Ch.6 cover page; geology is misspelled
- Ch.6 Table of Contents lists the incorrect page for tables 7, 8, 9, and Exhibit 6-6 should include 'B seam' in the title
- In Ch. 6 conduct a word search replacing the word 'form' with 'from' where applicable
- Ch.7 Table of Contents lists 724.600 which does not exist in text
- Ch.7 Table of Contents (pg. 7-v), Table 7-8 replace 'U.S. Fuel' with 'Hiawatha'
- Ch.7 Table of Contents, List of Appendices (pg. 7-vii), Appendix 7-12 through 7-14 exist in approved MRP, include in Table unless they are going to be removed from MRP and the information is clearly referenced to the Division database in text.
- Ch. 7 Table of Contents, List of Exhibits (pg. 7-viii), Exhibit 7-18 includes items A – D; Exhibits 7-22 and 7-23 need to be included in list (currently located on e-version only)
- Ch. 7 Table of Contents, Table 7-12 'Spring Monitoring Parameters Prior to 1986' and 'Spring Monitoring Parameter List' (in text) should be correctly identified as 'Operational Spring Monitoring Parameter List'
- Ch. 7 Table of Contents, Table 7-15 'Stream Monitoring, Baseline Sampling List (After 1988)' should correctly state 'Spring and Stream Monitoring Baseline Sampling List' to match the Table in the text
- Ch. 7 (pg. 7-52) Department of Agriculture letter needs to be included
- Ch. 7, Table 7-10 (pg. 7-74), lists U.S. Fuel Company water rights; if this is correct it needs to be explained
- Ch 7 (pg 7-95), 731.200 Water Monitoring, cited Tables '7-13 or 7-19' should be '7-12 or 7-15'
- Ch. 7 PHC, last paragraph of Impacts to Springs, needs to be updated to indicate the Division database provides current data or Appendix 7-14 needs updating.

- Ch.7, Table 7-13, should be correctly identified as ‘Mine Water Discharge Parameter List’ or ‘UPDES Parameter List’
- Provide one (1) hard copy of the June 25, 2001 Mayo and Associates, LC report

Findings:

Information in the proposal is not adequate to meet the requirements of the General Contents section of the regulations. Prior to final approval, the applicant must supply the following information in accordance with:

R645-301-121.200, Provide the requisite information and modifications, as cited above.

ENVIRONMENTAL RESOURCE INFORMATION

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

To fulfill the requirements of the May 1, 2002, Division Order, additional geologic information was requested to better understand the relationship between mining in the Hiawatha area and impacts to Big Bear Spring. Exhibits 6-4 through 6-12 have been added to the amendment to provide better illustrations of the geology of the permit area. Included in the Exhibits/illustrations are overburden and inter-burden maps, isopach maps of the coal seams, and structural contour maps of all three (3) coal seams to be mined. Included in Ch. 7 is Plate 7-23, which provides a north-south cross section extending from north of the Hiawatha permit boundary to Big Bear Spring in the south.

It is important to note that the mine portals have been sealed since 1993 and no new in-mine geologic data is available. Some of the drill hole information was lost prior to Hiawatha purchasing the mine. All cross-sections created by Hiawatha Coal Company are based on U.S. Fuel Company’s drill hole information that could be located.

Findings:

Information in the proposal adequately addresses the minimum requirements of the Environmental Resource Information – Geologic Resource Information section of the regulations.

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 **HYDROLOGIC RESOURCE INFORMATION**

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Ground-water Information

For a better understanding of the in-mine flows that are likely producing the discharge at the Mohrland portal, Plate 7-22 and additional text have been added to the amendment (Sec. R645-301-724, pg 7-14 – 7-16). The text provides comments from a mine engineer (Mr. Robert Eccli) who worked in the mine in the early 1970's. The comments outline three (3) primary sources of consistent inflow into the mine at that time, which are identified on Plate 7-22 (labeled A, B, C). Accurate flow records were never documented and the areas were subsequently abandoned. However, it is believed that once the pipeline servicing the town of Hiawatha from Area C was abandoned these sources were responsible for the flows at the Mohrland portal. The text provides additional narrative suggesting the Hiawatha mine is actually a dry mine relative to surrounding mines when comparing the ratio of discharge to the acreage of mine workings. This additional information adequately addresses the previously cited deficiency.

In Section R645-301-727, Alternative Water Source Information, text indicates flow could possibly be depleted by approximately 28 gallons per minute based on information supplied in the PHC. The only relevant information found in the PHC was located in 'Effects of Mining on Streamflow'. The text in the PHC draws a loose comparison using Exhibits 7-2 and 7-7. The 28 gpm depletion needs to be discussed and explained in further detail, possibly identifying specific springs and flow rates.

Within Section R645-301-727 the Operator indicates that the combination of no mining occurring near the Big Bear fault since 1977, no drop in flows at the spring was noticed for 10 years after mining had ceased, and no mining below the Hiawatha seam is planned, that no alternative water supply should be required for the spring. However, the plan does identify several options for providing an alternative water supply. The plan indicates the development of an alternative water supply will be done in consultation with the Division. The plan also states, "the settlement of any disputes will be between Hiawatha Coal Company, the user of the affected water right, and the Division of Water Rights. The Division wants the Operator to understand any finding will be based on the 'quantity and quality of water cited in the existing water right.' Also, that the Operator will be responsible for water replacement, due to water loss caused by subsidence, for any mining conducted after October 24, 1992 (effective date of rule).

Section R645-301-728 (PHC Determination) makes numerous references to the King Mines and whether water was encountered in-mine. It would be helpful if the seam that was mined is associated with the mine in the text. The King 4 mine, which apparently encountered moderate amounts of sustainable water through the floor, needs to be associated with a coal seam

in the text.

Section R645-301-728, Effects of Mining on Streamflow, paragraph four (4), indicates a table exists that compares stream monitoring sites and potential losses to baseflow due to subsidence. The table providing this information needs to be referenced and available.

Baseline Cumulative Impact area Information

In the second paragraph of Section 724.100, text indicates the region is hydrologically divided into three regions bounded by faults, and but does not give any further information, and cites a reference (Bills 2000). Please clarify the term ‘three hydrologic units that are bounded by faults’.

Since at least 1983, the Mohrland portal has produced an average discharge of approximately 400 gpm. An age-dating survey conducted by Mayo and Associates in 2001 indicates the age of the water discharged at the Morhland portal to be 9,000 years old. Referencing the Mayo 2001 report, section R645-301-724.100 indicates ‘groundwater flow is predominantly horizontal with very little vertical movement’. It goes on to say ‘vertical movement of groundwater is limited to 100 to 200 feet’. In addition, the report indicates ‘fracture-flow groundwater systems...are of limited lateral extent and do not convey large quantities of water over long distances’. Gentry Mountain is hydraulically isolated from other areas of the Wasatch Plateau and is supported in the Mayo report (Fig. 17 pg 99).

To better clarify the hydraulics in the Gentry Mountain area the Operator has provided additional Plates 7-22, 7-23, and an electronic version of the ‘Mayo 2001’ report. As discussed in the Groundwater Information section, Plate 7-22 illustrates the locations of in mine flows in relationship to previous mining. Plate 7-23 is a north-south cross-section beginning north of the Hiawatha permit area and extends south to Big Bear Spring. The Plate illustrates the stratigraphic location of the mineable coal in the Hiawatha area in comparison to the groundwater reporting at Big Bear Spring. Unfortunately, drill hole information within the Hiawatha permit area is restricted to the coal seams and the rest of the information is interpolated. Plate 7-23 illustrates the lowest coal seam to be mined (Hiawatha seam) is approximately 5 miles away from Big Bear Spring and likely separated from Panther Sandstone (aquifer supplying Big Bear Spring) by two (2) tongues of Mancos shale. When viewing the electronic version of the submittal, and the ‘Mayo 2001’ report is cited as a reference it is possible to ‘click’ on the reference and be automatically linked to the referenced page of the report. This additional information adequately addresses the previously cited deficiency.

Findings:

Information in the proposal is not adequate to meet the requirements of the Environmental Resource Information – Hydrologic Resource Information section of the regulations. Prior to final approval, the applicant must supply the following information in accordance with:

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R645-301-624, -724, In section 724.100, clarify the term ‘three hydrologic units that are bounded by faults’.

R645-301-728, The King 4 mine, which apparently encountered moderate amounts of sustainable water through the floor, needs to be associated with a coal seam in the text.

R645-301-728, The table that compares stream monitoring sites and potential losses to baseflow due to subsidence needs to be referenced and available.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

General

Section 731.700 of the MRP provides a brief description of the major Exhibits provided in Chapter 7. Please provide brief text descriptions of Exhibits 7-5, 7-6, and 7-23 in Section 731.700 of the MRP.

Coal resource and Geologic Information Maps

The current plan provides cross-sections VI-2 (cross-sections A-A’, B-B’, C-C’) that show a distinct break in slope/dip to the west. This break in slope begins west of drill holes DH 75-1 and DH 70-5, respectively. To assist in understanding the Operator was asked to provide an east-west cross section through the proposed future mined areas. The response indicated since no drill holes exist in the areas of proposed mining, only a general diagram could be provided (Figure 13b of the Mayo 2001 report). This diagram needs to be referenced in the text of the report or readily provided as one of the figures within the MRP.

As requested in the ‘Contour Maps’ section of this technical analysis, Plates 6-4 through 6-12 have been provided to illustrate a much better understanding of the geologic and mining conditions. Contour maps of the Hiawatha and A seams help illustrate how water encountered in these units would naturally flow south, southwest if mine working were not encountered. However for better understanding from a subsidence perspective, additional information is requested. On Plate 6-4 – Hiawatha Overburden map, both the past and projected Hiawatha working needs to be provided. Similarly, on Plate 6-7 – A-B seam Interburden map needs to provide past and projected A seam and B seam workings information. Also on Plate 6-7, a contour interval is absent and needs to be provided.

When addressing ‘Areas of Potential Subsidence’, the text is somewhat misleading indicating only two areas will be subjected to multiple-seam mining. Although this is accurate for future mining, it neglects to mention that the majority of future mining is in areas that have been previously mined. The text does indicate conventional room-and-pillar mining methods are normally not subjected to surface subsidence, but the text needs to identify how multiple seam extraction is being addressed (i.e. conventional overlying conventional, full extraction overlying conventional, or no full extraction overlying full extraction will take place).

Also in ‘Areas of Potential Subsidence’, Exhibit 7-7 – Maximum Extent of Potential Subsidence is referenced to illustrate the vertical projections of subsidence. This map has not been updated since 1993 and does not account for subsidence based on future areas to be mined. Exhibit 7-7 needs to be updated to account for potential subsidence related to future mining. It should be noted that subsidence is being evaluated from a hydrologic prospective only. An additional review involving the engineering prospective will be conducted prior to mining being conducted (i.e. a pre-subsidence survey is necessary).

Mine Workings Maps

To satisfy a request to update the Mine Workings map, Plates 5-2a through 5-2d, and Plate 7-22 have been provided. Plates 5-2a through 5-2c illustrate the individual seams, their respective future areas to be mined, method of mining to be used, and anticipated year to be mined. Plate 5-2d illustrates potential future mining for all three (3) seams. Plate 7-22 illustrates at the old working and their relationship to major mine in-flows. These maps provide the requested information, however the plates need the following clarifying information:

- mine workings in solid red (Plate 7-22, Plate 5-2B) and solid magenta (Plate 5-2c) need to be identified in their respective legends
- Mine workings identified on Plate 7-22 need better color distinction (preferably to match the colors used in Plate 5-2d)

Monitoring Sampling Location Maps

Although indicated in the official C2 form as being submitted, a revised Exhibit VII-1 – General Surface and Subsurface Water Hydrology Map is not included in current application. For specific information related to UPDES sites 003 through 009 and 011, the reader is directed to Exhibits 7-8, 7-9, 7-10, 7-11m, 7-12, 7-13, 7-14, and 7-15 respectively. With the exception of submitting a revised Exhibit 7-1 (VII-1), earlier requests have been adequately addressed.

Subsurface Water Resource Maps

Plate 7-22 and text provided in the Groundwater Information section of the amendment adequately identifies the known inflows into the Mine. It is stated that once the mine is re-opened, additional monitoring and information will be acquired.

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Text in Section R645-301-722.100 indicates the aquifers above the coal seams are discussed under Section 724.600 that no longer exists. In Section 722.100 the reader needs to be directed to the section of the MRP discussing the aquifers located above the coal seam.

The aquifers located above the coal seams are absent from cross sections 7-5 and 7-6. Exhibit 7-2, in conjunction with Tables 7-1 and 7-2, strongly link the upper aquifers with geology. To better illustrate this association, Exhibit 7-2 needs to be modified to include the geologic contacts outlined in Table 7-2, and the legend in Exhibit 7-2 needs to include a description of the spring/seep naming convention so sites can be easily located.

Contour Maps

As briefly mention above in the 'Coal Resource and Geologic Map' section, Plates 6-4 through 6-12 have been provided to illustrate a much better understanding of the geologic and mining conditions. Isopach maps for the Hiawatha, A seam, and B seam are illustrated in Plates 6-11, 6-8, and 6-5, respectively. Structural maps for the same seams are illustrated in Plates 6-12, 6-9, and 6-6, respectively. Overburden for the Hiawatha seam, Interburden for the Hiawatha-A seam, and Interburden for the A-B seam are illustrated in Plates 6-4, 6-10, and 6-7, respectively. This adequately addressed earlier cited deficiencies, and provides valuable information in determining the hydrogeologic impacts.

Findings:

Information in the proposal is not adequate to meet the requirements of the Environmental Resource Information – Map, Plans, and Cross Sections of Resource Information section of the regulations. Prior to final approval, the applicant must supply the following information in accordance with:

R645-301-622, -722, Provide Figure 13b (of the Mayo 2001 report) in the MRP or clearly use it as a reference in the text as a demonstration of the geologic offset created by the Big Bear fault.

R645-301-622, -722, On Plate 6-4 – Hiawatha Overburden map, both the past and projected Hiawatha working needs to be provided.

R645-301-622, -722, Plate 6-7 – A-B seam Interburden map needs to provide past and projected A seam and B seam workings information. Also on Plate 6-7, a contour interval is absent and needs to be provided.

R645-301-622, -722, The text needs to identify how multiple seam extraction is being addressed (i.e. conventional overlying conventional, conventional overlying full-extraction).

R645-301-623.300, -625, Exhibit 7-7 needs to be updated to account for potential subsidence related to future mining.

R645-301-622, -722, The plates need the following clarifying information:

- mine workings in solid red (Plate 7-22, Plate 5-2B) and solid magenta (Plate 5-2c) need to be identified in their respective legends-Mine workings identified on Plate 7-22 need better color distinction (preferably to match the colors used in Plate 5-2d)

R645-301-622, -722, Provide a revised Exhibit 7-1.

R645-301-622, -722, Exhibit 7-2 needs to be modified to include the geologic contacts outlined in Table 7-2, and the legend in Exhibit 7-2 needs to include a description of the spring/seep naming convention so sites can be easily located.

R645-301-622, -722, In Section 722.100 the reader needs to be directed to the section of the MRP discussing the aquifers located above the coal seam, and references to Section 724.600 need to be deleted.

R645-301-731.700, Provide brief text descriptions of Exhibits 7-5, 7-6, and 7-23 in Section 731.700 of the MRP.

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:

Sampling and Analysis

The Division wants a better understanding of the source of the water being discharged at the Mohrland portal to help determine how much mixing (if any) of Bear Canyon fault water and other interstitial water is taking place. The 'Mayo 2001' report indicates a more comprehensive water quality analysis (than the required UPDES parameters) of the discharge from Mohrland portal was conducted from 1994 through 1997. A total of three (3) age-dating analysis was also conducted in 1996 and 1998. The Division would like the existing water analysis be submitted electronically to the Division database, and also continue this sampling analysis on an annual basis. The Division understands the sampling currently being conducted fulfills the requirements

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of the UPDES discharge permit. The age-dating analysis conducted in 1996 and 1998 was conducted for C.W. Mining for a comparison to Big Bear Spring, however as stated in Section R645-301-724 the majority of water reporting to the Mohrland portal is generated within the workings on the Hiawatha mine. To fulfill the requirements of the Division Order, the Division feels this continued sampling is necessary to help confirm the water being discharged at the Mohrland portal is not getting younger with time.

Ground-water monitoring

In Section R645-301-728 – Probable Hydrologic Consequences Determination, Potential Water Bearing Zones, the Operator commits to monitor all in-mine flow encountered that are greater than 5gpm and last for more than 30 days once the portal seals are breached and mining resumes. This commitment needs to be included in Section 731.200 – Groundwater Monitoring Plan in the same area where the Operator makes the commitment to ‘consult the Division during the development of the plan’.

Section R645-731.200 – Groundwater Monitoring Plan of Chapter 7 needs the following modifications: provide an easy-to-read table that clearly outlines what springs are currently being monitored; clearly identify Table 7-12 as the ‘Operational’ Groundwater parameter list; within Table 7-12 clearly identify calcium, magnesium, manganese, potassium, and sodium as being dissolved analysis; within Table 7-12 clearly identify iron and manganese as being analyzed for both total and dissolved; and also within Table 7-12, include total cation and total anion analysis. Also in conjunction with the Groundwater Monitoring Plan, provide a table outlining the groundwater sites that are currently being monitored or refer to Table 7-17 in the Groundwater Monitoring Section of the plan as providing the current sites.

Surface Water  nitoring

Tables 7-14, 7-15 and 7-16 need additional information for clarification. Table 7-14 (Description of Surface Water Monitoring Points) needs to be updated to include sites ST-2B, ST-3A, ST-3B, ST-4A, ST-4B; and sites ST-6 and ST-7 should be omitted from the list. Tables 7-15 (Baseline Sampling List) and Table 7-16 (Operational Stream Monitoring list) need total cations and total anions added to the list. This is independent of whether the cation-anion balance is being provided in the analysis.

Water quality standards and effluent limitations

Section R645-301-750 of the amendment has been modified to accurately reflect the current frequency for sampling, reporting requirements and the recipients of the UPDES discharge information. This is available in Tables 7-17 and 7-13, respectively. This adequately addresses deficiencies cited in the earlier technical analysis.

Findings:

Information in the proposal is not adequate to meet the requirements of the Operation Plan – Hydrologic Information section of the regulations. Prior to final approval, the applicant must supply the following information in accordance with:

R645-301-731.210, Submit existing water quality analysis for the Mohrland portal to the Division database (from ‘Mayo 2001’ report).

R645-301-731.210, Continue water quality analysis for the Mohrland portal outlined in ‘Mayo 2001’ report.

R645-301-731.210, In Section R645-301-200 – Groundwater Monitoring Plan, the Operator needs to make the commitment to ‘monitor all in-mine flow encountered that are greater than 5gpm and last for more than 30 days once the portal seals are breached and mining resumes’.

R645-301-731.210, Make requisite modifications to Table 7-13 as outlined above.

R645-301-731.210, Provide a table outlining the groundwater sites that are currently being monitored or refer to Table 7-17 in the Groundwater Monitoring section of the text as providing the current sites.

R645-301-731.210, -731.220, Make the requisite changes to Tables 7-14, 7-15, and 7-16 necessary for clarification.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Prior to making modifications to the current Gentry Mountain Cumulative Hydrologic Impact Assessment (CHIA), the Division requests the information cited above. The Hiawatha Complex mine makes up a significant portion of the CHIA.

RECOMMENDATIONS:

Approval of the application by the Division is not recommended until the requisite deficiencies, cited above, are adequately addressed.