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BROOK MINING CO., LLC.
BROOK MINE
RESPONSES TO 3RD ROUND COMMENTS
TFN 6 2/025

Brook Mine
Permit Application
December 2015

Cover Letter
Change Index
Comments & Responses

DEQ Exhibit 34

RAMACO

BROOK MINING CO., LLC.
BROOK MINE
RESPONSES TO 3RD ROUND COMMENTS
TFN 6 2/025

CO
Brook Mine
Application
December 2015

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COMMENTS & RESPONSE

CHANGE INDEX

COVER LETTER

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Adjudication

Comment AG 1 – Round 1

Please also provide copies of the complaint and the answer. If there are any motions that the court has ruled on limiting or deciding any of the claims or factual or legal questions originally at issue in the case, please also provide copies of the orders, the motions, the responses to the motions, and any supporting memoranda.

Response AG 1 – Round 1

The Applicant's position with regard to any surface interests that may be claimed by Padlock Ranch Company and/or Big Horn Coal Company is that the Applicant alone owns the sole dominant present property right to use these surface lands for the coal mining operation described in the application, as that application has been submitted and supplemented. Applicant's sole dominant surface ownership and use interest in the relevant lands derives directly from the 1954 Deed (Attachment B) and its express reservation language. Pursuant to the controlling Wyoming Supreme Court authority set out in *WYMO Fuels, Inc. v. Edwards*, 723 P.2d 1230 (Wyo. 1986) (Attachment C), when the Applicant already owns the dominant surface use rights for coal mining on the property, then the Applicant consents to its own use pursuant to its application by submitting the application and no other surface consents can or should be required under W.S. § 35-11-406(b)(xi). As the Land Quality Division is aware, to the extent that Padlock Ranch Company incorrectly claims some surface rights on any lands described in the 1954 Deed, it necessarily could only attempt to do so fully subject to the Applicant's sole dominant surface rights to mine coal. Under the WYOMO Fuels, Inc. decision, no consent from Padlock can be required. To the extent that Big Horn Coal incorrectly claims some surface use right in this area at this time, the Applicant is proceeding with quiet title litigation (Fourth Judicial District Court, Sheridan County, Wyoming Civil No. CV 2014-372) against Big Horn Coal on this issue and has asserted its sole dominant reserved surface right to use the surface described in the 1954 Deed to mine coal there without any consent from Big Horn Coal pursuant to the WYMO Fuels, Inc. case decision. Accurate copies of the Applicant's pending summary judgment motion arguments on this issue are enclosed with this response (attachment D and E). The Applicant can and will supplement these pleadings with further documentation that is described in the pleadings upon request.

Comment AG 1 – Round 2

Please provide copies of the following documents related to the state district court litigation between the Applicant/Ramaco and Big Horn Coal Company:

- The complaint and answer filed in the case (if either has been amended, only the most recent amended version needs to be provided).

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- For the Applicant's summary judgment motion: Big Horn Coal's response to the motion.
- For Big Horn Coal's motion for summary judgment: the memo supporting that motion, the Applicant's response to the motion, and Big Horn Coal's reply memorandum.
- The "Section 5" of the "May 6, 1983, Release Agreement" that the Applicant mentioned in its reply in support of its summary judgment motion.
- When it is available, the district court's order deciding the Applicant's and Big Horn Coal's summary judgment motions.

Response AG 1 – Round 2

The materials requested in this comment were supplied to the Attorney General on August 20, 2015 after the Round 2 comments had been released. It is assumed if any further comment is required, it will be received in Round 3.

Comment AG 2 – Round 1

Therefore, the Division requests the Applicant to provide sufficient information and supporting documents for the Division to determine whether Padlock Ranch Company and Big Horn Coal Company are or are not "residential or agricultural landowners" under the statutory definition in W.S. § 35-11-406(b)(xi).

Response AG 2 – Round 1

Please see response AG 1.

Comment AG 2 – Round 2

Please also provide sufficient information and supporting documents for the Division to determine whether Padlock Ranch or Big Horn Coal qualify as a "resident or agricultural landowner," as defined in W.S. § 35-11-406(b)(xi). The statutory requirements for a permit application differ depending on whether that status exists, and the Division must determine which set of requirements (W.S. § 35-11-406(b)(xi) or -406(b)(xii)) may apply to this Application.

Response AG 2 – Round 2

The materials requested in this comment were supplied to the Attorney General on August 20, 2015 after the Round 2 comments had been released. It is assumed if any further comment is required, it will be received in Round 3.

Comment AG 3 – Round 2 (New Comment)

Would the 1983 release agreement apply to the surface rights that originate with the1954 Deed and are currently owned by Padlock Ranch? Did Padlock Ranch obtain its rights at issue before or after the 1980 release agreement?

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Response AG 3 – Round 2 (New Comment)

No. The 1983 release agreement does not affect any of the rights reserved in the 1954 Deed. The 1954 Deed controls the surface use mining rights of Ramaco relative to both Big Horn Coal and Padlock Ranch. Even if the release agreement had an effect as to Big Horn, Padlock Ranch is not a party to the release agreement and as a non-party has no rights under that agreement. Ramaco has found no documents that might show Padlock Ranch acquired any kind of interest or rights under the 1983 release agreement.

Instead, Ramaco has found documents that show Padlock Ranch acquired certain lands from Big Horn Coal in 1965, almost 20 years **before** the release agreement. Padlock then sold some of the land back to Big Horn Coal and vice versa. But none of the documents showing these transfers mention the 1983 release agreement.

Comment AG 4 – Round 2 (New Comment)

If one assumes that Big Horn's arguments in the litigation are correct that the 1983 release agreement granted Big Horn rights greater than those under the 1954 Deed, would Big Horn's arguments and the rights it argues that it obtained through the release agreement also apply to any of Padlock Ranch's lands?

Response AG 4 – Round 2 (New Comment)

No. As discussed in response to the previous question, Padlock Ranch does not have any rights under the release agreement. Likewise, Ramaco could find no documents showing that Padlock Ranch ever acquired any rights in the 1983 release agreement.

Comment AG 5 – Round 2 (New Comment)

Are there any contractual documents or property records related to Padlock Ranch's lands that arguably may have altered Padlock Ranch's rights under the 1954 Deed? If so, please provide copies of those documents and explain the nature of the documents and how they may have affected Padlock Ranch's rights.

Response AG 5 – Round 2 (New Comment)

No. Ramaco has found several deeds purporting to convey land from Big Horn Coal to Padlock Ranch's predecessor. These deeds, however, do not alter or try to alter any rights under the 1954 Deed.

Comment BJ 68 – Round 3 (New Comment)

The Certificate of Liability Insurance appears to have expired on October 14, 2015. Please generate a new Certificate of Liability Insurance to cover the present period.

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Response BJ 68 – Round 3 (New Comment)

A new Certificate of Liability Insurance covering the present period has been provided in this response package.

Comment DM 1 – Round 1

Adjudication – Appendix B2 – Groundwater Rights – There is a groundwater well that is missing in this volume. The listing is as follows:

Barbula #2

Permit No. 85631W

Location: SW NW Section 21, T57N R84W

Please add this entry to the table and to any corresponding maps.

Response DM 1 – Round 1

Adjudication text page WR-12 has been updated to include Barbula # 2 (P85631W) as well as Adjudication Exhibits 5 & 8.

Comment DM 1 – Round 2

No comment received.

Response DM 1 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 120 – Round 3 (New Comment)

Adjudication-Form 1. The index change sheet states that the affected area boundary was updated on several Exhibits. Has the affected area acreage changed? If so a new Form 1 will need submitted to show the correct affected area acreage. (MDK)

Response MK 120 – Round 3 (New Comment)

A new Form 1 has been provided with the revised affected acreage in this response package.

Appendix D1

Comment BJ 1 – Round 1

Appendix D1, Land Use, Table D1. 3-1; It is unnecessary to list the Expired Permit category of gas well permits. Since these APDs have expired without completion there is no related activity to the site. Listing of a non-event is not required. This also

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applies to the NO category since this indicates that the APD was refused, thus never became permitted through WOGCC.

Response BJ 1 – Round 1

Revised Table D1.3-1 as requested.

Comment BJ 1 – Round 2

No comment received.

Response BJ 1 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 1 – Round 1

Appendix D-1. Exhibit D1.1-1. The landuses defined in Chapter 1 should be used on this Exhibit. Not the entire Brook Mine Permit falls neatly into these definitions so the following comments provide guidance:

a) The railroad, primary roads, oil and gas wells, and the facilities for Taylor Quarry would be considered Industrial commercial and may be shown with the vertical line stippling. The rest of the vertical stippling should be removed.

b) The 4.5 acres of Agricultural lands would have the Land use of Cropland. This small acreage will not show up well on this map but is listed in Tables D.8-2 and RP.6-1 so no changes are needed to the map for this land use.

c) The 12.8 acres of water might be listed under multiple landuses such as Grazingland, Fish and Wildlife habitat or Recreational. This small acreage will not show up well on this map but is listed in Tables D.8-2 and RP.6-1 so no change is needed to the map for this land use.

d) The 4,421.8 acres remaining should be shown as Grazingland and Fish and Wildlife habitat. The legend on the map should have Fish and Wildlife Habitat added to Past and Present Grazingland landuse. The stippled area on the map will stay the same.

e) No changes are needed to the areas identified as Recreational.

Response SP 1 – Round 1

Revised Exhibit D1.1-1 as requested.

Comment SP 1 – Round 2

No comment received.

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Response SP 1 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 1 – Round 3

The response is satisfactory. Exhibit D1.1-1 has been revised to match the landuse definitions.

Comment SP 2 – Round 1

Appendix D-1. Text that refers to the areas mined as Industrial commercial should be revised to remove the mining. A reference to Section 1.6 on historic mining can be made in Section D1.3.1. Grazingland. The reclaimed mined lands are now being used as Grazingland. The difference between the mined and never been mined is defined as the vegetation community that is called Reclaimed. Section D1.6 discusses the historic mining of the area and the discussion on coal mining in Industrial commercial (D1.4.3) can be removed.

Response SP 2 – Round 1

Revised text as requested.

Comment SP 2 – Round 2

No comment received.

Response SP 2 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 2 – Round 3

The response is satisfactory. The text has been revised to identify the reclaimed land as Grazingland.

Appendix D2

Comment BJ 2 – Round 1

Appendix D2, History, There are no comments for this section of the application. The narrative is well written and comprehensive.

Response BJ 2 – Round 1

No response is necessary.

Appendix D3

No comments were received regarding Appendix D3.

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Appendix D4

Comment BJ 3 – Round 1

Appendix D4, Climatology, General comment – Is there no data for climatology that is more recent than 1990? It exists, therefore needs to be represented. Please locate and include the most recent climatological data. Twenty year-old data bears little resemblance to Sheridan County climate today so characterization of the present climate with a 20 year gap is problematic. Please reevaluate the data in light of locating and use more recent information.

Response BJ 3 – Round 1

Revised wind, relative humidity, and degree day data to reflect period between 1990 and 2013. Note, as can be observed by updated data, little change occurred in averages reported for wind, relative humidity, and degree days. Therefore, the wind rose provided in Figure D4.2-6 is deemed to still be representative of the Sheridan area. Revised Figure D4.2-1, Figure D4.2-11, Table D4.1-1, Table D4.2-2, Table D4.2-3, and Table D4.2-7 in response to this comment.

Comment BJ 3 – Round 2

No comment received.

Response BJ 3 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 4 – Round 1

Appendix D4, Climatology, Section D4.2.6, Why was 65°F used as the baseline temperature? Also, why were the high and low temperatures set to 86°F and 50°F respectively? Please clarify.

Response BJ 4 – Round 1

Revised text to clarify the choice of high and low temperatures.

Comment BJ 4 – Round 2

No comment received.

Response BJ 4 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 5 – Round 1

Appendix D4, Climatology, Figure 4.2-11, Are the degree days the total number of days that match the data points for the entire period from 1961 through 1990? This

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indicates that the data represented along the Y axis covers a period of 30 years on a daily basis. Please clarify.

Response BJ 5 – Round 1

Revised text with definitions of heating, cooling, and growing degree days to clarify Figure 4.2-11. Degree days are essentially a unit of measure like temperature, velocity, etc. A degree day signifies the number of degrees per day to heat or cool to a specified base temperature (most commonly 65°F). Each degree day is summed over the course of a month to estimate the total number of degree days that month. For example, July may have 0 heating degree days because all days are over 65°F, but will have cooling degree days nearly every day of the month. Figure 4.2-11 shows the average monthly degree days over the specified periods of data.

Comment BJ 5 – Round 2

No comment received.

Response BJ 5 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Appendix D5

Comment BJ 6 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Section D5.4.1, Paragraph 2 refers to "marginally suitable Selenium levels" as defined in LQD Guideline No.1. Guideline 1 has two separate sets of chemical quality criteria tables. Appendix 1 occurs on pages 17-21 as well as on pages 38-43. The first set of tables have been superseded by the second set of tables. Please use the tables on pages 38-43 when determining material suitability. The first Appendix 1 is being removed from the guideline.

The newer tables define the Selenium target as follows:

Suitable < 0.3 ppm

Marginal 0.3 – 0.8 ppm

Unsuitable > 0.8 ppm (dependent on premining water quality and overburden quality)

These values are established for uplands and ephemeral drainages unless it can be shown that Selenium impregnated materials will be buried above the groundwater potentiometric surface and below the reclaimed surface root zone. Other quality criteria have not changed.

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Response BJ 6 – Round 1

Revised text as requested to reflect the revised LQD Appendix 1.

Comment BJ 6 – Round 2

No comment received.

Response BJ 6 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 7 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Figure D5.3-2, What units are expressed in the figure as the %g? Please include a footnote clarifying the measurement parameter.

Response BJ 7 – Round 1

Updated Figure D5.3-2 as requested.

Comment BJ 7 – Round 2

No comment received.

Response BJ 7 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 8 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Addendum D5-1, Are the Northings and Eastings in State Plane coordinates? It is assumed that they are but please verify this. The title at the top of the page could read Drill Hole Tabulations (State Plane Coordinates)

Response BJ 8 – Round 1

Updated as requested.

Comment BJ 8 – Round 2

No comment received.

Response BJ 8 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment BJ 9 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Addendum D5-2, Please rearrange the Lithologic and Electric logs in such a way that the Electric log immediately follows the Lithologic log. This allows for a more comprehensive examination of the data.

Response BJ 9 – Round 1

Rearranged logs as requested.

Comment BJ 9 – Round 2

No comment received.

Response BJ 9 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 10 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Holes R12-000 through R12-020 have the Northings and Eastings reversed. Please correct.

Response BJ 10 – Round 1

Updated as requested.

Comment BJ 10 – Round 2

No comment received.

Response BJ 10 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 11 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, The Lithologic logs with the AMBRE designation 02, 03, and 04 do not have coordinates or elevations. Please provide coordinates and elevations for these three holes.

Response BJ 11 – Round 1

Updated as requested.

Comment BJ 11 – Round 2

No comment received.

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Response BJ 11 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 12 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Hole R13-018 appears to have erroneous coordinates. The Northing is listed as 11,941,802. It should probably be 1,941,802. The elevation is shown as 43,887.9, where it should probably be closer to 3,887.9. Please verify and correct.

Hole R13-024 has a very high Northing at 61,941,541 and elevation at 73,885.4. These may be 1,941,541 and 3,885.4, respectively. Please verify and correct

Response BJ 12 – Round 1

Updated as requested.

Comment BJ 12 – Round 2

No comment received.

Response BJ 12 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 13 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, A suggestion for future exploration: Ask the geophysical logger to reduce the gain on the gamma logs. The readjustment bounce on the logs makes them a bit difficult to read and interpret.

Response BJ 13 – Round 1

No response required.

Comment BJ 13 – Round 2

No comment received.

Response BJ 13 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 14 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Addendum D5-5, Pg. D5-5-4, The splitting tensile strength tests were run on four (4) samples from two (2) holes representing roof, coal, and floor conditions.

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a) Why were these locations used as representative of the lithologies encountered during mining?

b) Are these few samples representative of all conditions expected to be encountered by the continuous miner (CM)?

Please elaborate and clarify the narrative. A statement must be made that strength testing will be performed on at least one set of samples per mining panel prior to use of the CM to insure that conditions are favorable for roof retention without subsidence. Lithology in this area is inconsistent and rock strength can vary accordingly. Using the data provided on the four samples tested indicates that some of the overburden from hole R13-19 is unsuitable for highwall mining, based on the CAT® Site Evaluation Tool For Highwall Miners;

(http://webtools.cat.com/globalmining/highwallminers/index.html).

Response BJ 14 – Round 1

Appendix D5 Section D5.3.3.2 has been updated as requested.

Comment BJ 14 – Round 2

No comment received.

Response BJ 14 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 15 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Addendum D5-4, Exhibits 1 – 7, Please include the drill hole locations on these isopach maps.

Response BJ 15 – Round 1

Updated as requested.

Comment BJ 15 – Round 2

No comment received.

Response BJ 15 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 16 – Round 1

Appendix D5, Topography, Geology, and Overburden Assessment, Exhibit 8, The map labeled as the isopach map of the Lower Masters bed is a contour of a surface. Please replace the contour map with the appropriate isopach map

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Response BJ 16 – Round 1

Updated as requested.

Comment BJ 16 – Round 2

No comment received.

Response BJ 16 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 59 – Round 1

EXHIBITS, Addendum D5-4, Exhibit 1, The title on the map declares that this is an overburden isopach, but the bed name is missing. Please indicate which bed this map pertains to.

Response BJ 59 – Round 1

Updated Exhibit 1 of Addendum D5-4 as requested.

Comment BJ 59 – Round 2

No comment received.

Response BJ 59 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 60 – Round 1

EXHIBITS, Addendum D5-4, Exhibit 8, The name of the PDF file for this exhibit indicates that this is an isopach map of the Masters Lower coal bed. The title in the map indicates that this is the contour of the base of the Masters coal seam. Please correct the title of the PDF file.

Response BJ 60 – Round 1

The title of Exhibit 8 of Addendum D5-4 will be revised in the electronic copy, as requested.

Comment BJ 60 – Round 2

The title of Exhibit 8 in Addendum D5-4 remains unchanged. This appears to be an inadvertent oversight on the part of WWC.

The Current PDF file name is:

ADD_D5_4_EX_8_MASTERS_ISO-MASTERS_LOWER_R1.

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The Title of the map in the Title Block is:

BOTTOM ELEVATION OF MASTERS COAL SEAM.

Please correct the name on the PDF file to better represent the contents of the exhibit.

Response BJ 60 – Round 2

Thank you for catching the oversight. The name on the PDF file has been changed to more accurately represent the contents of the map. The PDF with the corrected name will be emailed to Mr. Kristiansen.

Comment BJ 60 – Round 3

No comment received.

Response BJ 60 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment BJ 61 – Round 1

EXHIBITS, Addendum D5-6, Exhibit 1, we commend RAMACO for sampling overburden locations on 80 acre spacing. There are some gaps in the sampling plan, however, that need to have core holes drilled to fill them. The underground Coal Rules and Regulations in Chapter 7, Section 1(a)(i) are specific on ensuring that overburden geology is characterized in all locations where overburden will be removed or subsidence may occur. This essentially means that all areas above the planned coal panels need representative cores drilled to a sufficient density, approximately one hole for every quarter section of affected area. Based on that, the following locations still need to be characterized by overburden sampling:

NE1/4, sec.22, T.57N., R.84W.

NW1/4, sec.15, T.57N., R.84W.

NW1/4, sec.14, T.57N., R.85W.

SE1/4, sec.10, T.57N., R.85W.

Response BJ 61 – Round 1

A drilling rig was not able to enter the areas NW1/4, Sec.14, T.57N., R.85W and SE1/4, Sec.10, T.57N., R.85W. due to the steepness of the terrain, therefore no samples were obtained. Sampling data for drill holes BH 166-78 and BE 326-78 have been incorporated into Addendum D5-2 and Addendum D5-7 to characterize the overburden in Sections 15 and 22.

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Comment BJ 61 – Round 2

No comment received.

Response BJ 61 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 62 – Round 1

EXHIBITS, Addendum D5-6, Exhibit D5.1-1, Kudos to the staff member that created this slope analysis map. It is clear and concise and the histogram is very informative. Good job.

Response BJ 62 – Round 1

Thank you for this comment.

Comment BJ 62 – Round 2

No comment received.

Response BJ 62 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 1 – Round 1

Appendix D5, The Coal Rules and Regulations, Chapter 7, Section 1(a)(i)(A) states that information required for the geological description pursuant to Chapter 2, shall be as follows: for areas where surface operations and facilities will cause removal of overburden down to a level of the coal seam, all information outlined in Chapter 2. Overburden sampling has not been performed in many of the locations where overburden will be removed during the mining operations. Additional sampling will be required to assess overburden chemistry in all areas where overburden removal will occur. The intensity of sampling should be 1 core per 160 acres (per quarter section). The LQD requests sampling every 1,900 linear feet on longer proposed disturbance areas or, at minimum, two cores within shorter disturbances separated sufficiently to provide a representative characterization of the proposed disturbance.

a. Not all overburden has been characterized during analysis. Several lenses of shallow coal mixed with partings or narrow coal seams that will not be mined were not characterized. Because all overburden must be handled so as not to negatively affect surface water, groundwater or vegetation, all overburden must be adequately characterized. Therefore, the LQD requests additional characterization of all overburden that will be backfilled into disturbed areas. It must also be stated that special handling and/or identification and use of topsoil/subsoil replacement may be required if unsuitable backfill or soil is

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placed within 4 feet of the surface on upland areas or within 10 feet of the surface in stream channels.

Response DS 1 – Round 1

Please see response to BJ 61.

Comment DS 1 – Round 2

Response is not adequate. The LQD requires additional overburden suitability analysis to be included for all areas to be disturbed during mining. No additional baseline overburden suitability assessment laboratory data was provided for holes BH 166-78 and BE 326-78. Please provide the raw data. Also, provide a commitment to sample overburden from areas to be disturbed by mining (specifically identify the pit sequence) where overburden baseline was not provided during baseline sampling. Sample every 1,300 feet in the sequence prior to overburden removal. Report the analytical results in the annual report for the year of initial disturbance for the pit sequence. Also, since RAMACO is reluctant to provide a special handling commitment, sampling must be performed at 500 ft. spacing on backfilled and rough graded pits (4 ft. depth on upland areas and 8 ft. depth under stream channel or permanent impoundments) to assure quality of surface materials. Also, if groundwater is expected in the pits, unsuitable materials must not be placed in the groundwater zone. Of the backfilled pit. (DS)

Response DS 1 – Round 2

For the location of the laboratory data for holes BH 166-78 and BE 326-78, please refer to Response BJ 61 (Round 1). Sampling data for drill holes BH 166-78 and BE 326-78 have been incorporated into Addendum D5-2, Addendum D5-7 and Table D5.4-2.

For the following commitments, please refer to the Mine Plan since these commitments are for operations rather than baseline studies. Please note that the text for these commitments has been in place. The following discussion provides the location of each commitment.

1. Section MP.4.6.1 states that the overburden sampling program will include one drill hole sample taken every 40 acres (16 sample locations per square mile) within areas where surface operations will cause removal of overburden down to the level of the coal seam. The delineation of 40 acres more correctly states the suggestion in Guideline No. 1 on page 9 in Section II(B)(3)(a)(1) as opposed to the suggestion of 1,300 feet. The first paragraph of Section MP.4.6.1 states that any additional overburden quality sampling will be submitted to WDEQ/LQD in the mine's annual reports. No changes have been made in response to this comment since the text has been in place.
2. Section MP.4.6.2 states in the first paragraph that a backfill sampling program will be set on a 500-foot grid. The first paragraph of Section MP.4.6.2 also

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states that the sampling program will ensure that unsuitable materials aren't placed within the following depths of the land surface: four feet for uplands, six feet for ephemeral channels, and 10 feet for permanent impoundments or major channels and their 100-year floodplains. No changes have been made in response to this comment.

Comment DS 1 – Round 3

Response is not adequate. The LQD requires additional overburden suitability analysis to be included for all areas to be disturbed during mining. No additional baseline overburden suitability assessment raw data was provided for areas to be disturbed as previously requested.

Response DS 1 – Round 3

A commitment to obtain necessary overburden samples and conduct overburden suitability analysis prior to mining related disturbance, as required by WDEQ/LQD, has been incorporated into Section MP.4.3 of the Mine Plan. Also a commitment to obtain samples at least every 1,500 feet of trench length and at both ends of a trench has been added to Section MP.4.3. No change to Appendix D5 was made in response to this comment.

Comment DS 2 – Round 1

Appendix D5, Section D5.4. – documentation of protocols that differ from those approved by the Administrator in Guideline 1 typically require a signed document by LQD staff, not a request for different procedure signed by the company. This issue has been discussed with other mining companies and it has been determined that documentation of approval by LQD staff will be required if sampling/analytical protocols differ from those required by standing LQD policy. Please provide documentation of LQD staff approval for the 10-ft. overburden sampling interval.

Response DS 2 – Round 1

See Attachment A to this response package. This has also been added to Addendum D5-6 pages 4 and 5.

Comment DS 2 – Round 2

No comment received.

Response DS 2 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 3 – Round 1

Appendix D5, Table D5.4-1 and Table D5.4-2 do not provide the current approved selenium concentration limits of 0-3 ppm (suitable), 3-8 ppm (marginal) and > 8 ppm

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(unsuitable). Please be sure to include the current approved suitability criteria as shown in Guideline 1, page 42. This will change the conclusions of the discussion provided in the Appendix D5 text. Also, in Table D5.4-2, please provide the correct units for analytical results in mg/Kg, not mg/L.

Response DS 3 – Round 1

Please refer to BJ 6 response. Appendix D5 text, Table D5.4-1, and Table D5.4-2 are updated as requested.

Comment DS 3 – Round 2

No comment received.

Response DS 3 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 4 – Round 1

Appendix D5, The permit application provided to LQD staff for review has duplicated data provided after the map identified as Exhibit 1 which should be deleted. The exhibit should also be better identified as Exhibit D5-1 or something similar to clarify placement in the permit application should it become separated from the document in the future.

Response DS 4 – Round 1

The electronic copies were provided to LQD staff for review purposes. The hard copy on file is the official version. Also, please see response to Comment DS 5.

Comment DS 4 – Round 2

Response is not adequate. This issue was not addressed in the Round 1 comment response package. Duplicate data in the hard copy should be deleted.

Response DS 4 – Round 2

The duplicate soil analysis reports have been removed from Appendix D5. The reports were removed from Addendum D5-5 (pages Addendum D5-5-21 through Addendum D5-5-92). The reports remain in Addendum D5-7 since this is the addendum specified for the soil analysis reports. The Change Index identifies this revision. No other change is necessary since page Addendum D5-5-92 was the last page and Addendum D5-6 has unique pagination.

Because the exhibit name of "Exhibit 1" is specific to the overburden sampling plan of 8/26/2013 that was presented to WDEQ, and this name is referenced in the document, the name has not been changed. The exhibit has a unique page number

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(page Addendum D5-6-3) which will ensure that the exhibit is always located properly in the permit.

Comment DS 4 – Round 3

Response is not adequate. Two of the first proposed disturbance areas in Sections 22 and 15 have no overburden baseline sample analyses provided. The LQD understands that these areas are not accessible by drilling equipment at this time, but baseline sampling is required prior to initial disturbance. Therefore, the LQD may be amicable to approval of the application if a condition exists to provide an Appendix D5 revision with overburden.

Response DS 4 – Round 3

A commitment to obtain necessary overburden samples and conduct overburden suitability analysis prior to mining related disturbance, as required by WDEQ/LQD, has been incorporated into Section MP.4.3 of the Mine Plan. Also a commitment to obtain samples at least every 1,500 feet of trench length and at both ends of a trench has been added to Section MP.4.3. No change to Appendix D5 was made in response to this comment.

Comment DS 5 – Round 1

Appendix D5, Comparisons were made between Exhibit 1, the soils map and the Mine Plan map. Distinct differences in the affected area and permit boundaries were observed. Please be sure that correct boundaries for the proposed affected area and permit area are provided on all maps. Please also provide the contour interval on this exhibit.

Response DS 5 – Round 1

Addendum D5-6 is a copy of the overburden sampling plan as presented to WDEQ on 8/26/2013, which referenced Exhibit 1. Therefore, no changes to the exhibit will be made.

Comment DS 5 – Round 2

Response is not adequate. All exhibits presented in this permit must show the correct permit boundary and affected area boundaries, or, if the boundaries are removed, must reference a map of the same scale that contains the correct boundaries. Please correct the permit boundaries and affected area boundaries on all exhibits in this permit application.

Response DS 5 – Round 2

The permit boundary on Exhibit 1 in Addendum D5-6 was removed from the exhibit due to this boundary not being the same as that presented in the current permit as requested by the reviewer. However, the current boundary was not added to the

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exhibit because this exhibit represents the information provided to, and approved by, WDEQ for the overburden sampling plan. Instead, a note has been added to the exhibit that references Exhibit C1a of the Adjudication File for the correct permit boundary of the Brook Mine.

Comment DS 5 – Round 3

No comment received.

Response DS 5 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 2 – Round 1

Appendix D5, Page D 5-9 refers to samples collected from roof and floor from "many" locations throughout the permit area. However, supporting documentation appeared to be from only two borings and included two roof and one floor sample. In addition, the laboratory noted the floor sample did not have sufficient length and a correction factor was used to determine unconfined compressive strength. Additional structural analysis of the overburden, interburden and floor is required.

Response KM 2 – Round 1

During preparation of the MSHA Ground Control Plan additional coring of the coal and overburden will occur, data gathered from this activity will be supplied to WDEQ/LQD when it is received. Please see response to BJ 14.

Comment KM 2 – Round 2

No comment received.

Response KM 2 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 3 – Round 1

Appendix D5, Please provide a discussion of the structural analysis of the overburden and interburden. The discussion shall address the potential for subsidence during and after mining.

Response KM 3 – Round 1

Structural analysis of the overburden, interburden, floor, and roof must be conducted for the MSHA Ground Control Plan. Information gathered for this plan will be provided when it is received. No text was updated in response to this comment. Please see response to BJ 14.

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Comment KM 3 – Round 2

No comment received.

Response KM 3 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 4 – Round 1

Appendix D5, Please discuss the aquifer(s) below the lowest coal seam and the potential for mining to impact these aquifer(s).

Response KM 4 – Round 1

The lowest coal seam targeted for mining is largely dry and is also confined by a clay layer. The underburden is not considered an aquifer therefore no impacts will occur.

Comment KM 4 – Round 2

No comment received.

Response KM 4 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 24 – Round 3 (New Comment)

On page D5-12, Section D5.3.3.4, please specify what the underburden produces at 0.5 gpm.

Response KM 24 – Round 3 (New Comment)

Section D5.3.3.4 has been revised to clarify that groundwater is produced in the underburden at 0.5 gpm.

Comment Muk 1 – Round 1

Appendix D5, Section D5.3.3.2 Overburden and Interburden, 1. This section provides a discussion of the thickness of interburden and not overburden. Please provide a discussion (or a reference) on the thickness of the overburden. (MK)

Response Muk 1 – Round 1

A reference to the geologic cross-sections Addendum D5-3 has been added to Section D5.3.3.2.

Comment Muk 1 – Round 2

Response not accepted. In addition to the reference to Addendum D5-3 cross section figures, please provide a textual interpretation on the overburden thickness. Please

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refer to D53.3.2 interburden thickness description as an example for the requested description. (MK)

Response Muk 1 – Round 2

A qualitative discussion of the Carney overburden thickness has been added to the first paragraph of Section D5.3.3.2.

Comment MuK 1 – Round 3

Response accepted.

Comment Muk 2 – Round 1

Appendix D5, Section D5.3.3.3 Coal, 2. On Page D5-10, there is a good discussion about the thickness of the two coal seams. Please provide a description on the depth from land surface to these coal seams. (MK)

Response Muk 2 – Round 1

A reference to the geologic cross-sections Addendum D5-3 has been added to Section D5.3.3.3.

Comment Muk 2 – Round 2

Response not accepted. In addition to the reference to Addendum D5-3 cross section figures, please provide a textual description/interpretation on the depth from land surface to the different coal seams targeted by the mine plan. (MK)

Response Muk 2 – Round 2

A qualitative description of the overburden material from the ground surface to the top of the Carney coal seam has been added to the middle of the second paragraph of Section D5.3.3.3. Discussion of the total material from the ground surface to the top of the Masters Seam has been added to the end of the third paragraph in Section D5.3.3.3. As requested, the revised text adds qualitative background on the varying depths of the total material from the land surface to the top of the two respective target coal seams, Carney and Masters.

Comment MuK 2 – Round 3

Response accepted.

Comment Muk 3 – Round 1

Appendix D5, Section D5.3.3.3 Coal, 3. Page D5-10 states, "Monarch seam exist within isolated portions of the mine areas as shown on the geologic cross sections in Addendum D5-3 and may present a secondary target." However, Table D5.3-2 does not provide the coal quality characteristics for Monarch coal seam. If Monarch seam

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is part of the mine plan, please include the coal quality characteristics of Monarch coal seam in Table D5.3-2 and a description of thickness and depth from land surface.

Response Muk 3 – Round 1

Table D5.3-2 has been updated with the coal quality characteristics for the Monarch seam. The overburden and seam thickness are included on the geologic cross-sections located in Addendum D5-3 referenced in the text.

Comment Muk 3 – Round 2

Response not accepted. It is acknowledged and accepted that Table 5.3-2 is updated with coal quality characteristics of Monarch coal seam. In addition to the reference to Addendum D5-3 cross section figures, provide a textual interpretation of thickness and depth from land surface for the Monarch coal seam. (MK)

Response Muk 3 – Round 2

Textual interpretation of the Monarch coal seam thickness and the depth of material above the top of the Monarch seam have been added to the end of fourth paragraph in Section D5.3.3.3.

Comment MuK 3 – Round 3

Response accepted.

Comment Muk 4 – Round 1

Appendix D5, Section D5.3.3.3 Coal, 4. Please include a discussion on Dietz (1, 2, 3) coal seams, if they are present in the mine permit boundary. If they are part of the mine plan, please include the coal quality characteristics in Table D5.3-2. (MK)

Response Muk 4 – Round 1

Discussion about the Dietz seams has been added in Section D5.3.3.3. These coal seams are not part of the currently proposed Mine Plan. Therefore, the quality data were not included in the table.

Comment Muk 4 – Round 2

No comment received.

Response Muk 4 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 5 – Round 1

Appendix D5, Section D5.3 Geology of Mine Area, 5. Please provide a description of the stratigraphic units below the Masters coal seam. (MK)

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Response Muk 5 – Round 1

Section D5.3.3.4 has been added to discuss the underburden.

Comment Muk 5 – Round 2

Response not accepted. Please expand the discussion in the newly added Section D5.3.3.4 to include a textual interpretation of the underburden thickness. (MK)

Response Muk 5 – Round 2

The text in Section D5.3.3.4 has been revised to include discussion of the underburden thickness.

Comment MuK 5 – Round 3

Response accepted.

Comment Muk 6 – Round 1

Appendix D5, Addendum D5-3 Geologic Cross Sections, 6. Several of the geologic cross sections show UNK – unknown coal seam (Stringer). Please include a brief discussion about this stringer in Section D5.3.3.3 (MK)

Response Muk 6 – Round 1

Discussion about the stringers with unknown names has been added to fifth paragraph in Section D5.3.3.3.

Comment Muk 6 – Round 2

Response not accepted. In addition to the reference to cross section figures, please provide a textual description on the variability, interpreted thicknesses of these stringers. (MK)

Response Muk 6 – Round 2

Further discussion of the unknown coal stringers has been added to the end of the fifth paragraph of Section D5.3.3.3.

Comment MuK 6 – Round 3

Response accepted.

Comment Muk 7 – Round 1

Appendix D5, Addendum D5-4 Isopachs, 7. Please include the wells/drill holes (control points) used to interpret the isopachs and elevation contours in the maps. In addition, label all the control points with names and the thickness (or elevation, as

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appropriate). This comment is applicable to Addendum D5-4, Exhibits 1 through 8. (MK)

Response Muk 7 – Round 1

Addendum D5-4 Exhibits 1 to 8 have been updated with drill hole locations as requested. A reference to Addendum D5-2 has been added to the exhibits for seam name and thickness.

Comment Muk 7 – Round 2

Response not accepted. It is acknowledged and accepted that the labels for all the control point names were included. However, thickness (or elevation, as appropriate) labels are not included as requested. Is it relatively easy for the software that was used for isopach elevation contours to label the thickness (or elevation)? The intent of this comment is to increase the robustness of the review of the interpreted contours by having appropriate point control data plotted in the same map. This comment is applicable to Addendum D5-4, Exhibits 1 through 8. (MK)

Response Muk 7 – Round 2

As requested, Addendum D5-4 Exhibits 1-8 have been revised to include thickness or elevation, as appropriate, of the applicable seam at each drill hole. It's worth noting, that generally the thicknesses/elevations were obtained from the lithologic logs in Addendum D5-2; however, some drill holes were interpreted differently using analysis of the electric logs (Addendum D5-2), lithologic logs (Addendum D5-2) and cross sections (Addendum D5-3).

Comment MuK 7 – Round 3

Response not accepted. The Table of Contents for Addendum D5-4 indicates that there is an "Exhibit l: Overburden Isopach Overlying the Carney Coal Seam". This Exhibit is not present in the Cheyenne Office copy of the Round 2 response submittal. (MK)

Response MuK 7 – Round 3

Exhibit 1 Overburden Isopach Overlying the Carney Seam was inadvertently left out of the Round 2 comment response package. The exhibit has been provided as part of the Round 3 response package.

Comment Muk 8 – Round 1

Appendix D5, Addendum D5-5 Overburden, Roof and Floor Sample Analysis Table, 8. Please describe these analyses, methodology, results and provide an interpretation of their applicability to the mine/reclamation plan. (MK)

Response Muk 8 – Round 1

Please see response to BJ 14.

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Comment Muk 8 – Round 2

No comment received.

Response Muk 8 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Appendix D6

Comment BJ 17 – Round 1

Appendix D6, Hydrology, Section D6.2.3, Pg. D6-20, Narrative in the last paragraph – why were no samples taken in Hidden Water Creek? Please explain.

Response BJ 17 – Round 1

No flow was observed in Hidden Water Creek during baseline sampling, so no samples were taken. The text has been revised to reflect that there were no flows observed.

Comment BJ 17 – Round 2

No comment received.

Response BJ 17 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 18 – Round 1

Appendix D6, Hydrology, Table D6.1-8, Regarding the HEC-RAS modeling results – The values for Hidden Water Creek and Slater Creek are identical. Is this accurate or is it a typographical error? Please clarify.

Response BJ 18 – Round 1

Updated table to remove typographical error.

Comment BJ 18 – Round 2

No comment received.

Response BJ 18 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 19 – Round 1

Appendix D6, Hydrology, Addendum D6-7, The well construction summary sheets need to have the coal bed names listed on the well lithology sections to the right of the well diagrams. Please label accordingly.

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Response BJ 19 – Round 1

Updated as requested.

Comment BJ 19 – Round 2

No comment received.

Response BJ 19 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 20 – Round 1

Appendix D6, Hydrology, Attachment D6-8-A, Pg. D6-8-20, A statement is made that water within both coal seams is expected to be "high quality" and "good" water. Please define the meaning of those characterizations. Are these judgments based on MCLs or some other value? Are they being classified by some constituent values? Or is there another metric being used? Please clarify.

For example; referencing WQD R&R, Chapter 8, Table I, Class I, II, or III would better define the essential characteristics of the water quality. Numerical values of critical constituents, such as TDS, could also serve to define the quality as "good". More descriptive qualifiers are needed to judge the water quality.

Response BJ 20 – Round 1

Revised text as requested.

Comment BJ 20 – Round 2

No comment received.

Response BJ 20 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 21 – Round 1

Appendix D6, Hydrology, Attachment D6-8-E, Hydrographs, The x parameter, time, is depicted in days. It appears that this scale should have been adjusted to show time in hours due to the rapid changes seen in the hydrographs. Please use a finer scale for the x axis.

Response BJ 21 – Round 1

The hydrographs were originally set up with the x axis in days to allow the reader to review recovery data. Rather than modifying the original hydrographs, additional hydrographs, each of which depict the time axis in hours, were developed and included as pages D6-8-36a and D6-8-37a. These additional hydrographs detail the

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water level changes over the portion of the pumping test period where the water level changes in the wells were the most rapid.

Comment BJ 21 – Round 2

No comment received.

Response BJ 21 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 22 – Round 1

Appendix D6, Hydrology, Attachment D6-8-F, The above mentioned comment can also be applied to the Carney well hydrographs. Please adjust the x axis to hours.

Response BJ 22 – Round 1

The hydrographs were originally set up with the x axis in days to allow the reader to review recovery data as well. Rather than modifying the original hydrographs, additional hydrographs, each of which depict the time axis in hours, were developed and included as pages D6-8-39a and D6-8-40a. These additional hydrographs detail the water level changes over the portion of the pumping test period where the water level changes in the wells were the most rapid.

Comment BJ 22 – Round 2

No comment received.

Response BJ 22 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 23 – Round 1

Appendix D6, Hydrology, Addendum D6-9, Pg. D6-9-2, Please include a column in Table D6-1 that indicates the elevation of the bottom of the well or TD. The total water column is important when assessing groundwater characteristics. Please correct.

Response BJ 23 – Round 1

Table D6-1 has been revised as requested.

Comment BJ 23 – Round 2

No comment received.

Response BJ 23 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment BJ 24 – Round 1

Appendix D6, Hydrology, Addendum D6-10, Pgs. D6-10-28 through D6-10-53, On the sample analysis reports, Please provide a brief narrative at the beginning of the lab results to give context to the data. Footnotes on the pages refer to MCLs or other parameters of water quality used for classification. However, the context that is used to define these parameters is missing. The assumption is made that these quality values are derived from the WQD R&R, Chapter 8, Table I definitions. But that is uncertain as no frame of reference is given. A brief sentence or two at the beginning of the section would clarify the numerical standards used in the report. Please adjust the narrative accordingly.

Response BJ 24 – Round 1

Page D6-10-27a was added to provide the requested narrative.

Comment BJ 24 – Round 2

No comment received.

Response BJ 24 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 25 – Round 1

Appendix D6, Hydrology, Please include the lithology of the sampled zone, either in the sampling information sheets, or on the sample analysis reports. Identification of the lithology sampled needs to be readily available with the analysis. This applies to all increments sampled. The sampled zones do have identification on the sample sheets with a shorthand nomenclature but persons unfamiliar with the lithology of the prospect area would be at a disadvantage when evaluating the sample results. A simple reference table at the beginning of the section would be sufficient. For example; MST=Masters, CRN=Carney, AL=Alluvium. Non-geologists need some frame of reference. Please create a clarifying narrative.

Response BJ 25 – Round 1

Reference text with abbreviations defined has been added on page Addendum D6-10-27a, as requested.

Comment BJ 25 – Round 2

No comment received.

Response BJ 25 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DM 2 – Round 1

Appendix D6-Hydrology, D6.1x – The drainage basin description and surface water quantity sections are lacking detail. As mentioned in M. Kunze's comments, the data from the terminated Slater Creek USGS gauge, and historical monitoring data from Big Horn Mine (permit no. 213) should be included.

The data collected at the monitoring stations that is presented in Addendum D6-4 does not appear to agree with the statement that Slater Creek is a "predominantly ephemeral" stream. Please reconcile the text with the data.

Response DM 2 – Round 1

Peak flow data from the USGS gage station on Slater Creek has been provided. See response to MK 30. The text in Section D6.1.5.2 has been updated to clearly indicate that Slater Creek is an ephemeral stream.

Comment DM 2 – Round 2

No comment received.

Response DM 2 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DM 3 – Round 1

Appendix D6-Hydrology, D6.2.4 States that Groundwater Rights are in Appendix E2 of the Adjudication Volume. Groundwater Rights are actually listed in Appendix B2. Please Correct.

Response DM 3 – Round 1

Text revised as requested.

Comment DM 3 – Round 2

No comment received.

Response DM 3 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 5 – Round 1

Appendix D6, 2. The pre-mining potentiometric map for the Masters coal seam shows the elevation of the groundwater at a higher elevation than the surface elevation in Sections 11 and 12 (in the vicinity of Slater Creek outside of the permit area). Either show the potentiometric surface as doted across this area or revise the potentiometric

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lines such that the groundwater elevation is below the ground surface elevation. Issue addressed by BJ Kristiansen. Please see comment No. 65.

Response KM 5 – Round 1

Exhibits D6.2-2 and D6.2-3 have been revised as requested.

Comment KM 5 – Round 2

No comment received.

Response KM 5 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 6 – Round 1

Appendix D6, 3. The groundwater elevation for the Carney coal seam in monitor well 578417-CRN was given as 3795.59. The potentiometric contour for 3800 is drawn south of this monitor well. Please correct the contour line to be consistent with the groundwater elevation shown for monitor well 578417-CRN. Correction of this contour line may also adjust how the contour lines for 3780 and 3760 are drawn, such that they may be drawn consistent with other contour lines.

Response KM 6 – Round 1

Contours in Exhibit D6.2-3 have been revised as requested.

Comment KM 6 – Round 2

No comment received.

Response KM 6 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 7 – Round 1

Appendix D6, 4. Page D6 8-8: The text refers to the pump test in the Carney coal seam. According to the procedures in the previous section, transducers were placed in CRN and CRN-OB; however on the referenced page, it states transducers remained in MST and MST-OB after pumping. LQD believes this to be a typographical error.

Response KM 7 – Round 1

LQD is Correct, this is a typographical error. The sentence should read "After the pumping period, the transducers remained in CRN1 and CRN-OB until 8:00AM on November 16, 2013." Page D6-8-8 has been updated with the typographical error corrected and a replacement page is included.

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Comment KM 7 – Round 2

No comment received.

Response KM 7 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 8 – Round 1

Appendix D6, 5. Please discuss why the water levels rose in the Carney coal seam during the pump test in the Masters coal seam.

Response KM 8 – Round 1

This comment is addressed in comment 19 from Muthu Kuchanur.

Comment KM 8 – Round 2

No comment received.

Response KM 8 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 9 – Round 1

Appendix D6, 6. What effect would a leaking pump have on the results of the pump test in the Masters coal seam?

Response KM 9 – Round 1

This comment is assumed to originate from the note on page Addendum D6-8-30. This note is in reference to activities that occurred immediately after the pumping test was shut off. The pump used for the pumping test did not have a foot valve. Therefore, after the pump was shut off, water in the discharge pipe immediately began to drain back into the well. The pump and piping was pulled out of the well as fast as possible and not all of the water in the pipe drained back into the well. However, the personnel conducting the pumping test were concerned that the water draining into the well would result in a rapid rise in the water level in the well and wanted to note it for the record on the field data sheet. It is estimated that less than 2 gallons of water actually drained out of the line into the well while the pump was being pulled which would result in a water level rise in the well of less than 0.25 foot. Given that the water level recovery in the well was very rapid immediately upon cessation of the pumping test (approximately 2 feet in the first ten minutes after the pumping test ended) and the early time recovery data was largely ignored for the purposes of doing the aquifer characterization evaluations, the leaking pump would not have had an impact on the results of the pumping test.

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Comment KM 9 – Round 2

No comment received.

Response KM 9 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 10 – Round 1

Appendix D6, 7. Please make sure all maps that are stamped are also signed and dated by the engineer, as required by regulation.

Response KM 10 – Round 1

All maps that are stamped will be signed and dated by the engineer as required by law. This does not include digital versions. The digital copies have been provided for WDEQ review. The hard copy is the official copy.

Comment KM 10 – Round 2

No comment received.

Response KM 10 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 17 – Round 2 (New Comment)

Based on LQD's review of the well logs for Wells 578409-CRN-OB and 578409-MST-OB, the wells were screened in a coal seam, not in overburden. Please address all hydrologic information discussing overburden which was based on these wells and which may be in error.

Response KM 17 – Round 2 (New Comment)

The "OB" designation refers to "observation" rather than overburden. It is noted that this is a poor naming convention, but the naming had already been established. We apologize for the confusion. Additionally, Section D6.2.1.1 states that electric logs with resistivity data have demonstrated that the overburden is dry. Section D6.2.2.1 states that no monitoring wells were completed in the overburden or interburden because no water was found in these units during drilling. The nomenclature page in Addendum D6-10 (page Addendum D6-10-27A) has been revised to state: OB=observation.

Comment KM 17 – Round 3

No comment received.

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Response KM 17 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 18 – Round 2 (New Comment)

The well logs for 578409-CRN and 578409-CRN-OB show the wells are screened in a coal seam labeled "Masters", not Carney. This appears to be a typographical error on the well log. Please correct.

Response KM 18 – Round 2 (New Comment)

The typographical error has been corrected on the well logs 578409-CRN and 578409-CRN-OB.

Comment KM 18 – Round 3

No comment received.

Response KM 18 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment MK 29 – Round 1

Appendix D6-Hydrology, Section D6.1.2 Drainage Basin Description, 3. On Page D6-2 it is stated that Slater Creek is an ephemeral stream. Aerial imagery shows a riparian area with trees and subirrigation occurring along much of the channel. PEM wetlands are also present as documented in Appendix D10. It would seem that an ephemeral stream may not be able to support these features. Please provide the justification why Slater Creek is considered an ephemeral stream, and that the stream does not contain intermittent characteristics where it is not below the local water table for a portion of the year. (MDK)

Response MK 29 – Round 1

Please see response to DM2.

Comment MK 29 – Round 2

Response not accepted. Please include additional discussion on the hydrology of Slater Creek to include what was added to Page D11-8 in Appendix D-11 in response to Comment MK 8: *Infiltration of precipitation into the burn and then slow release of the stored water acts as a water source for the subirrigation and surface flow of Slater Creek.*

In addition, a comparison of the 2014 observed flows between the upstream and downstream stations on Slater Creek shows that flows were higher at the upstream

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station for the majority of the period. This may suggest Slater Creek is a losing stream. Please discuss this further in the description of the hydrology of Slater Creek. (MDK)

Response MK 29 – Round 2

The additional discussion for Slater Creek hydrology has been added to the middle of the third paragraph in Section D6.1.2 as requested.

Comment MK 29 – Round 3

Response not accepted. The additional discussion on the hydrology of Slater Creek was included as requested. However, based on observations from the AVF reconnaissance site visit to Slater Creek on September 24, 2015, Slater Creek should not be characterized as an ephemeral stream. At the time of the site visit, standing water and a small amount of flow was observed in the channel, particularly in Section 12. This flow was observed during a dry period when no precipitation had occurred previously. Therefore the flow was due to some other source besides direct response to precipitation. The permit application indicates that some discharge to Slater Creek occurs from infiltration of precipitation into high perched scoria burn above the stream channel; this water is stored and slowly released to Slater Creek. It appears that this flow may form a shallow water table that provides baseflow to the channel.

In my opinion Slater Creek is better described as an intermittent stream with a few isolated reaches that may be perennial. Please revise any text in the permit application that describes Slater Creek as an ephemeral stream (Page D6-2-Section D6.1.2, Page D6-11 -Section D6.1.5.2, Page D6-11-Section D6. 1.5.3, Page RP-45-Section RP .8.5.2). (MDK)

Response MK 29 – Round 3

Slater Creek has been described as intermittent stream, as requested, in the following areas of the text: in Appendix D6, the third paragraph of Section D6.1.2, the third paragraph of Section D6.1.5.2, the second paragraph of Section D6.1.5.3.; in Appendix D11 the second paragraph of Section D11.3; and in the Reclamation Plan, the first paragraph of Section RP.8.5.2.

Comment MK 30 – Round 1

Appendix D6-Hydrology, Section D6.1.3.2 Flood Studies, 4. The USGS operated a peak flow gage on Slater Creek from 1967 to 1981 (Station No. 06299900, http://nwis.waterdata.usgs.gov/wy/nwis/inventory/?site_no=06299900&agency_cd=USGS). The gage was located just downstream of the proposed permit boundary near the confluence with the Tongue River. Please incorporate the annual peak flow data from this station into the permit application to illustrate the range of peak flows that might be expected from Slater Creek. (MDK)

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Response MK 30 – Round 1

The text and Tables D6.1-2 and D6.1-3 have been revised to include peak flow data for USGS Station No. 06299900.

Comment MK 30 – Round 2

No comment received.

Response MK 30 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 31 – Round 1

Appendix D6-Hydrology, Section D6.1.3.2 Flood Studies, 5. Some of the U.S. Army Corps of Engineers references cited in the text (2000, 2001) do not appear in the References Section (Section D6.3). Please add these to the references list. (MDK)

Response MK 31 – Round 1

The text edits have been made as requested.

Comment MK 31 – Round 2

Response not accepted. The citation (U.S. Army Corps of Engineers, 2001) on Page D6-3 still does not appear in the reference list. Please add this to the Reference Section (Section D6.3). (MDK)

Response MK 31 – Round 2

The year in the U.S. Army Corps of Engineers citation on page D6-3 was changed to 2009 to match the references provided in Section D6.3. The change was an inadvertent oversight on the part of WWC.

Comment MK 31 – Round 3

Response accepted.

Comment MK 32 – Round 1

Appendix D6-Hydrology, Section D6.1.3.2 Flood Studies, 6. Please add the year to the Miller reference within the text (2003) and add this citation to the references list in Section D6.3. (MDK)

Response MK 32 – Round 1

The text edits have been made as requested.

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DEQ 34-039

Comment MK 32 – Round 2

No comment received.

Response MK 32 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 33 – Round 1

Appendix D6-Hydrology, Section D6.1.3.2 Flood Studies, 7. Please explain in the text if the existing impoundments (stock reservoirs, old mine pits, etc.) in both the Slater Creek and Hidden Water Creek drainages were considered in the routing functions for the HEC-HMS runoff estimates. These features would likely have an effect on attenuating peak flows. (MDK)

Response MK 33 – Round 1

The text has been revised to clarify the impoundments are not included the HEC-HMS model. As described, peak flow estimates should be conservatively high without attenuation of storm events by impoundments.

Comment MK 33 – Round 2

No comment received.

Response MK 33 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 34 – Round 1

Appendix D6-Hydrology, Section D6.1.3.2 Flood Studies, 8. As the text states on Page D6-5, the HEC-HMS runoff estimates in Table D6.1-7 are higher than the Miller (2003) equation estimates. Please provide a discussion in the text as to the reasonableness of the HEC-HMS estimates and why the HEC-HMS estimates are so much higher than the Miller (2003) equation estimates.

The Miller (2003) equation for this region used, in part, data from the USGS peak flow gage on Slater Creek, so it would seem that the Miller (2003) estimates may be more reasonable. For example, compared to the HEC-HMS estimates, the 15-year record from the peak flow gage on Slater Creek would not register at anything greater than a five-year event. Furthermore, the May 18, 1978 event on Slater Creek resulted in a peak flow of 1,100 cfs, which according to the HEC-HMS estimates would only be around a 2-year event. USGS studies have shown that the May 1978 flood event was estimated to be a 100-year event on some parts of the Tongue River in this area (http://pubs.usgs.gov/pp/1244/report.pdf). (MDK)

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Response MK 34 – Round 1

A discussion in the text has been included that speaks to why the HEC-HMS results are higher than the Miller results. Additionally, a discussion acknowledges the report by the USGS on the May 1978 flood. The Miller analysis does appear to more closely estimate the peak flowrates for flood events for the short data record on Slater Creek. However, hydraulic calculations will continue to use the HEC-HMS results because of the conservative results and the ease in comparing to the postmining hydrologic environment. HEC-HMS provides a way to change the properties of the drainage basins to reflect what will be present postmining, and the comparison between the premining and postmining HEC-HMS models quantifies the magnitude of the impact the Brook Mine will have on the hydrologic balance.

Comment MK 34 – Round 2

No comment received.

Response MK 34 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 35 – Round 1

Appendix D6-Hydrology, Section D6.1.5.1 Monitoring Stations, 9. Please add the northing/easting State Plane coordinates for the four Brook Mine surface water monitoring stations to Table D6.1-11. (MDK)

Response MK 35 – Round 1

The locations of the surface water monitoring sites have been reported to the quarter-quarter, which is an adequate level of accuracy to report the monitoring locations.

Comment MK 35 – Round 2

Response not accepted. The location coordinates are needed for plotting the locations of the stations; the quarter-quarter does not provide the needed level of accuracy for this. Reporting the northing/easting State Plane coordinates for monitoring locations is standard practice in other LQD coal permits and would be required when reporting station information in the Annual Report as part of the LQD Coal Annual Report Format (CARF). Please add the northing/easting State Plane coordinates for the four Brook Mine surface water monitoring stations to Table D6.1-11. (MDK)

Response MK 35 – Round 2

The northing and eastings for the surface water monitoring station have been added to Table D6.1-11, as requested.

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Comment MK 35 – Round 3

Response not accepted. Although the coordinates were included in Table D6.1-11 as requested, the location appears incorrect for the upstream monitoring station on Slater Creek (SM578512-SW-1). During the AVF reconnaissance site visit to Slater Creek on September 24, 2015, station SM578512-SW-1 was observed approximately 1,800 feet downstream from where it is currently shown in Exhibit D6.1-2. Please see the attached map and photo below. Please also note that the location observed in the field matches what is shown in Addendum D6-5 Figure D6-2. Please provide the correct coordinates and location for station SM578512-SW -1 in Table D6.1-11 and Exhibit D6.1-2. Please also update the coordinates in Table MP.7- 1 and the appropriate permit application Exhibits (Exhibit D6. 1-2, Exhibit MP.7- 1, Exhibit RP.8-5) to show the correct location of the station. (MDK)

Response MK 35 – Round 3

The locations of all the surface water stations have been revised throughout the permit to correctly match the surveyed locations. The following tables and exhibits have been revised as requested: Table D6.1-11, Table MP.7-1, Exhibit D6.1-2, Exhibit MP.7-1 and Exhibit RP.8-5.

Comment MK 36 – Round 1

Appendix D6-Hydrology, Section D6.1.5.1 Monitoring Stations,10. On Page D6-8, it is not necessary to mention the State of Montana water quality classifications of the Tongue River, as only State of Wyoming classifications and standards would apply. Please remove reference to the Montana standards. (MDK)

Response MK 36 – Round 1

The text has been revised as requested.

Comment MK 36 – Round 2

No comment received.

Response MK 36 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 37 – Round 1

Appendix D6-Hydrology, Section D6.1.5.1 Monitoring Stations, 11. On Page D6-8, second paragraph, it states that increased E.Coli from samples collected in 2006 were attributable to high flows in May-June 2010. Were the samples also collected in 2010 and not 2006? Please revise this sentence. (MDK)

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Response MK 37 – Round 1

The sentence was revised to read more clearly. The sentence was saying that samples taken in 2010 experienced an increase in E.Coli bacteria compared to the samples collected in 2006.

Comment MK 37 – Round 2

No comment received.

Response MK 37 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 38 – Round 1

Appendix D6-Hydrology, Section D6.1.5.1 Monitoring Stations, 12. On Page D6-8, second paragraph, it would be informative to add that, in addition to the SCCD, other entities such as the Big Horn Mine, USGS, and WDEQ/WQD have collected water quality data on the Tongue River and Goose Creek near the proposed mine. It may also be informative to mention that sections of the Tongue River in the vicinity of the proposed mine are on the State's 303(d) list since certain uses are not supported due to impaired water quality. Goose Creek has also been on the 303(d) list in the past and a TMDL has been prepared. Information can be found at: http://deq.wyoming.gov/wqd/water-quality-assessment/resources/reports/ and http://deq.wyoming.gov/wqd/tmdl/. (MDK)

Response MK 38 – Round 1

The text has been revised as requested. Refer to Section D6.1.5.1.

Comment MK 38 – Round 2

No comment received.

Response MK 38 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 39 – Round 1

Appendix D6-Hydrology, Section D6.1.5.2 Surface Water Quantity, 13. The Big Horn Mine (WDEQ/LQD Permit 213) operated a station on Hidden Water Creek (HWC1-79) from 1979 to 1998. This station was located approximately ¼ mile upstream from station SM578415-SW-1 that was installed by the Brook Mine. The LQD Hydrology Database contains mean daily flow data from this station from 1982 to 1997, although several years are missing data. Baseline water quantity characterization of Hidden Water Creek in the Brook Mine permit application would be strengthened if these data were incorporated and discussed. The LQD can provide these data in electronic

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format upon request or a more complete dataset may be available if requested from the Big Horn Mine. (MDK)

Response MK 39 – Round 1

Please see response to DM 2 and MK 30.

Comment MK 39 – Round 2

Response not accepted. The response referenced Comments DM 2 and MK 30, which refer to Slater Creek, not Hidden Water Creek. The LQD emailed the Hidden Water Creek data to WWC Engineering on July 8, 2015. Please incorporate and discuss the data to strengthen the baseline water quantity characterization of Hidden Water Creek in the Brook Mine permit application. (MDK)

Response MK 39 – Round 2

Please refer to the added text at the bottom of the second paragraph of Section D6.1.5.2 summarizing the flow data from the Big Horn Mine Hidden Water Creek former surface water monitoring station, HWC1-79. In addition, Table D6.1-14 has been added which provides the number of flow days per month and the maximum average flow for each day during a given flow month for the 1982 through 1997 period of record. The approximate location of HWC1-79 has been added to Exhibit D6.1-2.

Comment MK 39 – Round 3

Response accepted.

Comment MK 40 – Round 1

Appendix D6-Hydrology, Section D6.1.5.3 Surface Water Quality, 14. Please briefly discuss in the text the water quality results from Slater Creek in the context of WQD Surface Water Quality Standards for Class 3B waters (see Chapter 1 of WQD Rules and Regulations). This would reveal whether or not designated uses were being met prior to mining. The two samples from Slater Creek indicate no exceedances of Class 3B criteria, indicating uses are supported. (MDK)

Response MK 40 – Round 1

The text has been updated as requested.

Comment MK 40 – Round 2

No comment received.

Response MK 40 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 41 – Round 1

Appendix D6-Hydrology, Section D6.1.5.3 Surface Water Quality, 15. It is understood that water was not flowing in Hidden Water Creek so the applicant could not collect a sample for baseline purposes. However, as previously mentioned, the Big Horn Mine operated a station on Hidden Water Creek (HWC1-79) from 1979 to 1998. The LQD Hydrology Database contains nine water quality samples collected at this site from 1979 to 1989. Baseline characterization of Hidden Water Creek in the Brook Mine permit application would be strengthened if these data were incorporated and discussed. The LQD can provide these data in electronic format upon request. (MDK)

Response MK 41 – Round 1

Request for information is pending. No update to the permit has occurred at this time in response to this comment.

Comment MK 41 – Round 2

Response to the comment is pending. As discussed in the review of the response to Comment MK 39, the LQD emailed the Hidden Water Creek data to WWC Engineering on July 8, 2015. Please incorporate and discuss the data to strengthen the baseline water quality characterization of Hidden Water Creek in the Brook Mine permit application. (MDK)

Response MK 41 – Round 2

Please refer to the added text at the bottom of the second paragraph of Section D6.1.5.3 summarizing the surface water quality in Hidden Water Creek for the Big Horn Mine surface water monitoring station, HWC1-79. In addition, Table D6.1-15 has been constructed which displays concentrations of the nine samples collected for the 1979 through 1989 period of record. The approximate location of HWC1-79 has been added to Exhibit D6.1-2.

Comment MK 41 – Round 3

Response accepted.

Comment MK 42 – Round 1

Appendix D6-Hydrology, Section D6.1.5.4 Sediment Transport, 16. This section would be enhanced by including data from a single sediment sample collected on Slater Creek at USGS Station No. 06299900 (peak flow gage previously discussed in Comment No. 4). This sample was collected in June 1967 at a flow of 18 cfs. The TSS was 11,600 mg/L and the suspended sediment discharge was 564 tons/day. (MDK)

Response MK 42 – Round 1

The text has been revised to include the additional sediment sample as requested.

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Comment MK 42 – Round 2

No comment received.

Response MK 42 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 43 – Round 1

Appendix D6-Hydrology, Addendum D6-5 – Rating Curves, 17. A rating curve developed using only the Manning equation will provide only a rough estimate of flows given the uncertainty in the Manning's roughness coefficient. It is recommended that direct discharge measurements also be taken over time to help evaluate the rating curves developed for the four monitoring sites. (MDK)

Response MK 43 – Round 1

The rating curves were developed for ephemeral streams that flow infrequently enough that water measurements cannot be taken at regular intervals. Manning's equation provides a reasonable and widely accepted mathematic approximation of stream flow rates.

Comment MK 43 – Round 2

Response not accepted. Developing a rating curve for an open channel using only Manning's equation and no direct measurements is not a standard practice. If a direct discharge measurement is not occasionally taken, the accuracy of the modelled rating curve will never be known. Please commit to periodically taking a direct measurement to evaluate the rating curves. (MDK)

Response MK 43 – Round 2

A commitment to obtain direct measurements of surface water monitoring stations, when possible, was added to Section MP.7.1.

Comment MK 43 – Round 3

Response not accepted. The text was updated but it is unclear what is going to be directly measured. For example, the text states: *In addition, direct measurements of surveyed cross sections will be obtained when possible.* It is not clear if the measurement will be of the water discharge or the cross section dimensions. Please revise the sentence so it is clear that direct discharge measurements will be taken when possible to evaluate the rating curves.(MDK)

Response MK 43 – Round 3

Section MP.7.1 has been revised to state that direct discharge measurements will be obtained when possible.

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Comment MK 44 – Round 1

Appendix D6-Hydrology, Addendum D6-5 – Rating Curves, 18. Given the uncertainty in the Manning equation, the estimated flow rates provided in Table D6-3 and Attachment D6-5-A (Rating Tables) are reported at much too high a level of precision to be meaningful. Depending on the magnitude of the flow estimate, there should be only one or two significant figures provided. For example, 0.29 cfs = 0.3 cfs and 3,584.38 cfs = 3,600 cfs. Please revise these tables. (MDK)

Response MK 44 – Round 1

Summary Table D6-3 has been revised to engineering precision (no more than three significant figures). The values in Attachment D6-5-A are essentially raw data that are being reported to that magnitude to show the validity of calculations and to aid in curve development. Being raw data, the values were not revised from those previously reported.

Comment MK 44 – Round 2

No comment received.

Response MK 44 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 9 – Round 1

Appendix D6, Section D6.2.1 Regional Hydrogeology, 9. Page D6-12 states, "The potential groundwater in the formation as capable of yielding small quantities of water for domestic and stock use". Please consider providing a range of estimates for well yields based on literature review or from the baseline data collected by the Brook Mine. (MK)

Response Muk 9 – Round 1

The text has been revised to indicate that coal is the only regional shallow aquifer that has a sufficient quantity of water to support domestic and stock use.

Comment Muk 9 – Round 2

No comment received.

Response Muk 9 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 10 – Round 1

Appendix D6, Section D6.2.1 Regional Hydrogeology, 10. The description in this section discusses only about the Fort Union formation. Please provide a description of

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the overlying and underlying water-bearing formations (aquifers) and describe their hydrogeologic characteristics (flow direction, gradients, aquifer properties, general outcrop locations) on a regional context. It is noted that some of the overlying formations may be dry or discontinuous within the mine permit boundary. (MK)

Response Muk 10 – Round 1

Section D6.2.1 has been updated as requested.

Comment Muk 10 – Round 2

No comment received.

Response Muk 10 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 11 – Round 1

Appendix D6, Section D6.2.1 Regional Hydrogeology, 11. Page D6-12 states, "The overburden is comprised of sand lenses, clinker and alluvial that have the potential of water bearing bodies. Due to the topography in this area, the valley cut through these deposits. Therefore, they are discontinuous and would not hold large quantities of water." It is noted that they are discontinuous and would not hold large quantities of water. Please provide additional justification for this statement by using the hydrogeologic data collected by the Brook Mine including any reference to the interpreted extent of dry zones based on drill holes, monitor wells and other applicable data. (MK)

Response Muk 11 – Round 1

Section D6.2.1.1 has been updated as requested.

Comment Muk 11 – Round 2

Response not accepted. In addition to a reference to Addendum D5-2, please provide a description/interpretation on the aerial and vertical extent of dry zones. (MK)

Response Muk 11 – Round 2

Discussion of the interpreted dry zones was added to the first paragraph of Section D6.2.1.1 (page D6-14). As discussed, the overburden is primarily dry as indicated by the lithologic logs in Appendix D5. A few boreholes did indicate the presence of water in the overburden; however, water was generally located in the shallow alluvium/colluvium material or in burn areas. These boreholes were generally located near streams or supporting tributaries throughout the permit area and adjacent areas.

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Comment MuK 11 – Round 3

Response accepted.

Comment Muk 12 – Round 1

Appendix D6, Section D6.2.1 Regional Hydrogeology, 12. Please clarify if there were groundwater springs or seeps observed in the areas within or adjacent to the mine permit boundary. Include a discussion (or reference) on the surface water - groundwater interactions.(MK)

Response Muk 12 – Round 1

Section D6.2.2.5 has been updated as requested.

Comment Muk 12 – Round 2

No comment received.

Response Muk 12 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 13 – Round 1

Appendix D6, Section D6.2.2.1 Monitor Well Construction, Completion and Development, 13. Page D6-13 states, "No monitoring wells were completed in the overburden or interburden as no water was found in these units during drilling operations". This information is critical in demonstrating the overlying units are dry. Therefore, for better documentation, please provide (or reference) a map with all the drill holes (both overburden and interburden) and their depths that were used to make this determination. (MK)

Response Muk 13 – Round 1

Section D6.2.2.1 has been updated as requested.

Comment Muk 13 – Round 2

No comment received.

Response Muk 13 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 14 – Round 1

Appendix D6, Section D6.2.2.1 Monitor Well Construction, Completion and Development, 14. Page D6-13 states, "Also one well 578409-MST-UB showed the presence of water in the underburden, while all the other wells drilled into the

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underburden were dry and therefore not completed as wells." Similar to the previous comment, this information is critical in demonstrating the underlying units are dry. Therefore, for better documentation, please provide (or reference) a map with all the drill holes (underburden) and their depths that were used to make this determination. (MK)

Response Muk 14 – Round 1

Please see response to Muk 13.

Comment Muk 14 – Round 2

No comment received.

Response Muk 14 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 15 – Round 1

Appendix D6, Section D6.2.2.2 Aquifer Tests, 15. Page D6-15 states, "Alluvial materials were also not analyzed during the aquifer testing." The alluvial aquifer materials are one of the key factors in determining any impacts caused by mining to the alluvial aquifer. Alluvial aquifer tests will be helpful in understanding any surface water – groundwater interactions. Please provide justification for not conducting any aquifer tests in the alluvial wells. (MK)

Response Muk 15 – Round 1

The text in Section D6.2.2.2 has been updated.

Comment MuK 15 – Round 2

Response not accepted. The updated text just notes that there were three alluvial wells completed in Slater Creek. The original comment remains to be addressed. (MK)

Response MuK 15 – Round 2

A short discussion was added to the second paragraph of Section D6.2.2.2 after the context of the response to Comment MuK 16. The discussion explains that aquifer tests weren't conducted in the alluvial wells because of the confining claystone intervals between colluvial/alluvial material and the differences in potentiometric head between the Carney coal and the colluvial/alluvial material. Therefore, it can be surmised that the confining intervals will provide a suitable barrier between the mining activities and the colluvium/alluvium, not necessitating aquifer tests in the alluvial aquifer.

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Comment MuK 15 – Round 3

Response not accepted. It is acknowledged that there is a potentiometric head difference between alluvium and Carney coal seam. Please clarify if this potentiometric head difference is an artifact caused by CBM dewatering. (MK)

Response MuK 15 – Round 3

It is unlikely that the potentiometric head difference between the alluvium and the Carney coal seam can be attributed to CBNG dewatering. The CBNG dewatering efforts have occurred approximately 2 miles away from the wells utilized for aquifer testing. Given the relatively low transmissivity of the coal it is unlikely that the CBNG dewatering efforts have significantly affected water levels in the wells utilized for the aquifer tests. The water levels measured in the Carney coal during the aquifer test demonstrate that the Carney coal is confined (see Addendum D6-8). If the drawdowns from CBNG dewatering were significant it is unlikely that the coal aquifer would still be confined. Discussion of the potentiometric head differences between alluvium and Carney coal as it relates to CBNG dewatering has been added to the end of the second paragraph in Section D6.2.2.2.

Comment MuK 16 – Round 1

Appendix D6, Section D6.2.2.2 Aquifer Tests, 16. Please provide justification for not observing the groundwater level responses in the alluvial aquifer during the two aquifer tests conducted by Brook mine. (MK)

Response MuK 16 – Round 1

No alluvial material was present in immediate vicinity of the clusters used for the pumping tests, hence there was no alluvial aquifer to monitor. Hidden Water Creek located to the east of the tested well cluster would be potentially the nearest location of alluvial material. However, as noted in Appendix D11, the fill material in Hidden Water Creek is more colluvial than alluvial.

In addition, as shown on the well completion summary logs in Addendum D6-7, multiple claystone intervals are located between the Carney Coal and the surface at the well cluster where the pumping tests were conducted. The top of the Carney Coal is approximately 90 feet below ground surface at the cluster well location which is approximately 50 feet below the level of any colluvial/alluvial deposits in Hidden Water Creek. Similarly, the potentiometric head in the Carney coal is some 50 feet below the level of the colluvial/alluvial deposits in Hidden Water Creek and if there were a direct hydraulic connection, there would be no water in the Hidden Water Creek colluvium/alluvium. Given the confining intervals between and the significant difference in potentiometric head between the Carney Coal and the Hidden Water Creek colluvium/alluvium, additional shallow monitoring above the Carney Coal was not necessary.

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Comment Muk 16 – Round 2

Response conditionally accepted. Please incorporate the response into the permit application. (MK)

Response Muk 16 – Round 2

The context of the response was added to the second paragraph of Section D6.2.2.2.

Comment MuK 16 – Round 3

Response accepted.

Comment Muk 17 – Round 1

Appendix D6, Section D6.2.2.2 Aquifer Tests, 17. Page D6-16 states, "A report of these tests can be found in Addendum D6-8 and summary tabulation of the aquifer test results is included in Table D6.2.2". Please consider including a comparison of these estimated aquifer properties with the aquifer tests conducted in other similar coal seams in the Powder River Basin (Example: Bighorn Mine). Given the number of tests conducted by the mine, this will increase the robustness of the reported estimates from the two aquifer tests. (MK)

Response Muk 17 – Round 1

As requested aquifer test results from Big Horn Coal Company and from the Youngs Creek Mine were added to the text.

Comment Muk 17 – Round 2

No comment received.

Response Muk 17 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 18 – Round 1

Appendix D6, Section D6.2.2.2 Aquifer Tests, It is noted that the aquifer tests were conducted for ~640 minutes. Will an increased aquifer test duration change the observed lack of interaction between the coal seams and the underburden? Please clarify with a brief description. (MK)

Response Muk 18 – Round 1

Given the head differences between the static water levels in the Carney Coal, Masters Coal, and the underburden it is unlikely that additional pumping would have resulted in any impacts to the water levels in the underburden. As shown on Table D6-2, (page Addendum D6-8-13) the initial water level in the Carney Coal was approximately 11.5 feet higher than the water level in the Masters Coal and the initial water level in the

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Masters Coal was approximately 9 feet higher than the initial water level in the underburden well. If there were a hydrologic connection between the aquifers, it is likely that the water levels in the aquifers would have already come into equilibrium.

Comment Muk 18 – Round 2

Response conditionally accepted. Please incorporate the response into the permit application. (MK)

Response Muk 18 – Round 2

The context of the response has been added as the third paragraph of Section D6-8.3.2.3 of Addendum D6-8 "Pumping Test Report." The context of the response seems to be better suited in the Pumping Test Report than in Section D6.2.2.2 of Appendix D6.

Comment MuK 18 – Round 3

Response accepted.

Comment Muk 19 – Round 1

Appendix D6, Section D6.2.2.2 Aquifer Tests, 19. The referenced Addendum D6-8, Table D6-2 shows an increase in water levels in two of the Carney coal seam observation wells during the Masters coal seam well pumping test. Please provide an explanation for this increase in water levels during the aquifer test. (Noordbergum effect?). (MK)

Response Muk 19 – Round 1

Upon review of the raw data collected during the pumping test it was noted that the drawdowns reported in Tables D6-2 and D6-3 were incorrectly reported. Replacement tables are included with this round of comment responses. As shown on the updated version of Table D6-2, the water level in both Carney observation wells (CRN-1 and CRN-OB) increased by 0.23 feet during the Masters coal pumping test. While the Noordbergum effect or other natural phenomena such as earth tides could have potentially influenced the water levels in adjacent aquifers during the pumping test, the increase in water levels can be largely attributed to barometric pressure changes. Water levels in the Carney observation wells were monitored using hand held electric lines and there were no adjustments for barometric pressure reported in Table D6-2. No site specific barometric data was collected during the pumping test period. However, to evaluate how barometric pressure changes may have impacted water levels in the wells, barometric data from the automatic weather observing station (AWOS) at the Sheridan County airport was obtained from the National Oceanic and Atmospheric Administration (NOAA) database. Barometric data from the Sheridan County Airport AWOS site was compared to water level measurements in Attachment D6-8-K. The data in Attachment D6-8-K demonstrates a clear correlation between barometric pressure and water level variations in the Carney coal monitor wells during

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the Masters coal pumping test. Generally over the course of the Masters coal pumping test the barometric pressure went down (roughly 0.31 feet). A decrease in the barometric pressure is expected to result in an increase in water levels in a confined aquifer like the Carney coal aquifer which is what was observed.

Similar increases in water levels were also noted in the Masters Coal observation wells (MST-1 and MST-OB) during the Carney pumping test as noted on Table D6-3. Attachment D6-8-K demonstrates a clear correlation between decreasing barometric pressure and rising water levels in the Masters coal observation wells during the Carney Pumping test. In addition, during the Carney coal pumping test, water levels in the Masters coal observation wells were still recovering from drawdowns induced during the Masters coal pumping test which may also have contributed to rising water levels in the Masters coal. The increase in water level measured in the Masters coal observation wells is attributed to a combination of continuing water level recovery and barometric effects.

Only very minor water level variations in the Masters underburden well (MST-UB) were noted during both pumping tests. As shown on the well completion form in Addendum D6-7, (Page D6-7-8) MST-UB was completed in an interval that was predominately claystone and the estimated yield is less than 2 gpm. Essentially the strata in which MST-UB is completed is more of an aquitard than an aquifer. As a result, it takes a lot longer for the water levels in the well to adjust to changing atmospheric pressure because water does not enter or discharge from the formation very fast. The lack of barometric responses in the MST-UB are attributed to the fact that the low yielding aquitard in which the well is completed has a lower barometric efficiency than the wells completed in the coal aquifers.

Vented transducers utilized to monitor water levels in the both the pumping and adjacent monitor wells during each pumping test, automatically compensated for the barometric pressure effects. Therefore, barometric pressure effects did not affect the aquifer analyses that were developed based on the pumping test data.

Comment Muk 19 – Round 2

Response conditionally accepted. Please incorporate the response into the permit application. (MK)

Response Muk 19 – Round 2

The context of the response has been added to Section D6-8.3.2.3 of Addendum D6-8 "Pumping Test Report." The context of the response seemed to be better suited within the Pumping Test Report than Section D6.2.2.2 of Appendix D6.

Comment MuK 19 – Round 3

Response accepted.

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Comment Muk 20 – Round 1

Appendix D6, Section D6.2.2.2 Aquifer Tests, 20. Please provide a discussion (or reference) on the role of faults in the results of aquifer tests. (MK)

Response Muk 20 – Round 1

As noted in Addendum D6-8, (page D6-8-9) no hydrologic boundary conditions were observed in the pumping test data. As can be seen on Exhibit D6.2-2, the 578409 well cluster is located approximately 2,100 feet south and east of the nearest mapped fault. Since neither the Carney nor the Masters coal seams are very robust aquifers and have low transmissivity values, it is not surprising that the fault would not influence the pumping test results. For example, using Theis drawdown equations and the aquifer characteristics measured in the Masters coal (transmissivity of 3.2 ft^2/day, storativity of 0.00025, and a pumping rate of 0.5 gpm) it is estimated that it would take over 70 days of continuous pumping for a water level response greater than 0.5ft to be observed 2,000 feet away. Therefore the likelihood that the faults would have influenced the pumping test results is very low.

Comment Muk 20 – Round 2

Response conditionally accepted. Please incorporate the response into the permit application. (MK)

Response Muk 20 – Round 2

The context of the response has been added to Section D6-8.4 of Addendum D6-8 "Pumping Test Report." This seemed like a more appropriate location for the context of the response than within Section D6.2.2.2 of Appendix D6.

Comment MuK 20 – Round 3

Response accepted.

Comment Muk 21 – Round 1

Appendix D6, Section D6.2.2.4 Premining Potentiometric Surface, 21. Please provide some additional discussion on the premining potentiometric surface maps, including ranges of estimated hydraulic gradients and groundwater velocity in the different coal seams/aquifers. (MK)

Response Muk 21 – Round 1

As requested, additional discussion on the hydraulic gradients and groundwater velocity in the coal seams were added to Section D6.2.2.4.

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Comment Muk 21 – Round 2

Response not accepted. The revised text states, "Groundwater gradients are low ranging from approximately 2 – 4 ft/year in the Masters Coal and 1 to 2.5 ft/year in the Carney Coal." Please correct the sentence to reflect velocities. (MK)

Response Muk 21 – Round 2

The text in Section D6.2.2.4, second paragraph was revised to correctly refer to 2 to 4 ft/year and 1 to 2.5 ft/ year as velocities rather than gradients.

Comment MuK 21 – Round 3

Response accepted.

Comment Muk 22 – Round 1

Appendix D6, Section D6.2.2.4 Premining Potentiometric Surface, 22. Please provide a discussion (or reference) on the hydrologic effects of any adjacent operations (including past coal mining activity by historic mines and Bighorn mine) on the premining information and data. (MK)

Response Muk 22 – Round 1

The last paragraph in Section D6.2.2.4 describes how CBNG production has affected water levels in the eastern side of the permit area. The drawdowns resulting from CBNG production have occurred since any historic coal mining activity and have superseded any drawdowns that may have occurred due to historic mining. Therefore, no lingering hydrologic effects from past coal mining activities are present. The text in the last paragraph in Section D6.2.2.4 has been updated to describe how CBNG impacts have superseded any impacts from historic coal mining activities.

Comment Muk 22 – Round 2

No comment received.

Response Muk 22 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 23 – Round 1

Appendix D6, Section D6.2.2.5 Recharge and Discharge Areas, 23. This section provides a good discussion on the recharge areas. However, please clarify if there are any discharges from the coal seams within the permit boundary. (MK)

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Response Muk 23 – Round 1

Within the permit boundary there are no discharges from the coal seams with the possible exception of the Carney coal on the far west side of the permit area. As shown on Exhibit D6.2-3, the Carney coal outcrops in the far western side of the permit area along the ridge tops but has been eroded away in the stream valleys. As a result, the Carney coal is perched with no real source of recharge and is generally dry. However, on the down dip side of the outcrop the coal may discharge within the permit if there is water in the coal seam to discharge. As shown on Figures MP-3-4.7-1 and MP-3-4.7-2 it was determined during the groundwater modeling efforts that most of the Carney coal within the far western side of the permit area was dry. Therefore, there is minimal (if any) discharge from the Carney coal within the permit area. Section D6.2.2.5 has been updated to clarify where discharges from coal seams may occur within the permit boundary.

Comment Muk 23 – Round 2

No comment received.

Response Muk 23 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 24 – Round 1

Appendix D6, Section D6.2.2.5 Recharge and Discharge Areas, 24. Please provide a range of estimates for recharge from precipitation to the aquifers within the permit boundary. Also, provide a discussion if this is the primary recharge mechanism for the aquifers within the permit boundary. (MK)

Response Muk 24 – Round 1

The estimated recharge rates from precipitation are summarized in Section 4.2.2 of Addendum MP-3. Addendum MP-3 describes recharge within the permit area in more detail than Section D6.2.2.5. A reference to MP-3 was added in Section D6.2.2.5.

Comment Muk 24 – Round 2

No comment received.

Response Muk 24 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment Muk 25 – Round 1

Appendix D6, Section D6.2.2.5 Recharge and Discharge Areas, 25. Consider providing a description of the soil properties within the permit boundary and the use of these percent soil distributions in the discussion of infiltration within the permit boundary. (MK)

Response Muk 25 – Round 1

The soil properties within the permit boundary are described in detail within Appendix D7. While different soil types are expected to have variable infiltration rates, the only infiltration rate that is significant for the coal aquifers is the infiltration rate assigned to the strata near the outcrop of the coal seams. Throughout the permit area the strata overlying the coal aquifer are generally dry. Therefore the primary source of recharge occurs at the outcrops. Scoria, in particular, plays a significant role in recharge of the coal seams because it usually occurs near the coal outcrop. Because of its highly permeable characteristics most of the precipitation that falls on the scoria infiltrates into the scoria where it either infiltrates into the coal or discharges along a seep line at the base of the scoria. As noted in the response to BJ Kristiansen's comment number 57, ash material between the base of the scoria and the coal seams sometimes limits how much of the water in the scoria actually comes into direct contact with the coal. Nevertheless, because a large percentage of precipitation falling on the scoria actually infiltrates into it, the scoria does provide a consistent water source for recharge into the coal outcrops. As noted in Addendum MP-3 Section 4.2.2 the scoria areas were delineated and assigned their own recharge zone because they do play a significant role in recharging the coal seams. Within the permit area, there are several locations where the coal seams outcrop as well. These outcrop areas were also assigned their own recharge zone because they also have a hydrologic connection to the coals. Since the strata overlying the coal seams to be mined in the Brook Mine are generally dry, the recharge component from the overburden to the coal is very low away from the outcrop areas. Because of the limited hydrologic interaction between the recharge at the surface and the coal in areas away from the outcrop, site specific changes in the recharge rates based on soil type will not impact the coal aquifers. For this reason additional analysis of the infiltration properties of the soils within the permit area represents a level of detail that is not necessary to describe the hydrologic impacts to the coal aquifers from the proposed mining operations.

Comment Muk 25 – Round 2

Response conditionally accepted. Please incorporate the response into the permit application to document the justification for not including additional analysis on infiltration. (MK)

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DEQ 34-058

Response Muk 25 – Round 2

The context of the response has been added as the second paragraph of Section D6.2.2.5 of Appendix D6.

Comment MuK 25 – Round 3

Response accepted.

Comment Muk 26 – Round 1

Appendix D6, Section D6.2.2.5 Recharge and Discharge Areas, 26. Page D6-18 states, "Collected groundwater elevation and hydrographs of the groundwater wells are found in Addendum D6-8". Please revise this statement to reference the correct addendum - Addendum D6-9. (MK)

Response Muk 26 – Round 1

The text has been updated to read "Collected groundwater elevation and hydrographs of the groundwater wells are found in Addendum D6-9".

Comment Muk 26 – Round 2

No comment received.

Response Muk 26 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 27 – Round 1

Appendix D6, Section D6.2.3 Baseline Water Quality, 27. Page D6-20 states, "A piper diagram of the groundwater wells with measured values is presented in Figure D6.2-1. Please provide a discussion on the water quality types observed at each aquifer (Example: Is the water quality type variable within an aquifer? If yes, explain the potential reasons for this observed variability) based on the piper diagram. (MK)

Response Muk 27 – Round 1

Section D6.2.3 has been updated as requested.

Comment Muk 27 – Round 2

No comment received.

Response Muk 27 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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DEQ 34-059

Comment Muk 28 – Round 1

Appendix D6, Section D6.2.3 Baseline Water Quality, 28. Page D6-20 states, "The constituents that most frequently exceed the standard concentration limitations are ammonia, TDS, sulfate and manganese". Please clarify if these constituents exceed the Chapter 8 standards at *all* the monitor wells. (MK)

Response Muk 28 – Round 1

Please refer to the Tables D6.2-8 thru D6.2-17 for exceedances of water quality based on Chapter 8 standards. Based on the tables, the concentrations are not exceeded at all monitor wells. No text edits were made in response to this comment.

Comment Muk 28 – Round 2

No comment received.

Response Muk 28 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment Muk 29 – Round 1

Appendix D6, Section D6.2.4 Groundwater Rights, 29. Page D6-20 states, "Adjacent and on-site groundwater rights are listed in Appendix E2 in the Adjudication Volume." Cheyenne copy of the TFN does not have a sheet separator and a tab for Appendix E2 in the Adjudication volume. Please provide a sheet separator and tab for Appendix E2. (MK)

Response Muk 29 – Round 1

Refer to Comment DM3. Groundwater rights are provided in Appendix B of the Adjudication Volume. This text edit has been made in Section D6.2.4.

Comment Muk 29 – Round 2

Response not accepted. The response indicates Appendix B and the updated text indicated Appendix B2. Please clarify if that is Appendix B or Appendix B2. (MK)

Response Muk 29 – Round 2

The text in Section D6.2.4 was corrected to reference Appendix B as opposed to Appendix B2.

Comment MuK 29 – Round 3

Response accepted.

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DEQ 34-060

Comment Muk 30 – Round 1

Appendix D6, Section D6.2.4 Groundwater Rights, 30. Page D6-20 states, "Adjacent and on-site groundwater rights are listed in Appendix E2 in the Adjudication Volume." Please provide a summary discussion/statistics on (i) total number of water rights, (ii) number of wells, (iii) aquifer, (iv) permitted water use and other relevant summary statistics. (MK)

Response Muk 30 – Round 1

Groundwater rights are listed in Appendix B of the Adjudication Volume. All of the aforementioned information is listed for each water right. Due to the constantly changing nature of water rights, a summary table is difficult to construct, and due to summary statistics not being required by WDEQ regulation, a summary statistics table has not been prepared.

Comment Muk 30 – Round 2

Response not accepted. It is acknowledged and noted that water rights vary with time. The intent of this comment is to request a summary of the raw data on the water rights presented in Appendix B, which is a snapshot in time before the approval of the proposed operations. It will enable the reviewers to get a clear understanding of the existing groundwater water uses and if there is a significant dependence on the affected aquifers. In addition, it is very useful information for the CHIA to provide a summary on the groundwater hydrologic concerns within the impact area. Please summarize (i) total number of water rights, (ii) number of wells (iii) wells grouped by aquifer and (iv) permitted water use. Example: Sum the total number of wells, provide a description on the percent of different types of uses. (MK)

Response Muk 30 – Round 2

A summary table (Table D6.2-18) has been added to Appendix D6. Text referencing this table has been added to Section D6.2.4, as well as text referencing discussion of impacted wells found in Addendum MP-3. Table D6.2-18 summarizes the total number wells not including cancelled, expired, abandoned, or suspended water rights. The table lists the permitted water use, the number of wells for each permitted water use, and the percent of total for each permitted use category. The table does not group the wells by aquifer. With nearly 500 wells being reported, the research required to determine the aquifer that each well is completed in would be exhaustive and, ultimately, not possible. Additionally, upon review of several of these water rights, one will note that most water rights have poor completion information. Water rights have either no lithology or have lithology that is so nondescript that a specific aquifer cannot be determined.

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DEQ 34-061

Comment MuK 30 – Round 3

Response accepted.

Comment Muk 31 – Round 1

Appendix D6, Section D6.2.4 Groundwater Rights, 31. Please provide a discussion (or reference) on the premine groundwater use (including the uses reported to SEO) within the permit boundary and the adjacent areas. (MK)

Response Muk 31 – Round 1

The premine groundwater uses as reported to the SEO within the permit boundary and the adjacent 3 miles are listed with each individual water right in Appendix B of the Adjudication Volume.

Comment Muk 31 – Round 2

Response not accepted. In addition to the reference to Appendix B, please include a textual description and summary of the premine groundwater use within the permit boundary and adjacent areas. (MK)

Response Muk 31 – Round 2

The text in Section D6.2.4 has been changed to include a discussion listing the predominant water uses in permit area and the adjacent 3-mile buffer. The text references the newly created Table D6.2-18 for a groundwater use summary.

Comment MuK 31 – Round 3

Response accepted.

Appendix D7

Comment DS 6 – Round 1

Appendix D7, Exhibit D7.3.-1 was compared with Exhibit MP.1-1. As required, it appears that the soil sampling was concentrated in areas where surface disturbance is to be expected. Please provide the contour interval on the soils map. For ease of review and to prevent misinterpretation, however, the map showing sampling locations should also clearly show the locations of proposed surface disturbances instead of providing these details on separate maps which may or may not present differing scale distances.

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DEQ 34-062

Response DS 6 – Round 1

The disturbance boundary can be found on Figure D7.1-1 and as the reviewer noted on Exhibit MP.1-1. No revision to exhibit D7.3-1 has occurred in response to this comment.

Comment DS 6 – Round 2

Response is not adequate. Please show the proposed surface disturbance locations on Exhibit D7.3.-1.

Response DS 6 – Round 2

Please refer to Comment DS 22 of the Mine Plan. Soil polygons have been added to Exhibit MP.4-2 integrating the disturbance boundary with the associated soil polygons. No revision to Exhibit D7.3-1 has occurred in response to this comment.

The reasoning behind this is to separate Mine Plan disturbance from baseline studies. It is RAMACO's opinion that baseline studies should only show those conditions prior to RAMACO's proposed operations. Additionally, when future revisions to the Mine Plan are potentially made, references to the Mine Plan in baseline studies could inadvertently be missed causing mistakes in the permit. However, RAMACO is open to showing baseline information within the Mine Plan for an easier evaluation of topsoil types stripped within the topsoil stripping areas.

Comment DS 6 – Round 3

No comment received.

Response DS 6 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DS 7 – Round 1

Appendix D7, Page D7-4. The second paragraph of this page contains text that should be deleted. It states "If for whatever reason overall sampling intensity.....was determined to not be enough, it is proposed that any additional sampling be deferred and included a stipulation of a future pre-stripping soil assessment program." The Mine Plan and Reclamation Plan soils handling and replacement is contingent on adequate baseline sampling of the proposed area that will be affected by mining operations (topsoil balance and stockpile location planning and bond calculation). Therefore, baseline sampling for soils must be adequate prior to approval of any permit application. Please remove the inappropriate language from the Appendix D7 text. If future changes to the Mine Plan require additional soil sampling the issue will be addressed at that time.

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DEQ 34-063

Response DS 7 – Round 1

As requested, the second sentence of the second paragraph on page D7-4 has been deleted.

Comment DS 7 – Round 2

No comment received.

Response DS 7 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 8 – Round 1

Appendix D7, Page D7-9. Text appears in this section that upon NRCS declaration of prime farmlands occurring in the permit area, a letter will be provided to the DEQ. A letter from the NRCS has been received and inserted in the permit declaring no prime farmlands to exist. The text, therefore, is not appropriate and should be removed.

Response DS 8 – Round 1

As requested, the sentence about prime farmland (the last sentence of the first full paragraph on page D7-9) has been deleted. A new reference, citing the letter received on October 31, 2015 (negative determination of prime farmland on Ramaco permit area) has been inserted on page D7-9 and the new reference has been added to the list of references on page D7-33.

Comment DS 8 – Round 2

No comment received.

Response DS 8 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 9 – Round 1

Appendix D7, WS § 35-11-415(b)(iii) and the Coal Rules, Chapter 4, Section (c)(ix) state that if topsoil is virtually nonexistent or is not capable of sustaining vegetation then subsoil or a selected spoil material may be used as a topsoil or subsoil supplement. Additionally, due to the proximity of this mine to the Tongue River, a Class 2AB stream, limits for chemical contaminants will be imposed on discharges from the permit. Therefore, for areas where unsuitable or marginal topsoil chemistry is located (e.g. Wibaux channery loam, sample R13), an alternative soil replacement material should be identified and used in reclamation. Such a commitment must also be provided in the Mine Plan and Reclamation Plan to provide evidence that such issues that could affect the condition of reclamation and/or lead to off-site impacts will be addressed.

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DEQ 34-064

Response DS 9 – Round 1

No "alternate soil replacement material" is necessary for areas of Wibaux channery loam (Map Unit Wx). The lower soil material below 8 inches of Wibaux (any "C" horizon soil substratum below 8 inches, where existent) was not recommended for salvage and would be grouped with the overburden spoil for placement purposes. This lower material had an excessive volume of hard coarse fragments (>35%) and, based on one of the three Wibaux sample sites (R13), an "unsuitable" EC and SAR value for the 8 to 15 inch depth, EC=12.8 and SAR=17.3. Two new sentences, indicating no soil salvage of Wibaux below 8 inches in depth, has been added to the soils report on page D7-26, one sentence each for Map Unit Wx and Map Unit Wx-RO. Furthermore, the amount of suitable soil available for salvage across the entire proposed disturbance area is not limiting, with a calculated weight-average of 20.2 inches. Therefore, additional "alternate soil replacement material" is not necessary.

Comment DS 9 – Round 2

No comment received.

Response DS 9 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 10 – Round 1

Appendix D7, The description of Map Unit G (Bauxson Loam, sample R-19) does not show marginal selenium that occurs between 22 – 48 inch depth range which could affect the salvage depth and may require special handling of the marginally suitable subsoil.

Response DS 10 – Round 1

Two new sentences have been added to the last paragraph on page D7-21 stating the presence of "marginal" rated Selenium values for lower material of Bauxson loam (Map Unit G) sample site R19. Strictly speaking, "marginal" rated soil material is not "unsuitable" and does not need to be specially handled. This lower Bauxson material has been recommended for salvage as "Subsoil", not "Topsoil'.

Comment DS 10 – Round 2

No comment received.

Response DS 10 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DS 31 – Round 2 (New Comment)

Section D7-2, Page D7-3 – A quotation and reference related to Schellinger, 2014, must be removed from the permit document as must all other quotations not supported by LQD documentation.

Response DS 31 – Round 2 (New Comment)

This quotation and reference is supported by LQD documentation. Please refer to Exhibit D7.2-1 of Appendix D7 which is a memorandum authored by David Schellinger, Soils Specialist on June 14, 2014. The quotation on page D7-3 accurately represents the sentence in the memorandum. Therefore, the quotation and reference remain in Appendix D7 as evidence for the extent of soil sampling in the Brook Mine permit area.

Comment DS 31 – Round 3 (New Comment)

Response is not adequate. The LQD Administrator has determined that LQD staff quotations not directly attributed to peer reviewed documents or documents signed by LQD staff should not be used in the text of permit documents; the quotes have no standing. The quotation of Mr. Schellinger, 2014, related to the survey required on affected areas where surface excavation would not occur must be removed.

Response DS 31 – Round 3 (New Comment)

The author of the citation has been revised to Wyoming Department of Environmental Quality (WDEQ-LQD). 2014b. However, the quotations and reference for the Memorandum to File remain in the text. As previously stated the quotation accurately represents the sentence in the memorandum as evidence for the extent of soil sampling in the Brook Mine permit area therefore the quotations will remain.

Appendix D8

Comment JJ 1 – Round 1

Appendix D8, 1. Please update the permit boundaries so that they are the same on Exhibit D8. 2-1 and Addendum D8 Map 1. I note specifically that lands should not be included within the permit boundary south of the interstate and that Section 10 TWN57N RNG85W displays different boundaries along the far west edge of the permit; it appears that the section lines are skewed between the two maps. The Addendum D8 Map 1 also is missing a sizeable amount of lands located in Section 21 TWN54N RNG84W which are included within the permit boundary of the Adjudication Exhibit 1 map. While comparing the maps I find that the maps display the same information in slightly different formats, please explain the necessity for two individual maps and at a minimum make them consistent against one another.

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DEQ 34-066

Response JJ 1 – Round 1

Baseline vegetation assessment maps have been updated to include the correct permit boundary. The discrepancy in the permit boundary is attributed to the difference in graphical representation between a USGS quad system and a PLSS system. The USGS quad system is now depicted. Exhibit D8.2-1 is a summary map for this Appendix and future updates made to this Appendix. This map will change throughout the life of the mine as future changes are incorporated. Addendum D8 Map 1 is for this Addendum and will not change throughout the life of the mine.

Comment JJ 1 – Round 2

The response is acceptable. The DEQ now understands the two separate maps and the boundaries now match.

Response JJ 1 – Round 2

Round 1 response is adequate. No response is necessary.

Comment JJ 2 – Round 1

Appendix D8, 2. Why does the study area not include all lands within the proposed permit boundary?

Response JJ 2 – Round 1

Portions of the proposed Brook Mine permit area not included within the study area were added during an October 2014 permit boundary change following completion of the baseline vegetation study. Additional studies were not conducted in these areas due to the limited size and similarity to areas within the study area. Section D8-1.1, page D8-1-5 text has been updated to explain the exclusion of these areas.

Comment JJ 2 – Round 2

The DEQ rules and regulations require vegetative characterization and baseline data for the entire permit area. Therefore, the lands located in Section 21, 22, and 15 that had not been previously included in the 2013 vegetation study area will require further attention. Please contact the DEQ to discuss the required baseline vegetation surveys. Due to the nature of the missing baseline vegetation data more comments may occur once all the data is submitted and applicable tables are updated.

Response JJ 2 – Round 2

The lands that are located in Sections 21, 22, and 15 that were not previously sampled in 2013 were sampled during 2015 quantitative baseline vegetation fieldwork. The data gathered for the areas in the above listed sections will be summarized for the WDEQ when the vegetation report is completed. The study area also needs to be

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updated on both Exhibit D8.2-1 and Addendum D8 Map 1, and will be provided to WDEQ in a supplemental submittal.

Comment JJ 2 – Round 3

Comment remains open until the data is provided and reviewed.

Response JJ 2 – Round 3

Addendum D8-1 text and Addendum D8-1 Table D8-2 have been revised to include the additional areas for the Brook Mine Study Area. Exhibit D8.2-1 and Addendum D8-1 Map 1 have been revised to include the updated Brook Mine Study Area boundary.

Comment JJ 3 – Round 1

Appendix D8, 3. The acreage displayed on Table D8.2-1 should equal that of the land permitted on the Form 11. The Form 11 displays 4,548.8 acres while the table shows 4,581.7 acres a difference of 32.9 acres. Please update either the Form 11 or Table D8.2-1 to show the true permit acreage as it relates to the vegetation communities. Upon further review I find that Table D8-2 located on page Addendum D8-1-41 exhibits the proper acreages in relation to the Form 11, thus the values represented there may be more accurately displayed in Table D8.2-1.

Response JJ 3 – Round 1

Total acreage of the permit area is 4,548.8 acres as illustrated in Form 11 and Table D8-2. Table D8.2-1 has been updated to reflect the correct acreage.

Comment JJ 3 – Round 2

The response is acceptable.

Response JJ 3 – Round 2

Round 1 response is adequate. No response is necessary.

Comment JJ 4 – Round 1

Appendix D8, 4. Table D8.2-1 states there are 56 acres of agricultural lands; however, I am unable to locate Agricultural lands north of the interstate. Please, discuss and edit the values to display true acreages in relation to the proposed permit boundary. (See comment 3 for more clarification and another table for utilization to update values.)

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Response JJ 4 – Round 1

Agricultural Lands within the permit area total 4.5 acres and are located in Section 21 TWN54N RNG84W. Table D8.2-1 has been updated to reflect the correct acreage of Agricultural Lands and other vegetation communities within the permit boundary.

Comment JJ 4 – Round 2

The response is acceptable.

Response JJ 4 – Round 2

Round 1 response is adequate. No response is necessary.

Comment SP 3 – Round 1

Appendix D-8 Vegetation Baseline, Page D8-3. Section D8.1.7. Guideline 2 is a non coal guideline. Please revise this sentence to reference the equation shown in Section D8-1.2.9 Sample Adequacy.

Response SP 3 – Round 1

Changed as requested. Additionally, Appendix D8 reference to Guideline 2 was replaced by reference for Chapter 2 in Section D8.1.1, page D8-1 and Section D8.3, page D8-4. Addendum D8 reference to Guideline 2 was replaced by reference for Chapter 2 in Section D8-1.2, page D8-1-5 and Section D8-1.9, page D8-1-38. Reference to Guideline 2 was removed from Section D8-1.2.9, page D8-1-12.

Comment SP 3 – Round 2

No comment received.

Response SP 3 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 3 – Round 3

The response is satisfactory. The references to Guideline 2 have been removed.

Comment SP 4 – Round 1

Appendix D-8 Vegetation Baseline, Page D8-4. Section D8.1.8. Please revise the second sentence to, "The EXREFA is all of the unaffected area for each native vegetation community."

Response SP 4 – Round 1

Changed as requested.

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Comment SP 4 – Round 2

No comment received.

Response SP 4 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 4 – Round 3

The response is satisfactory. The term EXREFA has been incorporated.

Comment SP 5 – Round 1

Appendix D-8 Vegetation Baseline, Page D8-1-8. Section D8-1.2.4. The last sentence in this section states that no sample locations occurred within the Brook Mine Permit Area. AG-13, 14, 17 and 25 are shown on Addendum: D8, Map 1 inside the permit area. Please correct this statement or the permit boundary on the Map.

Response SP 5 – Round 1

Baseline vegetation assessment maps have been updated to include correct permit boundary which illustrates AG-13, 14,17, and 25 are not located within the permit boundary.

Comment SP 5 – Round 2

No comment received.

Response SP 5 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 5 – Round 3

The response is satisfactory. The permit boundary has been corrected so that no Agricultural transects fell within the permit boundary.

Comment SP 6 – Round 1

Appendix D-8 Vegetation Baseline, Page D8-1-11. Section D8-1.2.8. The last sentence of the first paragraph should be revised to, "Sample adequacy was not required for species diversity and composition."

Response SP 6 – Round 1

Changed as requested.

Comment SP 6 – Round 2

No comment received.

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Response SP 6 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 6 – Round 3

The response is satisfactory. A sentence on sample adequacy for species diversity and composition has been revised.

Appendix D9

Comment DM 4 – Round 1

Appendix D9-Wildlife, Page D9-3 states that when a sage grouse confirmation letter is provided by WG&F, it will be provided to DEQ. It appears that the confirmation letter is already part of the package (Page D9-E3). Please reference the location of the letter.

Response DM 4 – Round 1

Page D9-3 was revised to reference Page D9-E3 as the location of the letter.

Comment DM 4 – Round 2

No comment received.

Response DM 4 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment WGF 1 – Round 1

(Appendix D9), We recommend this report become part of the annual reporting which will ensue throughout the operation of the mine.

Response WGF 1 – Round 1

Discussion was added at the end of Addendum D9-1 Section D9-1.6 on Page Addendum D9-1-31 titled "Monitoring and Mitigation" that references the sections of the Mine Plan where the annual wildlife report commitments are contained.

Comment WGF 1 – Round 2

No comment received.

Response WGF 1 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment WGF 2 – Round 1

(Appendix D9), We suggest coordinating with the USFWS regarding raptor mitigation as needed through the mining process.

Response WGF 2 – Round 1

The commitments to coordinate with the USFWS regarding raptors as well as T&E and other species of federal concern are provided in Section MP.18, Addendum MP-8 and Addendum MP-9 of the Mine Plan. Discussion was added at the end of Addendum D9-1 Section D9-1.6 on Page Addendum D9-1-31 titled "Monitoring and Mitigation" that references these discussions.

Comment WGF 2 – Round 2

No comment received.

Response WGF 2 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment WGF 3 – Round 1

(Appendix D9), We recommend mining reclamation practices consider providing suitable habitat for existing wildlife within the specifications required by DEQ-LQD.

Response WGF 3 – Round 1

The commitments to reclaim wildlife habitats are provided in the Reclamation Plan in Section RP.7 Wildlife Restoration. Discussion was added at the end of Addendum D9 - 1 Section D9-1.6 on Page Addendum D9-1-31 titled "Monitoring and Mitigation" that references the Reclamation Plan.

Comment WGF 3 – Round 2

No comment received.

Response WGF 3 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Appendix D10

Comment BJ 63 – Round 1

EXHIBITS, Addendum D10, The permit boundary layer on all of the exhibits covering the aquatic resource boundaries is incorrect. Please correct the permit boundary layers.

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Response BJ 63 – Round 1

Aquatic resource inventory maps have been updated to include the correct permit boundary.

Comment BJ 63 – Round 2

No comment received.

Response BJ 63 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DM 5 – Round 1

Appendix D10-Wetlands, D10-1.4 – Please include a copy of the letter requesting concurrence and jurisdictional determination sent to the ACOE At the end of the text, and reference the letter in the text.

Response DM 5 – Round 1

BKS Environmental Associates, Inc., on behalf of RAMACO, requested concurrence and jurisdictional determination from the USACE on May 29, 2015. A copy of the letter sent to the USACE has been included as Attachment D10-F. Section D10-4, page D10-10 text has been updated to reflect submittal of USACE request.

Comment DM 5 – Round 2

No comment received.

Response DM 5 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 45 – Round 1

Appendix D10-Wetlands, Section D10.2 Results, 19. The text may want to state when (what date) RAMACO requested the jurisdictional determination from the USACE, and include this request letter as an Addendum to Appendix D10. This would provide documentation that the request was submitted, as receipt of the USACE determination may lag behind the LQD permitting process. (MDK)

Response MK 45 – Round 1

See response to DM5.

Comment MK 45 – Round 2

No comment received.

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Response MK 45 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Appendix D11

Comment BJ 26 – Round 1

Appendix D11, Alluvial Valley Floor, Section D11.1, RAMACO has requested LQD to make a determination on the nature of the drainages as potential AVF within the permit boundary as well as within ½ mile of the permit boundary. This would then entail analysis of the following drainages (distances are approximations): • Hidden water Creek – all (4 mi.)

• East Fork Earley Creek – lower 1 mile

• Slater Creek – lower 3 miles

• Tongue River – ½ mi. east of Interstate 90 and 4 mi. west of Interstate 90 at the Acme exit.

Prior to such a declaration, LQD staff will have to perform a variety of assessments designed to assist us in making a declarative statement about AVF classification. An AVF declaration will be made after in-depth study of the drainages. Such investigation will consist of, but not be limited to:

1. Field evaluation of the geomorphic and lithologic character of the drainages in question;

2. Determination of the agricultural characteristics of the stream course;

3. Examination of available bore hole logs that can be used to characterize the subsurface materials beneath the valley floor;

4. Determination of groundwater and surface water characteristics, both quantitative and qualitative, within the drainages in question;

5. Other evaluation processes that may be deemed necessary should initial findings warrant further, in-depth analyses.

Response BJ 26 – Round 1

Revised D11 text throughout to expand discussion on the drainages mentioned above. Incorporated previous AVF studies into Appendix D11. Information satisfying each statement can be found in the following locations as well as many other locations throughout the document:

1. Borehole logs provided in Addendum D11-3. Hidden Water Creek test pits dug by Big Horn Mine and discussed in Section D11.3 "Stream Laid Deposits."

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2. Agricultural characteristics of the stream courses are discussed in Sections D11.4.2, D11.4.3, and D11.5, in particular.
3. Bore hole logs are provided in Addendum D11-3. Additional test pit and borehole information was analyzed from the Big Horn Mine Permit No. 213.
4. Groundwater and surface water characteristics are discussed extensively in Appendix D6. Potential impacts to surface water and groundwater are discussed in the Mine Plan. The water resources are generally discussed in Section D11.4.
5. Additional research has been incorporated from the Big Horn Mine Permit No. 213. Corrections and reevaluations of the AVF study have been made throughout Appendix D11.

Comment BJ 26 – Round 2

The response to the Round 1 comment is adequate. The original comment from round 1 was intended to create dialogue between Brook Mine Brook Mine and LQD:

a) The first goal was to engender further discussion in the permit document covering baseline information regarding the nature of all potential AVFs within the permit boundary. The Round 1 Response effectively established a starting point for both LQD and Brook Mine.

b) Now that there is a common foundation for all parties, field analysis and data studies can be initiated. This work needs to be scheduled.

c) Brook Mine must provide written surface owner consent enabling LQD staff access to all acreages covered in the AVF determination analysis. This includes lands defined in Round 1, BJ comment 26, itemized stream lengths by stream name and distance.

Response BJ 26 – Round 2

A field analysis and data study of the potential AVFs within the permit boundary and adjacent areas was scheduled for September 24, 2015. RAMACO has provided LQD personnel with written surface owner consent enabling LQD staff to access acreages covered in the AVF determination analysis. No edits to the text were made in response to this comment.

Comment BJ 26 – Round 3

No comment received.

Response BJ 26 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

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Comment BJ 70 – Round 3

An AVF determination for Slater Creek has yet to be finalized. The site was visited by LQD staff on September 24, 2015 for the purpose of gathering field data for the future AVF determination. This determination is in the process of analysis of data and a decision will be issued by the beginning of 2016.

Response BJ 70 – Round 3

No response required. No changes were made in response to this comment.

Comment BJ 27 – Round 1

Appendix D11, Alluvial Valley Floor, Addendum D11-3, Some of the borehole and well logs indicate a damp or wet interval encountered during drilling. Was an attempt made to allow wet materials to produce water prior to continuation of the hole or was water noted after adding another drill steel and lowering the kelly to begin the next 20 feet of hole? Typically, after the steel has been added and the compressor is engaged, a small amount of water can be air-lifted before the rotary table begins to turn. If so, are there field notes indicating water was observed during the connection?

Response BJ 27 – Round 1

It is standard procedure during drilling operations to provide wet or damp intervals an opportunity to produce water. If the intervals had produced water, this would have been noted in the drilling logs provided in Addendum D11-3. There are no other separate field notes that would provide additional information. No changes to the text were made.

Comment BJ 27 – Round 2

No comment received.

Response BJ 27 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 1 – Round 1

Appendix D11-AVF, Section D11.1 Introduction, 1. In the second paragraph on Page D11-1, the possible impacts of the proposed mining operation on the Tongue River AVF are dismissed because the area is planned for facilities level disturbance only. However, the groundwater model (Mine Plan Addendum MP-3) predicts drawdown in the Tongue River alluvium, thereby possibly affecting the AVF. As discussed in subsequent comments, additional analysis and monitoring is needed to comply with LQD Coal Rules and Regulations regarding AVFs. (MDK)

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Response MK 1 – Round 1

Revised text to reference Mine Plan Section MP.6 concerning the Brook Mine's effect on the Tongue River AVF.

Comment MK 1 – Round 2

Response not accepted. Mine Plan Section MP.6 does not explicitly mention or discuss the Tongue River AVF, or AVFs in general. Please provide a more thorough discussion in MP.6 on the possible effects of mining on the AVFs, particularly the Tongue River AVF with respect to drawdown in the Tongue River alluvium. Please also see the review of the response to Comment MK 21 below. (MDK)

Response MK 1 – Round 2

Discussion of the Tongue River and Goose Creek AVFs and their associated impacts has been added to the Mine Plan in Section MP.25. In addition, a reference to this section was added to Section D11.7 in Appendix D11 and Section MP.6 in the Mine Plan. As discussed in the text, no significant impacts to the alluvial valley floors within and adjacent to the permit area are expected as no mining is planned within these areas. Potential minor impacts that could occur is the insignificant loss of water due to temporary loss of flow from ephemeral tributaries contributing to the Tongue River and Slater Creek.

Comment MK 1 – Round 3

Response accepted.

Comment MK 2 – Round 1

Appendix D11-AVF, Section D11.2 Purpose and Scope, 2. On Page D11-2, please change "Wyoming Reclamation Act" to "Wyoming Environmental Quality Act". (MDK)

Response MK 2 – Round 1

Revised text to state "Wyoming Environmental Quality Act."

Comment MK 2 – Round 2

No comment received.

Response MK 2 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 3 – Round 1

Appendix D11-AVF, Section D11.3 Stream Laid Deposits, 3. For identification of unconsolidated stream laid deposits, LQD Guideline No. 9 (AVF) lists two items that may be used to positively identify unconsolidated streamlaid deposits: (1) channel

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bars, splays, abandoned meanders, modern flood plains, or terraces, and (2) bedload or washload sediment deposited or transported in a nonbedrock channel bottom. Presumably, item (2) would be met at the streams identified within the AVF study area. However, the permit application does not address whether the channels contain geomorphic features from item (1). Please address in the text whether channel bars, splays, abandoned meanders, modern flood plains, or terraces are observed within the streams within the AVF study area. (MDK)

Response MK 3 – Round 1

Revised text to discuss the lack of channel bars, splays, abandoned meanders, modern flood plains, and terraces that qualify for AVFs in the Hidden Water Creek, Slater Creek, East Fork Earley Creek, and Earley Creek valleys.

Comment MK 3 – Round 2

No comment received.

Response MK 3 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 4 – Round 1

Appendix D11-AVF, Section D11.3 Stream Laid Deposits, 4. On Page D11-5, the conclusion that the materials in Hidden Water Creek valley do not meet the definition of unconsolidated streamlaid deposits, is in conflict with the conclusion from the Big Horn Mine Permit. The Big Horn Mine Permit (Appendix D6, Pages D6-151 to D6-158) describes the evaluation of unconsolidated streamlaid deposits on lower Hidden Water Creek. The permit states: "The conclusion verified from the pit observations is that these deposits are unconsolidated and stream laid. Small isolated patches of colluvium or bedrock can be found throughout the alluvial deposits, but these characteristics do not exclude the deposit from being stream laid." Please evaluate the data and findings from the Big Horn Mine Permit before a conclusion is drawn about the absence of unconsolidated streamlaid deposits on Hidden Water Creek. (MDK)

Response MK 4 – Round 1

Revised text to discuss the findings of the Big Horn Mine from test pits in the Hidden Water Creek valley. Additionally, Exhibit D11.3-1 was revised to show the locations of the Big Horn Mine test pits in Hidden Water Creek in relation to both the Brook Mine permit area and the Big Horn Mine permit area. Added the Big Horn Mine Permit State Decision Document (SDD) 213-T2 to Addendum D11-2.

Comment MK 4 – Round 2

No comment received.

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Response MK 4 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 5 – Round 1

Appendix D11-AVF, Section D11.3 Stream Laid Deposits, 5. The Big Horn Mine Permit also describes subirrigation and flood irrigation studies on lower Hidden Water Creek and concludes: "Due to the lack of subirrigation and extremely low potential for flood irrigation, Hidden Water Creek is not an alluvial valley floor." Although this is in the approved mine permit, it does not appear that an explicit AVF determination for Hidden Water Creek was ever issued by the LQD, and the AVF findings in the SDDs for the Big Horn Mine Permit do not mention Hidden Water Creek. The Brook Mine Permit application should incorporate these previous AVF studies on Hidden Water Creek into Appendix D11. (MDK)

Response MK 5 – Round 1

See response to comment MK 4. Additionally, while the Big Horn Mine State Decision Documents do not mention Hidden Water Creek, the SDD 213-T2 states that "No other drainages are of significant size or lack the stream laid deposits necessary to be an Alluvial Valley floor within the renewal and/or amendment areas." Hidden Water Creek is located within the renewal area and was not included within the originally declared AVF area. Although it was not mentioned by name, it has been declared not to be an AVF within the Big Horn Permit Area. This SDD has been added to Addendum D11-2 and discussion added to the text in Section D11.3.

Comment MK 5 – Round 2

No comment received.

Response MK 5 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 6 – Round 1

Appendix D11-AVF, Section D11.4.2 Extent of Subirrigation, 6. On Page D11-6 it is stated the three monitor wells were installed along the thalweg of Slater Creek. The transects in Exhibit D11.3-2 show that two of the wells (578513-AL and 578418-AL) are not along the thalweg but are rather upgradient of the channel. Please revise this description in the text. (MDK)

Response MK 6 – Round 1

Revised text to more accurately state that the monitor wells are along or near the thalweg.

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Comment MK 6 – Round 2

No comment received.

Response MK 6 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 7 – Round 1

Appendix D11-AVF, Section D11.4.2 Extent of Subirrigation, 7. It appears that from Exhibit D11.1-1 that subirrigation is occurring on Earley Creek within the AVF study area. Please explain why subirrigation was not mapped on Earley Creek. (MDK)

Response MK 7 – Round 1

Revised Exhibit D11.1-1 to show potentially subirrigated lands on Earley Creek. The text was revised in Section D11.4.2 to reflect that subirrigation potentially occurs along Earley Creek.

Comment MK 7 – Round 2

No comment received.

Response MK 7 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 8 – Round 1

Appendix D11-AVF, Section D11.4.2 Extent of Subirrigation, 8. On Page D11-6, second paragraph, the alluvial/colluvial potentiometric surface is dismissed as a source of subirrigation along Slater Creek. However, the other hydrologic processes responsible for the subirrigation are not identified. Please discuss in the text why subirrigation is occurring along Slater Creek. (MDK)

Response MK 8 – Round 1

Revised text to discuss the presence of burn areas overlying residual coal ash bands that serve as aquacludes which prevent water from entering or escaping the coal below.

Comment MK 8 – Round 2

No comment received.

Response MK 8 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 9 – Round 1

Appendix D11-AVF, Section D11.4.2 Extent of Subirrigation, 9. The cross-sections in Exhibit D11-3-2 would be improved if the active channel and any floodplains or terraces were shown. A description of the materials in the active channel bottom would also help identify unconsolidated streamlaid deposits. (MDK)

Response MK 9 – Round 1

Revised Exhibit D11.3-2 to show the 2-year, 24-hour flood inundation area and the location of the active channel. Data regarding the materials in the active channel bottom are presented in the borehole logs in Addendum D11-3.

Comment MK 9 – Round 2

Response not accepted. The cross-sections were updated as requested but it is not clear if the materials from the borehole logs truly represent the active stream channel, as many of the borehole logs are shown to be tens to hundreds of feet away from the active channel. Please provide a description of the materials in the active channel bottom of both Hidden Water Creek and Slater Creek. (MDK)

Response MK 9 – Round 2

Borehole locations were chosen in areas that would represent the natural extent of the alluvium in the channel and those that could be accessed in order to obtain these boreholes. So while boreholes are located ten to a hundred feet off the natural channel in actuality, these areas are the closest location that could be physically accessed to obtain the boreholes due to the limitations of the drilling equipment. In addition, to ensure the boreholes were drilled in a location that was properly depicting the potential alluvial/colluvial material of the channel, the presence of scoria alluvial/colluvial material was used as an identifier. As exhibited in Addendum D11-3, scoria material was recorded in the majority of borehole logs. Text has been added to Section D11.3 regarding the selection of borehole locations.

Comment MK 9 – Round 3

Response accepted.

Comment MK 10 – Round 1

Exhibit D11.4-1, the extent of irrigated lands shown in Sections 2 and 11 along Slater Creek may not be correct. According to the summary for the Hart Brothers Ditches water right (permit 1317) in the SEO database, the land being irrigated under the water right has decreased to 23 acres:

> THIS FACILITY IS MADE UP OF TWO DITCHES. THE WEST DITCH HAVING A POINT OF DIVERSION IN LOT 2 AND THE EAST DITCH HAVING A POINT OF DIVERSION IN THE SENE OF SECTION 3, T57N, R85W. T57N, AND 58N, R85W

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HAS BEEN DEPENDENTLY RESURVEYED. REQUEST FROM PADLOCK RANCH TO ELIMINATE 67 ACRES AS FOLLOWS: 32 ACRES IN THE SWSW OF SECTION 2 - 30 ACRES IN THE NENW AND 5 ACRES IN THE NWNW OF SECTION 11 ALL IN T57N, R85W, RECEIVED AND GRANTED. REQUEST OF ELIMINATION AND PROOF OF OWNERSHIP FILED IN MISCELLANEOUS NOTICES. ADJUDICATED WITH H.H. WILLIAMS AS APPROPRIATOR. PERMIT RECORD REFLECTS SOURCE AS SLATER CREEK AND WATER STORED IN THE HART BROTHERS RESERVOIR, P60R, XR7825A, HOWEVER CERTIFICATE RECORD REFLECTS .91 CFS FOR THE IRRIGATION OF 64 ACRES. BOC PETITION II 89-4-2 BY PADLOCK RANCH WAS GRANTED TO ISSUE AMENDED CERTIFICATE C77/290A TO REDESCRIBE LANDS WITHOUT CHANGING LAND TOTALS AND TO CHANGE POINT OF DIVERSION FROM THE RECORD POINT IN THE NWNE AND SENE OF SECTION 3, 57N, R85W AND PARTIAL MEANS OF CONVEYANCE FOR 41 ACRES (.59 CFS) TO THE WILLIAMS DITCH, P8710D, C77/289A DIVERTING WATER FROM SLATER CREEK IN THE SESW OF SECTION 34, T58N, R85W AS RECORDED IN ORDER RECORD BOOK 36, PAGES 385-390 AND RECEIVED ON CD3/578A. THIS LEAVES 23 ACRES STILL IRRIGATED UNDER THIS PERMIT. LANDS SHOWN BELOW AS "AME" AND "ELI" ARE THOSE ORIGINALLY DESCRIBED UNDER THIS DITCH.

Please clarify the irrigated acreage status for the Hart Brothers Ditches water right with the SEO and revise Exhibit D11.4-1 accordingly. (MDK)

Response MK 10 – Round 1

Exhibit D11.4-1 was revised to more accurately capture irrigated lands on Slater Creek in Sections 2 and 11 of Township 57 North, Range 85 West.

Comment MK 10 – Round 2

No comment received.

Response MK 10 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 11 – Round 1

Appendix D11-AVF, Section D11.4.4 Water Quality, 11. On Page D11-7, it is not necessary to mention the State of Montana water quality classifications of the Tongue River, as only State of Wyoming classifications and standards would apply. Please remove reference to the Montana standards. (MDK)

Response MK 11 – Round 1

Removed text referencing State of Montana water quality standards.

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Comment MK 11 – Round 2

No comment received.

Response MK 11 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 12 – Round 1

Appendix D11-AVF, Section D11.4.5 Agricultural Practices, 12. On Page D11-8, second paragraph, it states that Exhibit D11.1-1 shows that sufficient water supply does not exist for consistent agricultural practices in East Fork Earley Creek. However, Exhibit D11.4.1 shows a point of diversion for Earley Creek Ditch No. 1 and several areas of irrigated lands less than 40 acres in East Fork Earley Creek. As documented in Addendum D11-4, there is an adjudicated water right for irrigation in this location. So there may be sufficient water supply for consistent agricultural practices. The text needs to further expand on this discussion of East Fork Earley Creek since there is an adjudicated water right for irrigation. (MDK)

Response MK 12 – Round 1

Revised text to include the Earley Creek Ditch No. 1 water right, but explained that subirrigation must not be prevalent in East Fork Earley Creek because no culvert or other conveyance structure is present beneath I-90. If subirrigation was prevalent and without a conveyance structure beneath I-90, substantial amounts of water would back up against the interstate.

Comment MK 12 – Round 2

Response not accepted. Please also add to the text any history available on the Early Creek Ditch No. 1 water right and the irrigation associated with the water right. I looked at several years of aerial imagery and it does not appear that any areas have been irrigated under this water right in recent times. I am able to view what appears to be the headgate and two ditches. It is possible that irrigation was abandoned long ago, which would support the contention that there is not sufficient water supply for consistent agricultural practices. Nonetheless, the water right remains fully adjudicated according to the SEO water rights database, so more discussion of this area is warranted in the text. (MDK)

Response MK 12 – Round 2

Text at the end of the second paragraph of Section D11.5 was added regarding the Earley Creek Ditch No.1. As presented in the text, based on CIR, imagery of the area, vegetation studies and absence of a conveyance structure under Interstate 90, the Earley Creek Ditch No.1 doesn't appear to have been used for irrigation purposes for some time.

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DEQ 34-083

Comment MK 12 – Round 3

Response accepted.

Comment MK 13 – Round 1

Appendix D11-AVF, Section D11.4.5 Agricultural Practices, 13. On Page D11-8, last paragraph, it states that the hay meadows along Slater Creek in Sections 2 and 11 are not within the boundaries of subirrigation or natural flood irrigation.

> (a) The areas symbolized as irrigated lands in Exhibit D11.4-1 do not necessarily correspond to hay meadows, as the imagery shows hay meadows in the SWNE, SENE, and NESE of Section 11, and the NWSW of Section 12. The hay meadows appear to correspond with the area mapped as "AG" in the Vegetation Map (Exhibit D8.2-1) in Addendum D8.
>
> (b) The irrigated area shown in Exhibit D11.4-1 near the Landen Ditch does overlap with subirrigation mapped in Exhibit D11.1-1.

Please re-evaluate the area of hay meadows along Slater Creek and revise the text accordingly. Comments No. 15 and 16 below also relate to this issue. (MDK)

Response MK 13 – Round 1

The text was revised in Section D11.5 to reflect the presence of limited hay meadows and overlapping of irrigation with subirrigation on the upper reaches of Slater Creek in Sections 2, 3, 11, and 12 of Township 57 North, Range 85 West. Exhibit D11.4-1 was revised to show irrigation in Sections 2, 3, 11, and 12 of Township 57 North, Range 85 West.

Comment MK 13 – Round 2

No comment received.

Response MK 13 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 14 – Round 1

Appendix D11-AVF, Section D11.4.5 Agricultural Practices, On Page D11-8, last paragraph, it states that, besides Hart Bros Ditches, the remaining portion of the Slater Creek valley does not contain SEO water rights. This is not the case as Exhibit D11.4-1 shows Landen Ditch in the NENW of Section 11. This water right (P11695) does not appear in Addendum D11-4. Please revise the text and add this water right to Addendum D11-4. (MDK)

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DEQ 34-084

Response MK 14 – Round 1

The text was revised in Section D11.5 to discuss the Landen Ditch water right (P11695). A copy of the Landen Ditch water right was added to Addendum D11-4.

Comment MK 14 – Round 2

No comment received.

Response MK 14 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 15 – Round 1

Appendix D11-AVF, Section D11.4.5 Agricultural Practices, 15. The irrigated acreage for the Landen Ditch water right appears to be 18 acres for one point of use and 22 acres for a second point of use. Please add these areas to Exhibit D11.4-1. (MDK)

Response MK 15 – Round 1

Exhibit D11.4-1 was revised to more accurately reflect irrigated lands in the vicinity of the Landen Ditch.

Comment MK 15 – Round 2

No comment received.

Response MK 15 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 16 – Round 1

Appendix D11-AVF, Section D11.4.5 Agricultural Practices, 16. The Hall Ditch (SEO Permit 5195), mapped in Section 11 of Exhibit D11.4.1, apparently provides irrigation water for hayfields in the NESE of Section 11 (30 acres) and the NWSW of Section 12 (22 acres). This water right does not appear in Addendum D11-4. Please add this water right to the Addendum and add the irrigated acreages to Exhibit D11.4-1. (MDK)

Response MK 16 – Round 1

A copy of the Hall Ditch water right (SEO Permit 5195) was added to Addendum D11-4. Exhibit D11.4-1 was revised to depict irrigated lands in Section 12, Township 57 North, Range 85 West. The text in Section D11.5 was revised to discuss the Hall Ditch water right.

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Comment MK 16 – Round 2

No comment received.

Response MK 16 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 17 – Round 1

Appendix D11-AVF, Section D11.6 Extent of Alluvial Valley Floor, 17. Portions of Earley Creek and East Fork Earley Creek are within the AVF study area yet the permit application does not attempt to conclude if these streams contain AVFs. Presumably, the LQD will need to make an AVF finding on these streams. (MDK)

Response MK 17 – Round 1

See response to Comment BJ 26. Additional discussion has been added to aid WDEQ in the AVF findings of East Fork Earley Creek and Earley Creek. Both valleys are upstream of mining activities proposed by RAMACO such that no material damages are expected to either valley.

Comment MK 17 – Round 2

Response not accepted. Additional discussion was added for East Fork Earley Creek, but not Earley Creek. However, it is unclear from Comment BJ 26 if the LQD intends to make an AVF determination for Earley Creek. Additional response to this comment may be needed after checking with other LQD staff on whether or not a determination will be made for Earley Creek. (MDK)

Response MK 17 – Round 2

As discussed with LQD personnel, the majority of Earley Creek is outside of the permit area and ½ mile adjacent study boundary, however a small portion of the creek intersects the ½ mile study boundary in T.57N., R.84W. in the northwest quarter of Section 16 and southwest quarter of Section 9. These portions of land are outside of any planned surface disturbance and groundwater impacts to the area are not expected; therefore, a study of these lands was not included in Appendix D11. Discussion of Earley Creek will remain in Appendix D6. No changes to the D11 text were made in response to this comment.

Comment MK 17 – Round 3

Response accepted.

Comment MK 18 – Round 1

Appendix D11-AVF, Section D11.6 Extent of Alluvial Valley Floor, 18. The first bullet for Slater Creek on Page D11-9 dismisses the positive identification of unconsolidated

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stream laid deposits because a layer of colluvial material was found over alluvial material. However, as stated in Appendix D5 on Page D5-8 and Page D5-9, sub-rounding of the clinker present in the cuttings suggests water driven deposition of limited extent. Also, as discussed in Comment No. 3, the application did not evaluate unconsolidated streamlaid deposits in a manner that is consistent with identification criteria listed in LQD Guideline No. 9. The application has not provided sufficient evidence that unconsolidated stream laid deposits are not present along Slater Creek. (MDK)

Response MK 18 – Round 1

See response to Comment MK 3. The discussion on the Slater Creek valley has been further expanded to include the absence of unconsolidated stream laid deposits such as channel bars, splays, abandoned meanders, modern flood plains, and terraces that qualify for AVFs. Exhibit D11.3-1 clearly indicates the presence of undifferentiated alluvium and colluvium (Qac) in the Slater Creek valley.

Comment MK 18 – Round 2

No comment received.

Response MK 18 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 19 – Round 1

Appendix D11-AVF, Section D11.6 Extent of Alluvial Valley Floor, 19. The third bullet on Page D11-9 for Slater Creek should be clarified that the width of natural flood irrigation in the valley is generally insufficient to provide for economic agricultural practices. However, economic agricultural practices clearly occur immediately upstream of the proposed mine permit boundary because of artificial flood irrigation of hayfields adjacent to the channel. These practices are documented by existing water rights that are approximately 100 years old. Please revise this discussion. (MDK)

Response MK 19 – Round 1

The text in Section D11.6 of Slater Creek's third bullet was revised to include the irrigated hayfield upstream of the permit boundary.

Comment MK 19 – Round 2

No comment received.

Response MK 19 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 20 – Round 1

Appendix D11-AVF, Section D11.6 Extent of Alluvial Valley Floor, 20. The fifth bullet for Hidden Water Creek on Page D11-9 seems to dismiss the positive identification of unconsolidated stream laid deposits because of colluvial material with shallow bedrock. However, as previously noted, this conflict with information in the Big Horn Mine permit concerning unconsolidated stream laid deposits on Hidden Water Creek. (MDK)

Response MK 20 – Round 1

Refer to response of Comment MK 4. The Big Horn Mine permit boundary has been added to Exhibit D11.1-1. The text in Section D11.6 has been updated to include a summary of the discussion stating that the Big Horn Coal Permit No. 213-T2 SDD determined the limits of the AVF, and no portion of Hidden Water Creek was determined as being AVF.

Comment MK 20 – Round 2

No comment received.

Response MK 20 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 21 – Round 1

Appendix D11-AVF, Section D11.7 Mining of Alluvial Valley Floor, Although the LQD has not yet issued its formal finding, the segment of the Tongue River adjacent to the proposed permit area, which was not declared under previous LQD findings, likely contains an AVF.

> (a) If this AVF is significant to farming, the applicant must comply with LQD Coal Rules and Regulations Chapter 3, Section 2(d)(ii) and demonstrate that the proposed mining operations will not materially damage the quantity and quality of water that supplies the Tongue River AVF. The absence of direct mining on the Tongue River AVF does not relieve the requirement of assessing the probable hydrologic impacts of the proposed operation to the AVF, particularly since the groundwater model in Mine Plan Addendum MP-3 predicts drawdown in the Tongue River alluvium. (MDK)
>
> (b) Regardless of the significance to farming, the applicant must also maintain and/or restore the essential hydrologic functions of the Tongue River AVF. The applicant must therefore identify the essential hydrologic functions of the Tongue River AVF and either (1) provide an analysis that the proposed operation will not hamper the essential hydrologic functions, or (2) demonstrate that the essential hydrologic functions will be restored. The essential

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hydrologic functions for another part of the Tongue River AVF are described in the Big Horn Mine Permit SDD (shown in Brook Mine Appendix D11 on Page Addendum D11-2-27), so this may be a good starting point to consider. (MDK)

(c) A monitoring system is also required to demonstrate the essential hydrologic functions are maintained, as per LQD Coal Rules and Regulations, Chapter 5, Section 3(b)(ii). Since the groundwater model (Mine Plan Addendum MP-3) predicts 2.5 feet of drawdown in the Tongue River alluvium, the monitoring system may likely contain alluvial monitoring wells and periodic evaluation of color-infrared imagery. (MDK)

Response MK 21 – Round 1

Revised text as requested. Revised text by adding information regarding the essential hydrologic functions of the declared AVFs (Tongue River and Goose Creek) from the SDD in Addendum D11-2. Also, added portion of text to describe possible monitoring system and plan for the AVFs that may be affected.

Comment MK 21 – Round 2

Response not accepted. Please see the review of the response to Comment MK 1. Please provide a more specific reference to the section of the Mine Plan (MP.6) that discusses the probable hydrologic impacts to the Tongue River and Goose Creek AVFs. Please also prove a more specific reference to the appropriate portion of the Mine Plan or Reclamation Plan that provides further details on the AVF monitoring plan. (MDK)

Response MK 21 – Round 2

See comment MK 1-Round 2 response. Discussion of the AVF monitoring plan for the Tongue River has been added to the Mine Plan in Section MP.25 as well as the Reclamation Plan in Section RP.10. In addition, monitoring locations have been updated on Table MP.7-4, Exhibit MP.7-1 and Exhibit RP.8-5.

Comment MK 21 – Round 3

Response not accepted. With respect to the three proposed alluvial monitoring wells, please state in the text in Section MP.25 that these wells will be installed prior to commencing any mining-related disturbance.

Response MK 21 – Round 3

A statement that the alluvial monitoring wells along the Tongue River will be installed prior to mining related disturbance was added to the last paragraph in Section MP.25 of the Mine Plan.

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Comment MK 22 – Round 1

Appendix D11-AVF, Section D11.7 Mining of Alluvial Valley Floor, 22. The essential hydrologic functions of the adjacent Goose Creek AVF must also be maintained during the proposed mining operation. The application needs to list these functions, as described in the Big Horn Mine Permit SDD (shown in Brook Mine Appendix D11 on Page Addendum D11-2-27). A monitoring system is also required to demonstrate that the essential hydrologic functions will be maintained. (MDK).

Response MK 22 – Round 1

See response to comment MK 21.

Comment MK 22 – Round 2

Response not accepted. The essential hydrologic functions of the Goose Creek AVF are listed, but the text does not explicitly address a monitoring system for the Goose Creek AVF, only the Tongue River AVF. Please commit to a similar monitoring system for the Goose Creek AVF to demonstrate that the essential hydrologic functions will be maintained. The text should also reference the appropriate portion of the Mine Plan or Reclamation Plan that provides further details on the AVF monitoring plan. (MDK)

Response MK 22 – Round 2

See comment MK 1-Round 2 response. Discussion of the AVF monitoring plan for Goose Creek has been added to the Mine Plan in Section MP.25 as well as the Reclamation Plan in Section RP.10. In addition, monitoring locations have been updated on Table MP.7-4, Exhibit MP.7-1 and Exhibit RP.8-5.

Comment MK 22 – Round 3

Response accepted.

Comment MK 104 – Round 2 (New Comment)

The permit application suggests that the Tongue River and Goose Creek contain AVFs. Appendix D-11 must therefore also include a discussion of the importance of these AVFs to farming, as discussed in LQD Guideline No. 9 (see Part IV, Section C). (MDK)

Response MK 104 – Round 2 (New Comment)

Text in Section D11.5 has been revised to discuss the importance of AVFs to farming.

Comment MK 104 – Round 3

Response conditionally accepted. The permit application has not provided the information discussed in LQD Guideline No. 9, Part IV, Section C for determining the importance of farming to the AVFs that presumably will be declared by the LQD on the Tongue River and Goose Creek. However as per Guideline No. 9, this information is

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only required for "affected AVFs". The permit application implies that the AVFs on the Tongue River and Goose Creek should not be considered "affected AVFs" since farming would not be interrupted, discontinued, or precluded, and the essential hydrological functions of the AVFs would be preserved during mining. No mining is scheduled for these areas and the disturbance that is proposed appears to be minor enough such that essential hydrologic functions would not be affected. Therefore a significance to farming determination for these AVFs does not appear to be required. This may be subject to change pending other LQD staff input when the AVF determinations are made. (MDK)

Response MK 104 – Round 3

No response is required. No changes have occurred in response to this comment.

Comment MK 105 – Round 2 (New Comment)

Appendix D-11 (or perhaps Mine Plan MP.6) should also include a discussion of whether the proposed operation would interrupt, discontinue, or preclude agriculture use of the Tongue River and Goose Creek AVFs. This discussion should evaluate if the predicted drawdown in the Tongue River alluvium (Mine Plan Addendum MP-3) would result in any loss of agricultural use of the AVF. (MDK)

Response MK 105 – Round 2 (New Comment)

Text has been added to Mine Plan Section MP.25 to describe how agricultural use of the Tongue River and Goose Creek AVFs will not be precluded.

Comment MK 105 – Round 3

Response accepted.

Comment MK 121 – Round 3 (New Comment)

D11.5 Agricultural Practices. The CHIA site inspection report (Dated October 21, 2015 and mailed to Randall Atkins c/o WWC Engineering) discussed the abandoned Conable Reservoir and Ditch and Lateral system in Sections 12 and 13 within the proposed Brook Mine permit area. According to the SEO water rights database, a water right for Conable Reservoir was granted in 1901 (P223.0R). The purpose of the reservoir was to store water for irrigation of lands under the Conable Ditch and Lateral, which also held a water right to divert 1.46 cfs (P3088.0D). The water right allowed for using the water for irrigation of 100 acres of land adjacent to Slater Creek in T57N, R85W, Section 13. Both water rights were cancelled in 1906, and it is unknown the extent that the irrigation was ever developed. The dam for the reservoir has long since failed, allowing Slater Creek to flow freely through. In Section D11.5, please incorporate the history of the Conable Reservoir and Ditch and Lateral System, as this demonstrates there was a historical attempt to irrigate lands in the Slater

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Creek valley within Section 13 of the proposed permit boundary. The attempt apparently failed and was abandoned and the water rights were cancelled. (MDK)

Response MK 121 – Round 3 (New Comment)

Discussion of the Conable Reservoir and Conable Ditch and Lateral were added as the fourth paragraph in Section D11.5.

Comment MK 122 – Round 3 (New Comment)

D11.7 Mining of the Alluvial Valley Floor. Although no mining is planned on the AVFs on the Tongue River and Goose Creek, the disturbance boundary is within a small part of the Big Horn Mine AVF extent (Exhibit D 11.6-1). It appears that this area includes the SP-1, OB-1, and OB-2 features in Section 21 on Exhibit MP .5-l, which was updated for this round. Please include a statement in the text of Section D11.7 that there is some minor disturbance proposed within the AVF extent. Please also see Comments 7 (MK 126) and 8 (MK 127) below that request this be addressed in the relevant sections of the Mine Plan and Reclamation Plan. (MDK)

Response MK 122 – Round 3 (New Comment)

Minor disturbance is planned within the declared Big Horn Mine AVF extent in Section 21of Township 57 North, Range 84 West. Text discussing the minor disturbance has been added to the first paragraph of Section D11.7, as well as a reference to the applicable sections of the Mine Plan and Reclamation Plan for further discussion of the disturbed AVF.

Mine Plan

Comment BJ 28 – Round 1

Volume 11, Mine Plan, Section MP.1.2.1, pg. MP-4, Tunnel and pillar widths are discussed in general terms. Please approximate a range for the widths, in feet, in the narrative to give context to the discussion.

Response BJ 28 – Round 1

Added text as suggested.

Comment BJ 28 – Round 2

No comment received.

Response BJ 28 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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DEQ 34-092

Comment BJ 29 – Round 1

Volume 11, Mine Plan, The fifth sentence, beginning with "To minimize the amount of exposure..." does not make sense. Please rewrite the sentence for clarity.

Response BJ 29 – Round 1

Added text as suggested.

Comment BJ 29 – Round 2

No comment received.

Response BJ 29 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 30 – Round 1

Volume 11, Mine Plan, The narrative also references figure MP.1-3 as a general schematic of the highwall mining operation. The figure depicts significant vertical highwalls above the mining operation. The text mentions that the highwalls will be vertical where the Masters and Carney converge but the illustration depicts conditions where the coal seams appear to be separated by a considerable thickness of parting. It is our experience that vertical highwalls in the Powder River Basin are unstable and should be discourage wherever possible. What would the maximum thickness of burden approximate where the vertical highwalls will exist? Please include an average on the schematic as has been done for pit width and bench width.

Response BJ 30 – Round 1

The figure has been updated to include the average depths.

Comment BJ 30 – Round 2

No comment received.

Response BJ 30 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 31 – Round 1

Volume 11, Mine Plan, Pages MP-3 and MP-4, These pages describe the highwall mining operation in vague generalities. The narrative states that the continuous miner will advance into the working face to a depth of 2,000 feet. The manufacturer's specifications for the ADDCAR system state that the depth of a cut is 1,600 feet. Is this a discrepancy of 400 feet or is there a difference in mining tools and the ADDCAR system comes with multiple depth capacities. Please clarify.

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Response BJ 31 – Round 1

Conversations with ADDCAR representatives indicates that they will be able to extend the range of the highwall mining system so cuts up to 2,000 feet can be achieved.

Comment BJ 31 – Round 2

No comment received.

Response BJ 31 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 32 – Round 1

Volume 11, Mine Plan, A general word of guidance – Ramps are mentioned in the narrative as designed to an 8% grade. The Cat 777 can generally handle this grade fairly well under most conditions. The Mack Titan trucks, however, may be problematic under certain conditions. Entering the pit on the ramp could be difficult for the Mack trucks with pups if the ramp has been watered to control dust. The overburden materials used for ramp systems are generally silty with a clay matrix and overwatering can create slipping hazards for vehicles. A truck with multiple trailers will have difficulty navigating these conditions. A 6% ramp under these situations is strongly advised.

Response BJ 32 – Round 1

Revised text as suggested.

Comment BJ 32 – Round 2

No comment received.

Response BJ 32 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 33 – Round 1

Volume 11, Mine Plan, The narrative describes the tunnel width as variable, depending on the cutting head chosen. Please indicate approximate footages of the tunnel widths. For example, Bucyrus and Joy manufacture continuous miners that have heads ranging from 11 to 12 feet in width. A mention of those widths would clarify the narrative. Also the protective coal pillars are described but have no dimensions indicated. The pillar width to tunnel width is crucial so an approximation of the remnant pillars width in feet is required. Please include approximate widths for tunnel and pillar widths.

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Response BJ 33 – Round 1

See response to Comment BJ 28. The text has been updated as requested.

Comment BJ 33 – Round 2

No comment received.

Response BJ 33 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 34 – Round 1

Volume 11, Mine Plan, Section MP.1.2.2, The dozer push method of overburden removal is not adequately described. Though Figure MP.1-4 does depict the dozer push materials to some extent, the overlapping nature of the multiple lift system can be confusing to some. The narrative on page MP-4 is too brief. Please elaborate further on the dozer push staging and overburden removal. Perhaps an illustration that depicts the dozer removal in stages would be more appropriate. This can be accomplished by creating a series of illustrations rather than only one. Please clarify the methodology.

Response BJ 34 – Round 1

Revised text as requested. Created Figure MP.1-5.

Comment BJ 34 – Round 2

No comment received.

Response BJ 34 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 35 – Round 1

Volume 11, Mine Plan, Section MP.1.4, Pg. MP-5, The last sentence does not make sense. Please rewrite the sentence.

Response BJ 35 – Round 1

Removed last sentence for clarity.

Comment BJ 35 – Round 2

No comment received.

Response BJ 35 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment BJ 36 – Round 1

Volume 11, Mine Plan, Section MP.4.2.3, Pg. MP-15, The discussion of temporary topsoil stockpiles describes creating a ring ditch around the topsoil pile if there is a potential for water erosion during the 2 week to 6 month life of the pile. Since the climate is unpredictable and subject to rapid changes, temporary topsoil stockpiles (2 weeks to 6 months) will be required to have ring ditches in all cases with no qualifiers. LQD writes more violations concerning inadequate topsoil practices than any other issue. Rewrite the narrative to indicate that all temporary topsoil stockpiles will have a ring-ditch and berm created for piles having a life of 2 weeks or more. Keep in mind that even a short-lived topsoil stockpile could generate a violation if a sudden rainstorm were to erode the soil and waste it on the surrounding terrain. RAMACO may want to allow for this as well

Response BJ 36 – Round 1

Updated text as requested.

Comment BJ 36 – Round 2

No comment received.

Response BJ 36 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 37 – Round 1

Volume 11, Mine Plan, Section MP.4.3.4, Pg. Mp-17, A swell factor of 16% is being used to convert bank cubic yards to loose cubic yards. The number was generated from information attained from Big Horn Coal (PT213). Where was this information located? Many of the coal mines in the northwestern corner of the Powder River Basin use a swell factor of 13% - 14% since the overburden material is finer grained, with a higher clay content than mines on the eastern margin of the basin. Please cite the use of a 16% swell factor.

Response BJ 37 – Round 1

Revised text as requested. Table MP.4-9 provides typical swell and load factors of materials.

Comment BJ 37 – Round 2

No comment received.

Response BJ 37 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment BJ 38 – Round 1

Volume 11, Mine Plan, Section MP.6.1, Pg. MP-39, The second paragraph discusses surface runoff attenuation during mine years 4 and 5. The peak flow rates for precipitation events will be attenuated by the mining trenches that lie perpendicular to the flow in the local drainages. What flow events are expected to be attenuated by the trenches? Will the 2 year, 10 year, or 100 year events be considered as an average event? Please modify the narrative, in general terms, to define which precipitation event will be used when designing the pit drainage plans.

Response BJ 38 – Round 1

Updated text as requested.

Comment BJ 38 – Round 2

No comment received.

Response BJ 38 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 39 – Round 1

Volume 11, Mine Plan, Section MP.8, Pg. MP-47, The narrative mentions that potable water will be hauled to the mine an placed in a cistern. Why is a cistern system being considered for potable water instead of a reverse osmosis unit? The local residents use such systems as do the mines. How large of a cistern will be used for water storage? Please modify the narrative to expand on the rational behind using a cistern.

Response BJ 39 – Round 1

The text has been revised. The final potable water system has not been determined.

Comment BJ 39 – Round 2

No comment received.

Response BJ 39 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 40 – Round 1

Volume 11, Mine Plan, Section MP.9.9, Pg. MP-52, When pre-dug mud pits are to be used for exploration drilling, the topsoil must be protected from contamination by removal and stockpiling. The pit location must be stripped to the base of the soil with an areal extent that allows the pit materials to be stacked as spoil without encroaching on native surface. Reclamation shall occur in a manner that will best restore the surface to its pre-disturbance condition. These contingencies need to be

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better described in the narrative. Please modify the text to reflect the aforementioned conditions.

Response BJ 40 – Round 1

Revised text as suggested.

Comment BJ 40 – Round 2

No comment received.

Response BJ 40 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 41 – Round 1

Volume 11, Mine Plan, Section MP.18, Pg. MP-68, The second paragraph discusses the speed limits that will be set on haulroads to protect wildlife. Approximately what speed limits will be used?

Response BJ 41 – Round 1

Updated text with a 45 MPH Speed Limit.

Comment BJ 41 – Round 2

No comment received.

Response BJ 41 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 42 – Round 1

Volume 11, Mine Plan, Section MP.20, Pg. MP-69, The brief description of underground mining should state that no "conventional" underground mining will occur. Highwall coal recovery is an underground mining technique, but no personnel work underground. Thus the mining is modified underground mining.

Response BJ 42 – Round 1

Revised text as requested.

Comment BJ 42 – Round 2

No comment received.

Response BJ 42 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment BJ 43 – Round 1

Volume 11, Mine Plan, Section MP.24, Pg. MP-70, The word "Operation" is misspelled in the title (OPERTATION).

Response BJ 43 – Round 1

Revised text as requested.

Comment BJ 43 – Round 2

No comment received.

Response BJ 43 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 44 – Round 1

Volume 11, Mine Plan, Section MP.25, Pg. MP-71, The second paragraph, third sentence, discusses requiring additional permitting. The word "additional" is misspelled (addidtional).

Response BJ 44 – Round 1

Revised text as requested.

Comment BJ 44 – Round 2

No comment received.

Response BJ 44 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 45 – Round 1

Volume 11, Mine Plan, TABLE MP.1-1, The total disturbance should read 895 acres, not 775. Please correct the table.

Response BJ 45 – Round 1

Revised text as requested.

Comment BJ 45 – Round 2

No comment received.

Response BJ 45 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment BJ 46 – Round 1

Volume 11, Mine Plan, FIGURE MP.1-3, The average width of the pit floor and safety bench have average widths indicated on the drawing. Please insert the average heights of the vertical highwalls in these situations.

Response BJ 46 – Round 1

Revised Figure MP.1-3 requested.

Comment BJ 46 – Round 2

No comment received.

Response BJ 46 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 47 – Round 1

Volume 11, Mine Plan, FIGURE MP.1-4, The cross section, as drawn, is confusing. It would appear that dozer pushed, loose material significantly exceeds the bank material available in the highwall. The figure is not drawn to scale but a more accurate attempt to represent dirt volumes would be appreciated. Also, the cross section itself does not make sense in the way that operational steps are illustrated. A series of cross sections over time would be much more beneficial to define the appearance of the dozer push. Please modify the figure accordingly. A sample of an idealized schematic is attached. It is volumetrically accurate.

Response BJ 47 – Round 1

Figure MP.1-4 has been updated to add clarity.

Comment BJ 47 – Round 2

No comment received.

Response BJ 47 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 48 – Round 1

Volume 11, Mine Plan, FIGURE MP.4-3, Pg. MP-F7, What is the narrow, vertical rectangle located in the center of the coal stockpile coming from the stacker?

Response BJ 48 – Round 1

The figure MP.4-3 has been updated to remove the rectangle.

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Comment BJ 48 – Round 2

No comment received.

Response BJ 48 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 49 – Round 1

Volume 11, Mine Plan, Addendum MP-3, Pg. MP-3-2, The introductory paragraph states that the Brook Mine is approximately 6 miles northwest of Sheridan, Wyoming. However, in earlier narrative, the mine is said to be 6 miles south of the Montana border and 8 miles northwest of Sheridan. This passage is found in the Land Use Appendix D1-1. The distances should be uniform in all instances throughout the narrative.

Response BJ 49 – Round 1

Revised text as requested.

Comment BJ 49 – Round 2

No comment received.

Response BJ 49 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 50 – Round 1

Volume 11, Mine Plan, Addendum MP-3, Section 2.3, Figures 2.3-1 and 2.3-2 show the potentiometric surfaces for the Carney and Masters coal beds. The contours daylight and appear to be in mid-air over the Slater Creek drainage. Please adjust the contours so they terminate at the outcrop.

Response BJ 50 – Round 1

Revised Figures 2.3-1 and 2.3-2 in Addendum MP-3-17 as requested.

Comment BJ 50 – Round 2

No comment received.

Response BJ 50 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment BJ 51 – Round 1

Volume 11, Mine Plan, Addendum MP-6, Section MP-6.1, Pg. MP-6-3, The second to last paragraph indicates that the depth of the penetration by the continuous miner will be 2,000 feet. Is this an approximation since the listed depth for the ADDCAR device is 1,600 feet. Please clarify the discrepancy.

Response BJ 51 – Round 1

Based on communication with ADDCAR's representative 2,000 ft penetration is achievable. Generally, users of the ADDCAR system encounter increasing depth of cover with greater penetrations requiring wider web pillar between holes. The loss in recovery due to the wider pillars potentially negates any production gain from increased penetration.

Comment BJ 51 – Round 2

No comment received.

Response BJ 51 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 52 – Round 1

Volume 11, Mine Plan, Addendum MP-6, Section MP-6.1, Pg. MP-6-4, The discussion in this sections centers around the necessity of maintaining a straight, even cutting depth to prevent pillars from being cut too narrow to hold up the roof material and allow subsidence. The 1:1 ratio suggested by NIOSH is acceptable as long as roof strength tests bear up (no pun intended) the use of the general guidelines. A small sample of tests have been run on roof and coal rock intervals and those tests have been reported. LQD requests a narrative placed either in this location of the text or other location of RAMACO's choosing that discusses the strength tests results as it pertains to roof stability. Also, a commitment must be made in the document to sample roof material for strength testing for at least one location in every panel that will mined by the continuous miner prior to mining. Our concern rests with the competence of the overlying lithologies and their possibility for subsidence. This has been a problem in this area for decades and care must applied to characterize roof materials accurately.

A sampling plan to test compressive strength above each coal panel must be submitted prior to permit approval.

Response BJ 52 – Round 1

RAMACO must submit and have an approved MSHA Ground Control Plan that contains the strength test and commitments requested. RAMACO will provide this information when it is received and include it in the Subsidence Control Plan.

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Comment BJ 52 – Round 2

No comment received.

Response BJ 52 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 53 – Round 1

Volume 11, Mine Plan, Addendum MP-6, Please provide the data used as input for the ARMPS-HWM program.

Response BJ 53 – Round 1

The following input values were used in the ARMPS-HWM program: compressive strength of coal - 660 psi, rock density - 162 lbs/ft3, abutment angle of 21°

Comment BJ 53 – Round 2

No comment received.

Response BJ 53 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 54 – Round 1

Volume 11, Mine Plan, Addendum MP-6, FIGURE MP-6.2-2, The scale of the photograph is too large to adequately depict the zones of surface subsidence from the old underground mines. Please blowup the scale to allow for clear visibility of the subsidence.

Response BJ 54 – Round 1

Cardno selected the larger scale to show that subsidence was limited to a small portion of the deep mine and not visible over other areas of the deep mine due its increased depth of cover. See revised figure in revision to Cardno's Subsidence Report

Comment BJ 54 – Round 2

No comment received.

Response BJ 54 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 55 – Round 1

Volume 11, Mine Plan, Addendum MP-6, FIGURE MP-6.2-3, This figure is very effective. It clearly shows the subsidence evident on the air photo as it correlates to

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the old underground map superimposed on it. One problem, though, is that the air photo base needs to be darker, with greater contrast. The photo is a bit washed out and manipulation of the brightness/contrast aspects of the photo would help its visibility greatly. Please recalibrate the photo tonality.

Response BJ 55 – Round 1

See revised figure in revision to Cardno's Subsidence Report

Comment BJ 55 – Round 2

No comment received.

Response BJ 55 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 56 – Round 1

Volume 11, Mine Plan, Addendum MP-8, Section MP-8.5.4, The last sentence in this section indicates that there is no suitable habitat available for the Northern Long-Eared Bat. Does this include the climax Cottonwood Forest along Tongue River? The well developed understory along the river is suitable for Long-eared bat habitation though none have been located in this area. Or does the negation of the existence of the bat only apply to the area in the hills above the river where the mining will occur. Please clarify the area that was considered for potential Long-Eared Bat occurrence.

Response BJ 56 – Round 1

The text was revised to clarify.

Comment BJ 56 – Round 2

No comment received.

Response BJ 56 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 64 – Round 1

EXHIBITS, Mine Plan, Exhibit MP.1-1, The patterns used to depict surface disturbance from year to year are too similar. It is difficult to differentiate between year 0 and year 2, for example. Please recreate the surface disturbance layers to be more unique. The overburden removal sequence map (Exhibit MP.4-4) is a good example.

Response BJ 64 – Round 1

Revised Exhibit MP.1-1 as requested.

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Comment BJ 64 – Round 2

No comment received.

Response BJ 64 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 67 – Round 2 (New Comment)

Mine Plan, Table MP.4-5., Overburden Stockpile Design –

The Estimated Capacity volumetrics for the Overburden stockpiles appear to be low. Based on a recalculation of the volumes given the acreage and average heights, each stockpile has a higher volume of capacity than which is shown in the table. A recalculated table would look like this:

Table MP.4-5. Overburden Stockpile Design

Stockpile Designation	Estimated Capacity **E** (cy)	Approximate Basal Area **A** (ac)	Average Height **H** (ft)	Calculated Capacity **C** (cy)[1]	Difference[2]
OB-1	300,000	4.7	55	417,047	117,047
OB-2	500,000	9.4	55	834,093	334,093
OB-3	950,000	13.4	95	1,189,027	239,027
OB-4	1,000,000	21.4	85	1,898,893	898,893
OB-5	730,000	9.2	70	816,347	86,347
OB-6	400,000	8.3	55	736,487	336,487
OB-7	400,000	8.9	70	789,727	389,727
OB-8	1,100,000	14.2	75	1,260,013	160,013
OB-9	510,000	8.7	55	771,980	261,980
OB-10	260,000	5.6	45	496,907	236,907
OB-11	100,000	4.1	50	363,807	263,807
OB-12	1,200,000	14.0	95	1,242,267	42,267
OB-13	165,000	4.2	45	372,680	207,680
OB-14	122,000	5.6	55	496,907	374,907
OB-15	76,000	3.2	30	283,947	207,947
OB-16	104,000	3.6	20	319,440	215,440
	7,917,000			12,289,567	4,372,567

[1]Calculated Capacity C = ((A*43560)*H)/27
[2]Difference = C-E

Based on the Recreated Table, Volumes derived from acreage and average height formulas give values that are approximately 35% too low. Please reevaluate the table in light of the mathematical calculations. Or, if there are extenuating circumstances that help create the overburden volumes in column B, please explain the seeming inconsistency.

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Response BJ 67 – Round 2 (New Comment)

The capacities of the overburden stockpiles calculated by WDEQ do not account for the sideslopes of the overburden stockpiles. The calculations are appropriate for rectangular prisms with a uniform rectangular cross section. This explains why the calculations area significantly higher. The reported volumes by RAMACO are outputs from AutoCAD which uses 3D surfaces to construct stockpiles and calculate volumes. AutoCAD also takes into account the variation in a topographical surface that the stockpiles are placed on, which can affect the extent of the basal area and the average height. The volumes of the stockpiles were also rounded up to be conservative in the reported volumes. The average height is only a rough approximation because the height will change considerably depending upon the topographic surface beneath each pile. No changes have been made to the volumes of overburden. However, Table MP.4-5 has been revised to indicate sideslope angles and that the volumes have been computed using AutoCAD.

Comment BJ 67 – Round 3

No comment received.

Response BJ 67 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment BJ 69 – Round 3 (New Comment)

The new haulroad design appears to be missing a haulroad for the first pit to be mined, in sec. 22 T.57N., R.84W. Is this an oversight or has a haulroad not yet been designed?

Response BJ 69 – Round 3 (New Comment)

A haulroad for pit TR-1 is currently not designed. With the uncertainty of the initial pit, the design has not been completed. The design will be provided prior to construction. No changes to the Mine Plan have been made in response to this comment.

Comment DM 6 – Round 1

Mine Plan, MP.3.1.3 – A primary haul road appears to cross the Tongue River using the bridge that is currently in place from previous mine usage. Please discuss any updates needed for that bridge to be adequate for the intended usage.

Response DM 6 – Round 1

The revised primary haul road alignments do not cross this bridge and the use of this bridge for haul trucks and other traffic associated with the mine is not planned. Updated Exhibit MP.3-1.

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Comment DM 6 – Round 2

No comment received.

Response DM 6 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DM 7 – Round 1

Mine Plan, Exhibit MP4-3 shows Overburden Stockpiles OB-12 and OB-13, and Topsoil Stockpile TS-6 being located directly in the Slater Creek channel, without any mention of redirecting slater creek, or otherwise preventing the hydrologic consequences of damming up the creek with Overburden and Topsoil stockpiles. Please correct.

Response DM 7 – Round 1

Revised Exhibit MP.4-3 as requested with OB-12 and 13 as well as TS-6 moved out of slater creek channel.

Comment DM 7 – Round 2

No comment received.

Response DM 7 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DM 8 – Round 1

Mine Plan, MP.7 – Because of the proximity of the planned facilities primarily in T57, R84 Sec.15 to the Tongue River and Goose Creek, I would like to see surface water monitoring upstream of these facilities on Goose Creek and Tongue River, and downstream of these facilities on Tongue River. Please discuss the feasibility of fulfilling this request, with reasoning.

Response DM 8 – Round 1

Revised text as requested. Revise Exhibit MP.7-1 with USGS stream gage location that is within the viewing area.

Comment DM 8 – Round 2

No comment received.

Response DM 8 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DS 11 – Round 1

Mine Plan, 11) Depending upon the outcome of required overburden sampling, commitment for special handling of unsuitable overburden will be required to assure that placement of unsuitable materials so as not to hinder plant growth or to adversely affect surface or groundwater quality will be required in the Mine Plan.

Response DS 11 – Round 1

See section MP.4.6.1, fourth paragraph.

Comment DS 11 – Round 2

Response is not adequate. Section MP.4.1.6 does not discuss placement of unsuitable materials above groundwater sources which will undoubtedly be encountered in early mining progressions at this mine. Unsuitable materials taken from above the groundwater level cannot be placed within the groundwater zone. Please address this and describe how the mine plan pit sequence of removal and backfill will be altered to accommodate placement of suitable materials near the surface or in the aquifer zone during mining. This may require stockpiling of materials to assure the best quality materials will be used.

Response DS 11 – Round 2

The majority of the permit area is dry. Therefore, most backfill materials will not be placed in an aquifer. Additionally, it is generally accepted that if unsuitable materials are placed below the water table, there will not be cause for concern. If unsuitable materials are place below the water table, they will not have the opportunity to oxidize. If unsuitable materials are above the water table, they may oxidize, but they won't be transported by groundwater flow. The only zone that could potentially cause concern is the limited area where the potentiometric surface fluctuates. In this way, unsuitable materials can be oxidized and transported by groundwater flow. Due to the overburden and coal seams being primarily dry and the majority of mining activities occurring above the potentiometric surface, placement of unsuitable materials within an aquifer is not anticipated to be a concern.

Comment DS 11 – Round 3

No comment received.

Response DS 11 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DS 12 – Round 1

Mine Plan, 12) Does RAMACO provide a better detailed description of the topsoil salvage and handling process than that discussed in section MP.4.2.1? The

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description provided is not detailed so as to provide a description of the equipment used, the methods for assuring adequate soil salvage, or whether topsoil and subsoil salvage will follow the recommendations in Appendix D7 for stockpiling topsoil separate from subsoil. (Map Unit A Cambira Loam, Map Unit B Zigweid Loam, Map Unit C Forkwood Loam, Map Unit G Bauxson Loam, Map Unit H Haverdad Loam, Map Unit U Ulm Clay Loam) Please understand that topsoil and subsoil may only be mixed if both meet Guideline 1 suitability criteria. Please include more detail for topsoil salvage and handling or let the LQD know where the information may be accessed.

Response DS 12 – Round 1

Revised text as requested.

Comment DS 12 – Round 2

Response is not adequate. Details of your topsoil salvage operation have not been adequately provided in the Mine Plan. Please provide the requested details of the topsoil salvage operation as stated above.

Response DS 12 – Round 2

The text in Section MP.4.2.1 has been supplemented to describe the topsoil salvage operation in more detail. The text now states that RAMACO will likely salvage topsoil with dozers, loaders, and trucks based on the current plan for equipment purchase. However, planning is still in its infancy and different, though typical, topsoil salvage equipment could be used. Methods to assure accurate salvage were already outlined in Section MP.4.2.1 in the three bulleted steps provided by WDEQ/LQD Guideline 1. However, these were supplemented with examples. Drilling or test pits ahead of salvage will ensure proper topsoil removal. Equipment operators and qualified personnel will be trained to recognize the difference in soil profiles. Additionally, Section MP.4.2.1 now states that RAMACO will generally follow the recommendations of Appendix D7 for the separation of topsoil and subsoil to ensure that unsuitable subsoil will not be mixed with topsoil. However, RAMACO reserves the right to mix topsoil and subsoil, if subsoil is suitable as a plant-growth medium, according to WDEQ/LQD R&R Chapter 4, Section 2(c). For example, Map Unit A, Map Unit B, Map Unit C, Map Unit H, and Map Unit U are all suitable across the entire profile (topsoil and subsoil) and are not required by rules and regulations to be separated. Therefore, RAMACO will not have separate stockpiles for subsoil. If subsoil is suitable, it will be salvaged. If subsoil is not suitable, it will not be salvaged. Any suitable subsoil that is salvaged will be mixed into topsoil stockpiles.

Comment DS 12 – Round 3

Response is not adequate. The LQD will allow mixing of suitable and unsuitable soil/subsoil if the resulting mix is suitable or only slightly marginal. Chapter 4, Section 2(c)(iii) provides the Administrator with the ability to require segregation of topsoil and subsoil if the Administrator determines that the practice is necessary for

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vegetation establishment. However, the subject of this comment was to provide more detail about the methods that will be employed by the company and equipment operators to ensure adequate salvage will occur (color change in soils, staking with depths ahead of salvage, etc.). The LQD recommends that RAMACO review other approved permits for adequate topsoil/subsoil handling language in order to assure adequate detail is provided in the RAMACO permit application for topsoil handling.

Response DS 12 – Round 3

Section MP.4.2.1 has been revised to include details on staking prior to topsoil salvage operations. Data obtained during drilling and test pits ahead of stripping activities will be used to conduct depth staking on 500 foot grid centers. Section MP.4.2.1 includes other details describing adequately the topsoil salvaging procedures. A commitment has been added to the end of Section MP.4.3.1 to prevent overburden materials on native topsoil areas during overburden removal operations.

Comment DS 13 – Round 1

Mine Plan, 13) Section MP.4.2.3 all topsoil stockpiles, even those stockpiled temporarily or windrowed at the edge of a disturbance, must be identified by a topsoil sign from initiation of the salvage operation as required under Chapter 4, Section (c)(D) that states that signs must be in place at the time stockpiling is begun. Therefore, the text in the first paragraph of this section stating that signs will not be required must be corrected. Signs will always be required to identify all salvaged topsoil and must be placed on all approaches to the topsoil and no more than 150 feet from the stockpile location.

> a. Additionally, all stockpiled topsoil, even windrowed along the edge of a disturbance, must be protected against wind and runoff erosion, compaction or potentially toxic materials no matter what the longevity designation of the stockpiled material. The Mine Plan must provide a commitment to these requirements.

Response DS 13 – Round 1

Revised text as requested.

Comment DS 13 – Round 2

No comment received.

Response DS 13 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DS 14 – Round 1

Mine Plan, 14) Section MP.4.2.4(4.2.1?) does not discuss topsoil salvage during winter months. Salvage during the winter months, especially of shallow soil profiles, is discouraged by the LQD due to a lack of depth control caused by varying depths of permafrost. Please provide discussion concerning this subject.

a. Even short term and temporary topsoil stockpiles must be identified on maps and the volumes accounted for in annual reports. Several criteria that must be considered are well established for placement of topsoil stockpiles and include:

i. Construction of stable areas to minimize wind and water erosion

ii. Stockpiles will not be placed in areas where runoff water can contribute to the loss of topsoil (side hills or drainages)

iii. Stockpiles will not be constructed on unsuitable backfill locations

iv. Stockpiles will have associated sediment control established in advance of construction

v. Stockpiles will not be constructed at locations of known cultural or wildlife resources for which protection or mitigation is required.

b. Other topsoil stockpile construction and maintenance considerations include:

i. Stockpiles will be constructed with slopes of 3h:1v or less

ii. Bypass ditches, berms or equivalent may be used to divert runoff around stockpiles

iii. Stockpiles that will remain for less than 1 year may be revegetated or treated with surface roughing methods such as ripping or discing to reduce runoff and wind erosion potential.

Response DS 14 – Round 1

Revised text as requested.

Comment DS 14 – Round 2

Section MP.4.2.1 does not discuss topsoil salvage during winter months. Salvage during the winter months, especially of shallow soil profiles, is discouraged by the LQD due to a lack of depth control caused by varying depths of permafrost. Please provide discussion concerning this subject.

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a. Even short term and temporary topsoil stockpiles must be identified on maps and the volumes accounted for in annual reports. Several criteria that must be considered are well established for placement of topsoil stockpiles and include:

iii. Stockpiles will not be constructed on unsuitable backfill locations

v. Stockpiles will not be constructed at locations of known cultural or wildlife resources for which protection or mitigation is required.

Responses to the above items were not adequate. Please provide the required permit commitments.

Response DS 14 – Round 2

A statement to Section MP.4.2.1 has been added that states RAMACO will not salvage topsoil if high antecedent moisture conditions have led to deep frost cementing topsoil to overburden. Additionally, the statement has been made that RAMACO will salvage topsoil ahead of planned winter mining activities to avoid complications with deep frost.

All currently planned topsoil stockpiles have been identified on Exhibit MP.4-3. A statement has been added to Section MP.4.2.3 in the first paragraph that any accumulations of topsoil that meet the definition of a stockpile will be mapped with volumes accounted for in the Annual Report. Another statement has been added to the first paragraph of Section MP.4.2.3 that topsoil stockpiles will not be constructed on unsuitable backfill or known locations of cultural or wildlife significance that require protection and mitigation.

Comment DS 14 – Round 3

No comment received.

Response DS 14 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DS 15 – Round 1

Mine Plan, 15) Section MP.4.2.7, page MP 4-5. Aside from operation of soil salvage equipment with the potential for soil contamination due to blown hydraulic hoses or small fuel leaks, the LQD expects not contamination of soil during the mining operation. Contamination of subsoil and overburden is more likely. The LQD recommends that RAMACO re-phrase the section header and text to show petroleum contaminated materials being and not soils.

a. What criteria will RAMACO use to determine if spills require reporting to the DEQ, and what process will be used in spill reporting?

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b. What will the operational procedure be for management of the proposed on-site landfarm for contaminated materials, and where will it be located? Will it be identified on the ground by a sign?

Response DS 15 – Round 1

Revised text as requested.

a. See Section MP-4.5.2 of Addendum MP-4
b. See Section MP-4.5.3 of Addendum MP-4

Comment DS 15 – Round 2

No comment received.

Response DS 15 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 16 – Round 1

Mine Plan, Section MP.4.2.8. Please provide a detailed description for the disposal of empty drums, not just a citation of the EPA Rule which is probably not know by most readers of this public document.

Response DS 16 – Round 1

The EPA Code Federal Regulation cited is public information which may be accessed online or at a public library if the reader desires to know the specifics requirements and steps regarding container disposal.

Comment DS 16 – Round 2

Response is not adequate. The Round 1 review comment was not addressed. Please provide the required detail in the drum disposal discussion. The general public may or may not have access to the Federal Register, but must provide a public document which stands alone, without need to reference other documents to provide the information required to explain the commitments made. Therefore, RAMACO must expand on what the EPA Rule requires for the readers of this permit.

Response DS 16 – Round 2

RAMACO has committed to disposing of empty drums according to Title 40 CFR Part 261.7. RAMACO has cited the federal regulation that stipulates the disposal of empty containers. RAMACO will not summarize this federal regulation in the Brook Mine Permit for two reasons:

1. Federal regulations are made public. Any member of the public has access to the Code of Federal Regulations. This regulation was accessed by WWC on the

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internet, meaning any person with access to the internet can search and find this regulation. If a member of the public does not personally have access to the internet, said person can go to the local public library to obtain access to the internet.

2. The Code of Federal Regulations is a living document that is subject to change at any time. By committing to the stipulations of Title 40 CFR Part 261.7 without summarizing the regulation, RAMACO commits to observing any requirements of the regulation at any time no matter how the regulation might change in the future. If RAMACO summarizes the regulation and the regulation changes in the future contrary to what it originally stipulated, RAMACO will be automatically stating commitments contrary to federal regulation. The possibility of being out of compliance with federal regulation is avoided by simply citing the regulation RAMACO commits to observing.

Addendum MP-4 remains unchanged.

Comment DS 16 – Round 3

No comment received.

Response DS 16 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DS 17 – Round 1

Mine Plan, MP.4.3.1 discusses overburden removal processes. However, little detail is given to explain the actual process for overburden handling. Will the first cut be stockpiled and used to fill the last cut? When special handling is required, which is almost certain given the nature of some overburden and the need for some soil replacement materials, what assurance will be made that poor quality materials will be safely located in the backfill or in separate stockpiles, or that topsoil substitutes will be handled and stored as topsoil in a useful manner as required under Chapter 4, Section 2(b)(x)(A)? Please provide a more detailed overburden handling plan. Perhaps some of these details are observed in later sections. Please provide additional details not provided elsewhere.

Response DS 17 – Round 1

See Sections MP.4.3.5, MP.4.6 and MP.4.7. Revised text as requested.

Comment DS 17 – Round 2

No comment received.

Response DS 17 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DS 18 – Round 1

Mine Plan, Section MP.4.3.4. The volumetric analysis shown in Table MP.4-4 and MP.4-5 may change depending on results of required additional overburden sampling and volumetric analysis. If the overburden depth overlying coal changes as a result of additional sampling, the volumetric analysis will also change. If post mining contour changes are necessary due to adjusted swell factors permit revision will probably not be required until the changed PMT exceeds plus or minus 20 feet of the approved at which time a Reclamation Plan revision will be required. This kind of detail should be included in the permit commitments.

Response DS 18 – Round 1

Revised text as requested.

Comment DS 18 – Round 2

Response is not adequate. Does the volumetrics of stockpiles include the coal partings and heavily oxidized coal seams that will not be mined for sale and have not been included in overburden quality assessment data? Will swell factors be adequate to meet PMT requirements after mining of coal from box cuts? What steps will be taken, such as borrow areas not currently shown on any maps, would be used to mitigate inadequate backfill, keeping in mind that contouring must provide reestablishment of drainage patterns on the mine.

Response DS 18 – Round 2

The volumes of materials required to be placed in stockpiles were calculated from grid files in AutoCAD. The grid files are based on borehole/exploration hole data. These volumes were then increased by 16% (as stated in Section MP.4.3.4) to account for swell. In response to Comment DS 22 – Round 2, the topsoil volumes have been recalculated using the specified depths in Appendix D7 within each soil polygon. In most of these cases, the salvage depth of topsoil was increased from 0.5 feet to nearly 1.5 feet (or whatever the appropriate salvage depth was in the specific area). This significantly increased the volume expected to be placed in topsoil stockpiles. However, that volume that was originally assumed to be overburden that is now in topsoil stockpiles was not removed from the overburden stockpiles. Therefore, the volumes shown for overburden stockpiles should be slightly high. This will provide for additional storage of coal partings or materials from heavily oxidized coal seams should such volume requirements be necessary. The overestimate of overburden stockpile size is conservative. This simply shows that the mine does have the capability to store all the overburden materials. It is unnecessary to readjust overburden stockpiles to be smaller after topsoil calculations since this material was planned to be placed during reclamation.

As stated in Section MP.4.3.4, the actual swell factors will be monitored. Also stated in Section MP.4.3.4, if the actual swell factors differ significantly from what is

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approved, the post mining topography will be adjusted. This is standard practice for coal mines, and RAMACO is prepared to meet this obligation. RAMACO cannot be certain what the swell factors will be until after material is excavated, stockpiled, handled, and reclaimed. Once the material is monitored and volumes of swelled material are better known, this data will be reported in the Annual Report, as stated in Section MP.4.3.4.

In reference to the PMT, please refer to the Reclamation Plan. As shown in Exhibit RP.3-1, all drainage patterns were maintained. Any borrow to tie the PMT into the existing ground occurred within the disturbance boundary. Because of the relatively minimal disturbance by the Brook Mine, reclaiming the surface to nearly premining conditions was relatively simple. Again, should the swell factor vary significantly from what is currently assumed, the PMT will be redone to account for this adjustment and should any additional borrow areas be required, the disturbance boundary will be increased.

Comment DS 18 – Round 3

No comment received.

Response DS 18 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DS 19 – Round 1

Mine Plan, Section MP.4.6.1. The typical overburden sampling protocol as stated in Guideline 1 calls for one sample taken every 40 square acres of the permit area. Overburden sampling for underground mining operations differs from typical coal mine sampling protocols and is stated in the Coal Rules, Chapter 7, Section 1(a)(i)(A) which calls for overburden sampling and characterization on areas where surface operations will cause removal of overburden down to the level of the coal seam. Please make changes to the text accordingly and perform additional overburden sampling where required.

Response DS 19 – Round 1

Revised text as requested.

Comment DS 19 – Round 2

No comment received.

Response DS 19 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DS 20 – Round 1

Mine Plan, Section MP.4.3.5. A statement was made in this section that "Overburden stockpiles will only block ephemeral drainages if runoff control and sediment control measures are made and approved by WDEQ/LQD." Placement of overburden in ephemeral drainages will require a discussion of how water will be diverted around the overburden stockpile to prevent impoundment of water in addition of a discussion of sediment control measures for the stockpile to prevent of-site impacts of erosion down-slope from the stockpile. The LQD recommends that no overburden stockpiles be placed in ephemeral drainages.

Response DS 20 – Round 1

Revised Exhibit MP.4-3.

Comment DS 20 – Round 2

Response is not adequate. No response was provided. Please make necessary changes to the Mine Plan language concerning placement of overburden stockpiles.

Response DS 20 – Round 2

The statement reflects the allowances made by WDEQ/LQD rules and regulations. The statement was not made as a certainty that overburden piles will be placed in ephemeral drainages. Instead, the statement is provided in case overburden piles have to be placed in ephemeral drainages and provides the guidance as to how this will be done according to WDEQ R&R. WDEQ/LQD R&R Chapter 4, Section 2(c)(xi)(B) states:

"Ephemeral drainages may be blocked if environmentally sound methods for dealing with runoff control and sedimentation are approved by the Administrator."

The Mine Plan currently states in Section MP.4.3.5 in the first paragraph:

"Overburden stockpiles will only block ephemeral drainages if runoff control and sediment control measures are made and approved by WDEQ/LQD."

"...runoff control and sediment control measures are made and approved by WDEQ/LQD" implies that if an overburden stockpile blocks an ephemeral drainage, discussion and approvals by WDEQ will be made for diverting water, use of ASCMS, prevention of down-slope impacts, etc. before the placement of the stockpile. Because the permit text meets WDEQ/LQD R&R, no changes have been made to the text.

As shown in Exhibit MP.5-1, all of the overburden stockpiles avoid being placed such that they block ephemeral drainages. All ephemeral drainages flow around the stockpiles. However, the statement remains in the permit should RAMACO be required to block an ephemeral drainage and seeks the permission and approval of WDEQ/LQD, as allowed by WDEQ/LQD R&R Chapter 4, Section 2(c)(xi)(B).

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Comment DS 20 – Round 3

No comment received.

Response DS 20 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DS 21 – Round 1

Mine Plan, Tables MP.1-1, MP.1-2 and MP.4-1 must show the actual years for proposed progressions, or the year 1 progression must be tied to a specific year in the Mine Plan text.

Response DS 21 – Round 1

Revised tables as requested. Added note saying that Year 0 corresponds to the year 2016.

Comment DS 21 – Round 2

No comment received.

Response DS 21 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 22 – Round 1

Mine Plan, Tables MP.4-3 and MP.4-5. Topsoil volumes appear to be underestimated in TS- 2, TS-6, TS-10 and TS-11 while underestimating the proposed volume in TS-1. Also overburden volumes appear to be underestimated in OB-4, OB-7, OB-11, OB-14 and OB-15, and overestimated in OB-16, which may affect estimates presented in Table MP.4-4 as well.

Response DS 22 – Round 1

Volumes are estimated based on the stripping volumes and available backfill area with excess material going to and from stockpile for contemporaneous reclamation. No updates will occur in response to this comment.

Comment DS 22 – Round 2

Response is not adequate. Several discrepancies have been discovered during the review. TS-1 capacity according to Table MP.4-3 is 89,600 cubic yards, but Table MP.4-1 shows 120,200 cubic yards added to the stockpile. Our estimate are significantly different from yours based on the footprint and average height.

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Stockpile	Basal Area (acres)	Average Height (ft)	Volume Estimate (cy)	RAMACO's Volume Estimate (cy)
TS1	1.4	20	22,587	89,600
TS2	3.5	45	127,051	85,100
TS3	1.5	30	36,300	70,300
TS4	1.1	25	22,183	26,600
TS5	3.0	55	133,101	98,400
TS6	4.5	45	163,351	150,800
TS7	0.7	20	11,293	13,800
TS8	0.9	25	18,150	19,300
TS9	0.8	20	12,907	15,900
TS10	2.0	50	80,667	70,300
TS11	0.9	20	14,520	12,000

The volume of topsoil in stockpiles by year presented in Table MP.4-1 appears to be based on a six-inch salvage depth as shown below. Perhaps the salvage depth was intended to be 2 ft. but the volumes would have to increase by a factor of 4.

Stockpile	Acres Salvaged	Volume Salvaged (cy)	Depth (ft) (Volume (cu.ft./Area (sq.ft.))
TS1	80	64,500	0.50
TS1	43	34,700	0.50
TS1	23	18,600	0.50
TS1	13	10,500	0.50
TS1	19	15,300	0.50
TS1	5	4,000	0.50
TS1	9	7,300	0.50

The LQD requires RAMACO to evaluate topsoil stockpile volumes and depths of soil salvage expressed on specific areas of disturbance since each disturbance will undoubtedly result in different salvage and replacement depths.

All volumetric data in tables presented in the Mine Plan and in the reclamation bond estimate must be must be correct, so the LQD requires that:

a) All topsoil salvage and bond estimates must be based on depth estimates provided in Appendix D7 and the approximate acreage of each soil series disturbed. Therefore, the soil salvage depth and topsoil volumes expressed in table MP.4-3 must be linked to site-specific soil depths. Table MP.4-1 must also include salvage depths for each calculation.

b) All following topsoil salvage and volumetric tables must be corrected based on volumes for TableMP.4-1.

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c) All reclamation performance bond estimates must be changed to reflect corrected topsoil volumes.

d) An average depth of topsoil to be salvaged for the entire mining operation must be provided in the Mine Plan text.

e) Topsoil stockpile footprints and heights will need to be corrected on tables and figures.

Response DS 22 – Round 2

Responses to the list of WDEQ/LQD requests are as follows:

a) Topsoil salvage estimates were updated to reflect the salvage depths of specific soil types in Appendix D7. To accomplish this, the soil polygons in Appendix D7 Exhibit D7.3-1 were used to create a 3D grid in AutoCAD that represented the salvage depth for each soil type. Volumes were then "removed" within each topsoil stripping area shown in Exhibit MP.4-2. Outputs from AutoCAD included the average cut depth within each topsoil stripping area. The average cut depth essentially reflects the weighted average of cut depths depending on recommended salvage depth of each soil and the areal extent of each soil type within the stripping areas. The average cut depth is now provided in Table MP.4-1. Again, this depth reflects a weighted average and will not match the recommended salvage depths in Appendix D7. To reflect what topsoil types will be salvaged in each stripping area, the soil polygons shown on Exhibit D7.3-1 were added to Exhibit MP.4-2 which already shows the topsoil stripping areas. This exhibit can be compared to Table MP.4-1 for volume calculations.
b) Table MP.4-1, Table MP.4-2, and Table MP.4-3 were all updated to show the corrected topsoil volumes.
c) The weighted average of salvage depth is provided in the Mine Plan text in Section MP.4.2.1 in the second paragraph.
d) The topsoil stockpile footprints and heights have been corrected on Table MP.4-3 to reflect the new volumes. Please note: Stockpile heights are only averages. The stockpile height varies considerably for most stockpiles because of the nature of the topography in the Brook Mine permit area. When AutoCAD builds the 3D stockpiles, the topography is taken into account for the areal extent of the base. Therefore, hand calculations will unlikely replicate the volumes of stockpile by only considering basal area, average height, and typical side slope. To reflect the change in the topsoil stockpile footprints, the disturbance boundary was updated in Exhibits MP.1-1, MP.4-1, MP.4-2, MP.4-3, MP.4-4, MP.4-5, MP.5-1, MP.5-2, and MP.16-1. The hatches that represent the stockpile footprints were updates in Exhibit MP.4-3 and Exhibit MP.5

Comment DS 22 – Round 3

No comment received.

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DEQ 34-120

Response DS 22 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DS 23 – Round 1

Mine Plan, Exhibit MP.4-2 and MP.4-3 must show the dates (actual years) for the salvage of topsoil and removal of overburden, or year 1 must be tied to an actual year when operations will begin (2016, 2017, etc.). The map or tables in the Mine Plan must provide proposed years and volumes for stockpile construction as well.

Response DS 23 – Round 1

Revised Exhibits as requested. Added note saying that Year 0 corresponds to the year 2016 on all Exhibits with years.

Comment DS 23 – Round 2

No comment received.

Response DS 23 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 30 – Round 1

Reclamation Plan, All Mine Plan Maps with progressions must show the actual years of the initial disturbance or mining activity, or the progression must be linked to a specific year in Reclamation Plan text. The maps must also include the contour interval.

Response DS 30 – Round 1

Revised Exhibits as requested.

Comment DS 30 – Round 2

No comment received.

Response DS 30 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 32 – Round 2 (New Comment)

The LQD requests that RAMACO provide pit identification number/names for all proposed initial box cut locations which will reduce confusion for identification of incident locations or for descriptions during inspections. (DS)

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Response DS 32 – Round 2 (New Comment)

Exhibits MP.1-1, MP.4-1, MP.4-4, MP.5-1, MP.15-1, and MP.15-2 were all updated to include pit identification numbers. The text in Section MP.6.1 was also updated to include pit identification numbers to more conclusively identify pits in the hydrologic consequences discussion.

Comment DS 32 – Round 3

No comment received.

Response DS 32 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DE 1 – Round 1

Mine Plan, Figure MP.1.2 and page MP-3 – MSHA and best practices may require a safety berm on this safety bench which could require a wider bench. Figure MP.1.2 notes a minimum of 35' but the text on page MP-3 just states the bench will be 35' wide. There is a real possibility this safety bench might be used for light plants so it may need to be wider for access and small vehicle use as well as providing a safety bench.

Response DE 1 – Round 1

Revised text as requested.

Comment DE 1 – Round 2

No comment received.

Response DE 1 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 2 – Round 1

Mine Plan, Table MP.1-1 – The total disturbance doesn't seem to match the overall disturbance listed for the trench mining and facilities. Please explain or correct.

Response DE 2 – Round 1

Revised table as requested.

Comment DE 2 – Round 2

No comment received.

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Response DE 2 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 3 – Round 1

Mine Plan, Section MP.2.3, page MP-9 – The 1st sentence would be better if it started, "The explosive materials...". The 2nd sentence should replace the word "detonating" with "explosive". The 5th sentence in the 2nd paragraph should include cast boosters. The 6th sentence in the 2nd paragraph should discuss storage of emulsions, water gels, and slurries also. This section should also commit to proper signage of the explosive storage area. Please correct.

Response DE 3 – Round 1

Revised text as requested.

Comment DE 3 – Round 2

The third sentence in the 2nd paragraph needs to be corrected. It states one magazine will contain cast boosters and the other magazine will contain detonating cod and boosters. Boosters cannot be stored with detonating cord or detonators. I believe the text should say, "...the other magazine ...will contain detonating cord, detonators and other initiation products. Please correct.

Response DE 3 – Round 2

The third sentence of the second paragraph in Section MP.2.3 was changed as suggested to reflect that boosters will be stored separately from detonating cord, detonators, and other initiation products.

Comment DE 3 – Round 3

Response adequate.

Comment DE 4 – Round 1

Mine Plan, Section MP.5.7.5, page MP-34 – The word "of" in the 2nd line of the last paragraph should be "or". Please correct.

Response DE 4 – Round 1

Revised text as requested.

Comment DE 4 – Round 2

No comment received.

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Response DE 4 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 5 – Round 1

Mine Plan, Section MP.6.1, page MP-39 – The 1st sentence of the 1st full paragraph needs some improvement so it reads properly and makes sense. Please correct.

Response DE 5 – Round 1

Revised text as requested.

Comment DE 5 – Round 2

The 1st sentence of the 1st full paragraph still needs to be improved so it makes sense. The current version says "... Hidden Water Creek watershed will occur..." It doesn't make sense as it is written. Please correct.

Response DE 5 – Round 2

The text was corrected in the fourth paragraph of Section MP.6.1 to state:

"In the fourth and fifth years, mining occurs east of the Slater Creek watershed and west of the Hidden Water Creek watershed. Mining will occur primarily in minor drainages of the Tongue River in Sections 8, 17, and 18, T57N, R84W, as seen on Exhibit MP.1-1."

Comment DE 5 – Round 3

Response adequate.

Comment DE 6 – Round 1

Mine Plan, Section MP.14.2, page MP-55 – The 2nd paragraph discusses the use of "cast primers". The term should be "cast boosters" as it doesn't become a primer until the detonator is added or detonating cord is attached to it. The discussion of priming holes should describe the use of a cast booster and how it is made-up to become a primer, i.e. with detonating cord or a detonator (blasting cap). Please correct.

Response DE 6 – Round 1

Revised text as requested.

Comment DE 6 – Round 2

No comment received.

Response DE 6 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DE 7 – Round 1

Mine Plan, Section MP.14.3.2, page MP-56 – In the 2nd line the item "(primer with detonator)" should be changed to "(cast booster with detonator)". Please correct

Response DE 7 – Round 1

Revised text as requested.

Comment DE 7 – Round 2

No comment received.

Response DE 7 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 8 – Round 1

Mine Plan, Section MP.14.3.2, page MP-56 – The 2nd paragraph discusses powder factors in coal and overburden and the high end of the ranges is extremely high for the type of rock and coal in this area. RAMACO should eliminate the range and simply state powder factors will be adequate to effectively fragment the overburden and coal.

Response DE 8 – Round 1

Revised text as requested.

Comment DE 8 – Round 2

RAMACO kept the powder factor range of 0.2-0.7 pounds per ton in the text. As stated in the 1st round review the high end of the range is extremely high for coal. I would recommend that the text simply state that the powder factors will be adequate to effectively fragment the coal and overburden. Please correct.

Response DE 8 – Round 2

In Section MP.14.3.2, the powder factor ranges for coal and overburden were removed as suggested. The text now states that the powder factors will be chosen to adequately fragment coal or overburden, depending upon which is being blasted.

Comment DE 8 – Round 3

Response adequate.

Comment DE 9 – Round 1

Mine Plan, Section MP14.3.3, page MP-56 – RAMACO should reword this to say that initiation will be done using non-electric or electric systems, which may include electronic detonators, shock tube detonators, detonating cord, electric detonators or a

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combination of these. Igniter cord is used to initiate safety fuse and it's highly unlikely that any safety fuse will be used at this mine. Please correct.

Response DE 9 – Round 1

Revised text as requested.

Comment DE 9 – Round 2

No comment received.

Response DE 9 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 10 – Round 1

Mine Plan, Section MP.14.4, pages MP-56 & 57 – It is probable that emulsions will also be stored on site so it should be mentioned since emulsion/ANFO blends are the most widely used product in wet holes. Please correct.

Response DE 10 – Round 1

Revised text as requested.

Comment DE 10 – Round 2

No comment received.

Response DE 10 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 11 – Round 1

Mine Plan, Section MP.14.6, pages MP-57 & 58 – Residents who request a pre-blast survey must make the request to the permittee and the Administrator of Wyoming Land Quality Division (LQD). The permittee is responsible for getting the pre-blast survey done and distributed to the person that requested it and the LQD Administrator. Please correct.

Response DE 11 – Round 1

Revised text as requested.

Comment DE 11 – Round 2

No comment received.

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Response DE 11 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 12 – Round 1

Mine Plan, Section MP.14.7, pages MP-58 & 59 – LQD will not approve protecting uninhabited structures (what LQD refers to as engineered structures) at 8.0 inches per second (ips) of peak particle velocity. LQD would allow a maximum limit of 5.0 ips. RAMACO would have to assure that this limit was not exceeded by the use of a seismograph at these structures on all blasts. RAMACO could apply for a modified scale distance factor to show compliance with this limit of 5.0 ips by submitting a vibration study and doing a regression analysis to show the allowable ppv is not exceeded at a 95% confidence level. However, this will require the vibration study be submitted with seismograph records from shots in the mining area so it cannot be done until after some blasting has been done at the mine. Please correct this text.

Response DE 12 – Round 1

Revised text as requested.

Comment DE 12 – Round 2

No comment received.

Response DE 12 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 13 – Round 1

Mine Plan, Section MP.14.8.1, page MP-60 – The discussion on typical pattern size should be changed to more general language. Using the parameters given the powder factor used would be approximately 0.16 lbs./CY using ANFO and in the 0.23-0.25 lbs./CY range when shooting an emulsion blend. These powder factors are not high enough to adequately fragment the overburden. Please correct.

Response DE 13 – Round 1

Revised text as requested.

Comment DE 13 – Round 2

RAMACO continues to discuss a "typical" pattern size and stemming amount. Given the bench height, pattern size, stemming height, hole diameter listed it would be nearly impossible to get powder factors high enough to adequately fragment the overburden. The large burdens and spacings in a 50' high bench would likely leave hard zones between the holes. The large amount of stemming compared to powder

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column height gives poor powder distribution in the holes which will likely lead to hard zones in the upper portions of the bench. This discussion needs to be improved.

Response DE 13 – Round 2

The text in Section MP.14.8.1 has been edited to discuss generalities in overburden blast design as opposed to listing the specifics of before. The text now provides more open design standards for RAMACO to function as necessary for safe and efficient blasting during mining operations.

Comment DE 13 – Round 3

Response adequate.

Comment DE 14 – Round 1

Mine Plan, Section MP.14.8.1, page MP-60 – The 2nd paragraph says if water is in the holes a slurry or water gel explosive will be used. Most likely an emulsion/ANFO blend with good water resistance will be used in wet holes and not a slurry or water gel. Please correct.

Response DE 14 – Round 1

Revised text as requested.

Comment DE 14 – Round 2

No comment received.

Response DE 14 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 15 – Round 1

Mine Plan, Section MP.14.8.1, page MP-60 – The 3rd paragraph discusses the explosive weight per hole and the powder factors. The explosive densities listed are correct but the pounds per hole and powder factors are incorrect. In a 7.875" hole and with a density of ANFO of 0.85 g/cc the pounds/foot of hole is 17.95 lbs. and with 24' of powder column the pounds/hole is 431 lbs., making the powder factor = 0.16 lbs./CY. Similarly using an emulsion blend of 1.32 g/cc the pounds/foot = 27.87 lbs. and the pounds per hole would be 669 lbs. so the powder factor =o.25 lbs./CY. In the 50' hole described with 26' of stemming and 24' of powder the powder distribution is poor so it would likely lead to blocky material near the top of the bench. Please correct.

Response DE 15 – Round 1

Revised text as requested.

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Comment DE 15 – Round 2

No comment received.

Response DE 15 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 16 – Round 1

Mine Plan, Section MP.14.8.2, page MP-61 – Drilling a 35' x 35' pattern in a 15' thick coal seam with a 7.875" hole and 4.5' of stemming will probably result in excessive flyrock, stemming ejection, high airblast and hard zones between the holes. Expecting to stem 4.5' is not realistic – in the field the blaster is going to try to hold for 4' or 5' of stemming. Again RAMACO discusses using slurry or water gel in wet hole when an emulsion/ANFO blend with high water resistance would probably be used. Please correct. Also the powder factor listed for coal is probably a little high so it would be better to just say that the powder factor will sufficient to fragment the coal for the prime movers. Please correct.

Response DE 16 – Round 1

Revised text as requested.

Comment DE 16 – Round 2

RAMACO lists a pattern Drilling size of 35' x 35' and then in the text states the burden and spacing will 17.4' and 35.4'. As stated in the round 1 review comments, this pattern size in a 15' thick coal seam with a 7.875" drill hole will probably result in excessive flyrock, airblast and leave behind hard zones between the holes. The 2nd paragraph discuses using slurry and water gel and it is likely that an emulsion/ANFO blend with high water resistance would be used. RAMACO needs to revise the text in this section because this plan will not be effective.

Response DE 16 – Round 2

The text in Section MP.14.8.2 has been edited to discuss generalities in coal blast design as opposed to listing the specifics of before. The text now provides more open design standards for RAMACO to function as necessary for safe and efficient blasting during mining operations.

Comment DE 16 – Round 3

Response adequate.

Comment DE 17 – Round 1

Mine Plan, Section MP.14.10, page MP-63 – The last bullet item says that detonation during electric storms might be a reason for unscheduled blasting. This is confusing

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because it makes it sound like the operator would shoot during electric storms and the only safe thing to do when an electric storm approaches is clear the pattern and keep everyone a safe distance away until the storm passes. Please correct.

Response DE 17 – Round 1

Revised text as requested.

Comment DE 17 – Round 2

No comment received.

Response DE 17 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 18 – Round 1

Mine Plan, Addendum MP-7, Blaster's Log – Under the "Holes" heading RAMACO should use "burden" not the term "burden spacing". On the 2nd page the word "signiture" should be changed to "signature". Please correct.

Response DE 18 – Round 1

Revised text as requested.

Comment DE 18 – Round 2

No comment received.

Response DE 18 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment KM 11 – Round 2 (New Comment)

LQD recommends that sequence maps be revised to include only yearly backfilling and/or replacement, monthly backfilling and/or replacement areas may not be achievable as a permit commitment.

Response KM 11 – Round 2 (New Comment)

RAMACO appreciates the comment and understands the potential difficulty, but the permit remains unchanged.

Comment KM 11 – Round 3

No comment received.

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DEQ 34-130

Response KM 11 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 12 – Round 2 (New Comment)

Exhibit MP.1-1 shows surface disturbance beginning in 2017. However, other maps show disturbance beginning in Year "0", which according to the maps is Year 2016. Please be consistent.

Response KM 12 – Round 2 (New Comment)

Exhibit MP.1-1 has been corrected to properly show surface disturbance beginning in 2016.

Comment KM 12 – Round 3

No comment received.

Response KM 12 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 13 – Round 2 (New Comment)

Exhibits MP.4-2 and RP.5-1 use the same symbol for all years of activities; only color designates different years. Some of the color variations denoting years are not easily discernible from the legend to the map.

Response KM 13 – Round 2 (New Comment)

The exhibits have been changed to use different hatch patterns and colors for years to make separate years more easily discernible.

Comment KM 13 – Round 3

No comment received.

Response KM 13 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 14 – Round 2 (New Comment)

Do the slot openings include truck ramps? How will truck ramps be constructed in each slot?

Response KM 14 – Round 2 (New Comment)

The slot openings will include truck ramps that will be used to remove spoil and coal from the slots to the haul roads. By WDEQ/LQD definition in Chapter 1, Section

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2(ds), ramps are not considered roads. As discussed in Section MP.3.1.4, ramps are exempt from mine plan design considerations. The ramps will move and change frequently as mining progresses. To describe a specific way in which the truck ramps will be constructed in each slot would be difficult to accomplish due to the variability in each slot and at each phase of construction of the slot. As Section MP.3.1.4 states, the ramps will be developed with consideration given to the type of equipment operating on them, safety considerations, and surrounding conditions. Safety berms will be installed on all elevated edges.

Comment KM 14 – Round 3

No comment received.

Response KM 14 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 15 – Round 2 (New Comment)

Please confirm the volume of the overburden stockpiles. For example, based on LQD's review of the mine plan and the spoil backfilling sequence maps, it appears that OB-3 will be used to contain all overburden removed from the first slot opening.

Response KM 15 – Round 2 (New Comment)

Please see response to Comment BJ 67. WDEQ/LQD calculations did not consider the side slope of overburden stockpiles, therefore overestimating the volume of overburden stockpiles. Overburden stockpile volumes will be constantly changing over the course of mining due to ongoing reclamation activities. The overburden stockpiles have been sized to accept the required volume of spoil from the trenches, but spoil will likely be cycled in and out of the stockpiles on a regular basis to meet backfilling requirements. Volumes to be placed in stockpiles were calculated from 3D grid files in AutoCAD and given a swell of 16% to approximate the required space.

Comment KM 15 – Round 3

No comment received.

Response KM 15 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 16 – Round 2 (New Comment)

LQD recommends using a swell factor of 11 to 13%, based on our experience in the area.

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DEQ 34-132

Response KM 16 – Round 2 (New Comment)

A swell factor of 16% was used as an average approximation. Swell factors of material at other mines in the area have been as high as 20%-22%. After the first pit has been backfilled, a swell study will be conducted and stockpile and PMT design will be reevaluated if necessary. Refer to Section MP.4.3.4 for a discussion that states that actual swell factors will be monitored and PMT will be adjusted if necessary.

Comment KM 16 – Round 3

No comment received.

Response KM 16 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 19 – Round 2 (New Comment)

Page MP-8 states that the "approved Spill Prevention, Control, and Countermeasure (SPCC) plan will be on file with WDEQ and available at the Brook Mine. Who is responsible for approving the plan? WDEQ does not require a SPCC plan to be filed with the agency. SPCC plans is a federal requirement.

Response KM 19 – Round 2 (New Comment)

The text in Section MP.2.1.4 was edited to correctly state that the SPCC plan will be kept onsite at the mine for review and inspection by the EPA.

Comment KM 19 – Round 3

No comment received.

Response KM 19 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 20 – Round 2 (New Comment)

Page MP-8 states that the leachfield(s) will accept water from the change house and equipment service shop. Discharge of industrial wastewater from the equipment service shop into a leachfield may be subject to Chapter 16, Wyoming Water Quality Rules and Regulations.

Response KM 20 – Round 2 (New Comment)

Section MP.2.1.6 states that sewage wastewater from the change house and equipment service shop will be discharged into the leach field. The section does not mention disposal of industrial wastewater into a leach field. However, a statement was added that the septic tank and leach field will be constructed in accordance with WDEQ/WQD rules and regulations.

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DEQ 34-133

Comment KM 20 – Round 3

No comment received.

Response KM 20 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 21 – Round 2 (New Comment)

Page MP-8 states that wash down water will be sent to a wastewater impoundment. However Section MP5.2 (page MP-26) state that no wastewater impoundments are currently planned for the Brook Mine. Please discuss.

Response KM 21 – Round 2 (New Comment)

The statement made in Section MP.5.2 that no wastewater impoundments are currently planned was revised to state that designs for a wastewater impoundment are provided in Addendum MP-2. A wastewater impoundment will be required to treat wash down water.

Comment KM 21 – Round 3

No comment received.

Response KM 21 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 22 – Round 2 (New Comment)

Groundwater from dewatering pumps is to be pumped to sumps or NPDES treatment for use in road dust control. What kind of "NPDES" treatment is proposed?

Response KM 22 – Round 2 (New Comment)

The third paragraph of Section MP.5.9 states that the treatment facilities will be sedimentation ponds.

Comment KM 22 – Round 3

No comment received.

Response KM 22 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment KM 23 – Round 2 (New Comment)

The State of Wyoming has primacy for the National Pollutant Discharge Elimination System and issues permits under the Wyoming Pollutant Discharge Elimination

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DEQ 34-134

System (WYPDES). Please change all references to NPDES to WYPDES to accurately reflect the current regulatory situation.

Response KM 23 – Round 2 (New Comment)

The reference in the third paragraph of Section MP.5.9 to NPDES was removed. A statement was added that all water is intended to be used, and discharge from the permit area is not anticipated.

Comment KM 23 – Round 3

No comment received.

Response KM 23 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment MK 23 – Round 1

Mine Plan, Section MP.20 Alluvial Valley Floors, The discussion of underground mining in AVFs does not seem necessary given there is no plans for underground mining at the Brook Mine. Furthermore, it is conceivable that circumstances could exist where underground mining of an AVF would not be allowed by the LQD. For example, if the AVF was significant to farming and underground mining of the AVF would result in surface effects such that material damage to the AVF would occur. (MDK)

Response MK 23 – Round 1

While no underground mining is proposed within delineated AVFs, the mine maintains this option. If underground mining is ever planned under the AVF, the appropriate revisions will be made. Revised text as requested.

Comment MK 23 – Round 2

No comment received.

Response MK 23 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 46 – Round 1

Mine Plan, Section MP.4.1 Mining Sequence, 20. On Exhibit MP.4-1, please attempt to show the areas that would be highwall mined versus surface mined. These layers are currently not found until Exhibit MP.15-1. Alternatively, the text in this Section could specify that the areas to be highwall versus surface mined are shown in Exhibit MP.15-1. (MDK)

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Response MK 46 – Round 1

Revised text as requested.

Comment MK 46 – Round 2

No comment received.

Response MK 46 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 47 – Round 1

Mine Plan, Section MP.5.1 Surface Drainage and Erosion Plan, 21. Only Slater Creek and Hidden Water Creek are labeled and shown in Exhibit MP.5-1. In order to better evaluate the Hydrologic Control Plan, please provide labels and locations for the other stream channels, including Tongue River, Goose Creek, East Fork Earley Creek, and the other unnamed channels (as shown on the USGS 24K Quad) on the proposed permit area. (MDK)

Response MK 47 – Round 1

Revised Exhibit MP.5-1 as requested.

Comment MK 47 – Round 2

No comment received.

Response MK 47 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 48 – Round 1

Mine Plan, Section MP.5.1 Surface Drainage and Erosion Plan, 22. Exhibit MP.5-1 shows overburden stockpiles OB-13 and OB-12, as well as topsoil stockpile TS-6, occurring directly over the Slater Creek channel. The Exhibit does not show any diversion ditches to be used in these locations. Please either move the location of the stockpiles or present a plan to use a diversion to route Slater Creek around the stockpiles. (MDK)

Response MK 48 – Round 1

Revised Exhibit MP.5-1 as requested.

Comment MK 48 – Round 2

No comment received.

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Response MK 48 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 49 – Round 1

Mine Plan, Section MP.5.2 Sedimentation and Wastewater Impoundments, 23. Exhibit MP.5-1 shows the locations of two "sediment basins". Are these considered the same as "sedimentation impoundments", as discussed in this Section? If so, the designs for these two impoundments are not found within the Mine Plan. (MDK)

Response MK 49 – Round 1

The "sediment basins" shown in Exhibit MP.5-1 are not considered the same as the "sediment impoundments (reservoirs)." Sediment Basins are considered an Alternative Sediment Control Measure and are discussed in Addendum MP-1. As such, the design for these "sediment basins" are not included in the Mine Plan. However, the design criteria and construction standards for "sediment basins" are similar to those discussed within Section MP.5.2 of the Mine Plan. Revised text as requested.

Comment MK 49 – Round 2

Response accepted. The text states that there are no currently planned sedimentation impoundments planned at the Brook Mine. Please see new Mine Plan and Reclamation Plan comments below that request this clarification elsewhere in the permit. (MDK)

Response MK 49 – Round 2

The statement in Section MP.5.2 was revised to state that sedimentation and wastewater reservoirs will be required for mining operations. The designs of these impoundments are provided in Addendum MP-2. Exhibit MP.5-1 has been revised to show the locations of these impoundments. The disturbance boundary has also been adjusted to encompass the impoundments. Permit-level designs have only been provided for impoundments that are planned to be needed in the first five years of operations. Any potential impoundments required after the first five years will be provided once these impoundments are within five years of ensuing operations. Due to the fact that sedimentation, wastewater, and flood control reservoirs will be required, the text changes referenced in Comments MK 106, 108,109, 110, 111, 112, 113, and 114 (New Comments) were not made. The responses to these comments reflect that.

Sedimentation reservoirs have been designed to replace the ASCMs originally shown within one half of a mile of the Tongue River and Goose Creek to satisfy the requirements set forth in Guideline 15 (as discussed in Comment MK 116 (New Comment)).

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Comment MK 49 – Round 3

No comment received.

Response MK 49 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment MK 50 – Round 1

Mine Plan, Section MP.5.3 Flood Control, 24. This section discusses flood control reservoirs but it is not mentioned how many flood control reservoirs would be constructed and where their locations would be. Please provide this information to comply with LQD Coal Rules and Regulations, Chapter 2, Section 5(a)(i)(D)(IV). (MDK)

Response MK 50 – Round 1

Revised text as requested.

Comment MK 50 – Round 2

No comment received.

Response MK 50 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 51 – Round 1

Mine Plan, Section MP.5.4 Diversions, 25. This section mentions permanent diversions, but there are no apparent plans for permanent diversions. Please discuss if permanent diversions are anticipated as part of the mining operation, or if all diversions will be temporary. (MDK)

Response MK 51 – Round 1

Revised text as requested.

Comment MK 51 – Round 2

No comment received.

Response MK 51 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 52 – Round 1

Mine Plan, Section MP.5.4 Diversions, 26. Exhibit MP.5-1 shows only one diversion ditch for Hidden Water Creek in T57N, R84W, Section 9. Please discuss this particular diversion and its typical design in more detail in Section MP.5.4. (MDK)

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Response MK 52 – Round 1

Revised text as requested. Add design exhibit of the Hidden Water diversion ditch.

Comment MK 52 – Round 2

No comment received.

Response MK 52 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 53 – Round 1

Mine Plan, Section MP.5.5 Culverts, 27. Please provide a brief statement that commits to a periodic culvert inspection and maintenance plan to ensure that culverts will function properly over time. (MDK)

Response MK 53 – Round 1

Revised text as requested.

Comment MK 53 – Round 2

No comment received.

Response MK 53 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 54 – Round 1

Mine Plan, Section MP.5.8 Mine Pit Dewatering Plan, 28. The first sentence references a sedimentation reservoir. Where is the location of this sedimentation reservoir? Are these the "sediment basins" shown in Exhibit MP.5-1? If not these sedimentation reservoirs need to be added to this Exhibit. (MDK)

Response MK 54 – Round 1

Revised text as requested.

Comment MK 54 – Round 2

No comment received.

Response MK 54 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 55 – Round 1

Mine Plan, Section MP.5.8 Mine Pit Dewatering Plan, 29. The first paragraph references treating and discharging pit water. Please also reference in the text that appropriate WDEQ/WQD discharge permits (e.g., WYPDES) will be obtained prior to any discharge. (MDK)

Response MK 55 – Round 1

Revised text as requested.

Comment MK 55 – Round 2

No comment received.

Response MK 55 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 56 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 30. Exhibit MP.1-1 shows surface disturbance directly over a few areas of Slater Creek and Hidden Water Creek. Please identify the source of disturbance in these areas. Direct disturbance of the channel should be avoided unless there is a plan for a diversion to route the stream around the disturbance. (MDK)

Response MK 56 – Round 1

See response to Comment MK 76, 88 and 99. Revised text as requested.

Comment MK 56 – Round 2

No comment received.

Response MK 56 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 57 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 31. The mining trenches are often discussed with reference to Exhibit MP.1-1. However, the trenches are not shown on this Exhibit. Please add the locations of the trenches to Exhibit MP.1-1. (MDK)

Response MK 57 – Round 1

Revised Exhibit MP.1-1 as requested.

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Comment MK 57 – Round 2

Response not accepted. Exhibit MP.1-1 does show trenches in the east portion of the mine, but not the western portion. For example, in the first full paragraph on Page MP-42, it discusses trenches being constructed perpendicular to the flow path of the minor Tongue River drainages. On Page MP-43, several trenches are discussed: one trench constructed parallel to Slater Creek's flow in Section 18, a trench in associated with the surface mine to the west of Slater Creek, and a trench parallel to Slater Creek in Sections 11, 12, and 13. On Page MP-43, a trench is discussed along the "TRD5" channel. Please add all of these trench locations to Exhibit MP.1-1. Also, please use a different color other than grey for the trenches, as this color tends to blend with the topographic line color. (MDK)

Response MK 57 – Round 2

A hatch has been added to Exhibit MP.1-1 in the western portion of the permit boundary to more clearly show the trench locations. Another hatch has been added to Exhibit MP.1-1 to more clearly show the location of the surface mine. The hatch colors were chosen to stand out from the topographic line color. Additionally in response to Comment DS32 (New Comment), RAMACO has provided pit identification numbers on several exhibits and in Section MP.6 to make pit locations more easily understood.

Comment MK 57 – Round 3

Response accepted.

Comment MK 58 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 32. On Page MP-39, in the first carryover paragraph from the previous page, it states that any surface runoff to come in contact with mining disturbance will be treated prior to discharge. Please also reference in the text that appropriate WDEQ/WQD discharge permits (e.g., WYPDES) will be obtained prior to any discharge. (MDK)

Response MK 58 – Round 1

Revised text as requested.

Comment MK 58 – Round 2

No comment received.

Response MK 58 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 59 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 33. Please discuss the diversion ditch for Hidden Water Creek in the first carryover paragraph on Page MP-39. (MDK)

Response MK 59 – Round 1

Revised text as requested. See Hidden Water Creek diversion Exhibit MP.5-2 for further details.

Comment MK 59 – Round 2

No comment received.

Response MK 59 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 60 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 34. On Page MP-40, in the first carryover paragraph from the previous page, it states that any surface runoff to come in contact with mining activities will be treated prior to discharge. Please reference in the text that appropriate WDEQ/WQD discharge permits (e.g., WYPDES) will be obtained prior to any discharge. (MDK)

Response MK 60 – Round 1

Revised text as requested.

Comment MK 60 – Round 2

No comment received.

Response MK 60 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 61 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 35. On Page MP-40, there is a sentence: "The surface disturbance activities will have temporary impacts on Slater Creek geomorphology including ground cover and soil erodibility". This statement is unclear. Are the impacts to the actual Slater Creek channel or the uplands and other tributaries in the watershed? Is it reduced ground cover and increased soil erodiblity? Please provide a more explicit description of the possible impacts. (MDK)

Response MK 61 – Round 1

See response to Comment MK 56, 76, 88 and 99. Revised text as requested.

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Comment MK 61 – Round 2

Response not accepted. The text clarified that the only direct disturbance to the Slater Creek channel is where the channel will be redirected through a culvert under a proposed haul road. However, the sentence: "The surface disturbance activities will have temporary impacts on Slater Creek geomorphology including ground cover and soil erodibility" is still unclear. This statement implies that the channel stability of Slater Creek will be affected, and that bed and banks could experience excessive erosion. Please provide more discussion on what is meant by impacts to Slater Creek channel geomorphology. (MDK)

Response MK 61 – Round 2

Text was added to the fifth paragraph of Section MP.6.1 to clarify that the geomorphology of the Slater Creek channel such as the bed and banks will not be impacted. The only impacts to ground cover and soil erodibility will be in upper portions of the Slater Creek drainage where surface disturbance activities are proposed. The text now clarifies that this is the case and that ASCMs and other sediment and runoff control measures will be used to control sediment transport to Slater Creek.

Comment MK 61 – Round 3

Response accepted.

Comment MK 62 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 36. Please provide a discussion on whether the proposed mining operation would affect surface water quality such that designated uses would be affected on the major streams on and adjacent to the proposed permit area. (MDK)

Response MK 62 – Round 1

Revised text as requested.

Comment MK 62 – Round 2

No comment received.

Response MK 62 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 63 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 37. The text describes possible reductions in peak flows and storm volumes. Please describe in the PHC if the proposed mining operation will have any effects on nearby or downstream surface water rights. (MDK)

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Response MK 63 – Round 1

Revised text as requested.

Comment MK 63 – Round 2

Response not accepted. The text speaks to impacts to existing reservoirs/water rights on the permit boundary but does not provide a statement as to possible impacts to water rights off or downstream of the permit boundary. Please provide this discussion in the text. (MDK)

Response MK 63 – Round 2

The last paragraph of Section MP.6.1 previously stated:

"...the Brook Mine is expected to have an extremely small effect on surface water quality in the Tongue River and other major streams adjacent to the permit boundary of the Brook Mine. As such, no effect on the designated uses present on major streams adjacent to the permit boundary is expected."

Two sentences have been added to the last paragraph of Section MP.6.1. The first states:

"There is no anticipated impact to water rights downstream of the permit boundary either." (In reference to water quality.)

The second sentence states:

"Additionally, the minimal reduction of any surface water runoff in the upper reaches of drainages in the Brook Mine permit area will not likely have any impact on downstream water rights."

Comment MK 63 – Round 3

Response accepted.

Comment MK 64 – Round 1

Mine Plan, Section MP.6.1 Surface Water, 38. Please add a brief statement to the PHC that if it is determined that the mining operation affects a surface water right, that water right would be replaced with a water source of similar quantity and quality as provided by W.S. § 35-11-415(b)(xii). (MDK)

Response MK 64 – Round 1

Revised text as requested.

Comment MK 64 – Round 2

No comment received.

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Response MK 64 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 65 – Round 1

Mine Plan, Section MP.6.1.1 Land Erosion Stability, 39. It is unclear the intent of this section. It seems to be out of place in the mine plan, as it discusses the USLE in the context of only native and reclaimed conditions. Furthermore, no data other than the K factors are presented in Mine Plan Tables (Table MP.6.1). The Reclamation Plan also does not discuss applying the USLE, so it would seem that Section MP.6.1.1 should be removed unless a USLE analysis is completed of pre- vs during- vs postmine erosion predictions. (MDK)

Response MK 65 – Round 1

Section MP.6.1.1 has been removed.

Comment MK 65 – Round 2

No comment received.

Response MK 65 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 66 – Round 1

Mine Plan, Section MP.7.1 Surface Water Monitoring, 40. It is unclear why reservoirs will be monitored in the operational monitoring program when these features were not sampled for during baseline characterization. If the reservoirs have the potential to be affected by the mining operation they should be sampled prior to mining with this information presented in Appendix D6. (MDK)

Response MK 66 – Round 1

Revised text as requested.

Comment MK 66 – Round 2

Response not accepted. Any reservoir potentially disturbed by mining activities should have a baseline water quality sampled collected with the information presented in Appendix D6. Section MP.6.1 states that Big Horn No. 2 Reservoir, Big Horn No. 14 Reservoir, Permanent Impoundment #1 Reservoir, and Legerski #1 Reservoir will be impacted by mining activities and will be reclaimed. At a minimum, the baseline water quality should be provided for these reservoirs in Appendix D6. RAMACO may also wish to expand the list of reservoirs sampled for baseline water quality to match those listed in Table RP.8-9. (MDK)

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Also, there is now a statement on Page MP-49: *All existing reservoirs, stockponds, and proposed reservoirs that will be disturbed by surface mining activities as discussed in Section MP.6.1 will be monitored for relevant discharge through grab samples to ensure that any water released from these reservoirs meets the WDEQ/LQD guidelines discussed above.* It is unclear which WDEQ/LQD guidelines are being referred to. Also, if these reservoirs are going to be discharging, a WYPDES permit would likely be required. Please clarify these items in the text (MDK).

Response MK 66 – Round 2

A commitment has been added to the first paragraph of Section MP.7.1 that states RAMACO will collect water quality data from reservoirs that could potentially be impacted by mining prior to its disturbance and this data will be provided in the Annual Reports. Table MP.7-1provides the expected monitoring locations.

Second, the statement in the third paragraph of Section MP.7.1 referring to discharge and citing aforementioned WDEQ/LQD guidelines was revised. Because these are existing reservoirs, discharge should not be the concern of RAMACO. RAMACO will monitor the reservoirs for the water quality constituents provided in Guideline 8, Appendix 7 for the time during mining upstream to ensure that mining has not impacted the reservoir.

These items should clarify that RAMACO will monitor reservoirs prior to mining operations upstream of the reservoir, and that the water quality monitoring will be to evaluate the aforementioned list as opposed to discharge. RAMACO does not have control of these reservoirs or how they are operated.

Comment MK 66 – Round 3

Response accepted.

Comment MK 67 – Round 1

Mine Plan, Section MP.7.1 Surface Water Monitoring, 41. Please add the reservoir monitoring locations listed in Table MP.7-1 to Exhibit MP.7.1. (MDK)

Response MK 67 – Round 1

Revised Exhibit MP.7.1 as requested.

Comment MK 67 – Round 2

No comment received.

Response MK 67 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 68 – Round 1

Mine Plan, Section MP.7.1 Surface Water Monitoring, 42. Please add the northing/easting State Plane coordinates for the surface water monitoring stations to Table MP.7.1. (MDK)

Response MK 68 – Round 1

See response MK

Comment MK 68 – Round 2

Response not accepted. The coordinates were not added to the Table. Please see response to Comment MK 35. Please add the northing/easting State Plane coordinates for the surface water monitoring stations to Table MP.7.1. (MDK)

Response MK 68 – Round 2

Table MP.7-1 has been updated to include the State Plane coordinates.

Comment MK 68 – Round 3

Response accepted.

Comment MK 69 – Round 1

Mine Plan, Section MP.7.1 Surface Water Monitoring, 43. Please identify what type of water quantity data will be generated from the continuous stage monitoring. For example, will mean daily flow rates and/or peak daily flow rates be estimated, as these would likely be submitted to the LQD in the Annual Report? (MDK)

Response MK 69 – Round 1

Revised text as requested.

Comment MK 69 – Round 2

No comment received.

Response MK 69 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 70 – Round 1

Mine Plan, Section MP.7.1 Surface Water Monitoring, 44. The text in the last paragraph on Page MP-45 states that water quality samples will be collected from a single station using an ISCO automatic sampler. Please identify in the text which station this is. Also, please explain the rationale for using an ISCO sampler at only one of the four stream monitoring sites. (MDK)

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Response MK 70 – Round 1

Revised text as requested. The station equipped with the ISCO automatic sampler was the only station equipped with such a device due to the stations location as well as expected flows. Quarterly grab samples taken at stations upstream of mining disturbances will give an accurate representation of water quality entering the permit boundary. Since the station equipped with an automatic sampler is located near the area in which Slater Creek exits the permit boundary, an automatic sampler allows the operator see if the mining activities of the Brook Mine have an impact on the water quality of Slater Creek as the highest chance water quality is affected will occur during precipitation events. An automatic recorder was not installed at the station downstream of disturbances on Hidden Water Creek because the recorded and modeled flows for the drainage are extremely low. No observable flow had been recorded on any surface water station along Hidden Water Creek, despite precipitation events having occurring. As such, any data collected by an automatic sampler on Hidden Water Creek would occur during extreme precipitation events in which the flows through Hidden Water Creek would likely have high turbidity and be an unrealistic representation of the water quality within Hidden Water Creek.

Comment MK 70 – Round 2

No comment received.

Response MK 70 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 71 – Round 1

Mine Plan, Section MP.7.1 Surface Water Monitoring, 45. The text in the first paragraph on Page MP-46 states that data will be evaluated to determine if any surface water and groundwater interactions exist. It would seem that any interactions should have already been identified during the baseline characterization of the hydrological system on and near the proposed permit area. It does not appear that the permit application discusses surface/groundwater interactions. (MDK)

Response MK 71 – Round 1

Revised text as requested. The monitoring is a continuation of the baseline monitoring sites.

Comment MK 71 – Round 2

Response not accepted. The response states that the text was revised but the same statement remains without any additional explanation. If surface and groundwater interactions are expected to exist then these should have already been discussed in the baseline characterization of the hydrologic system. It does not appear that the

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permit application discusses surface/groundwater interactions. Please provide more explanation on this in the text. (MDK)

Response MK 71 – Round 2

The third and fourth to the last sentences in the last paragraph of Section MP.7.1 were edited to state:

"Baseline monitoring has not indicated any interactions between surface water and groundwater. However, surface water data will continue to be compared to groundwater monitoring data to determine if any surface water and groundwater interactions exist that weren't observed in baseline studies."

Comment MK 71 – Round 3

Response accepted.

Comment MK 72 – Round 1

Mine Plan, Section MP.8 Water Use, 46. Please state in the text that all water from surface reservoirs or wells will be used under appropriate permits from the State Engineer's Office (SEO). (MDK)

Response MK 72 – Round 1

Revised text as requested.

Comment MK 72 – Round 2

No comment received.

Response MK 72 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 73 – Round 1

Mine Plan, Section MP.8 Water Use, 47. It is advised that the applicant discuss with the SEO-Interstate Streams Division any implications that water use may have under the Yellowstone River Compact. (MDK)

Response MK 73 – Round 1

Revised text as requested.

Comment MK 73 – Round 2

No comment received.

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Response MK 73 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 74 – Round 1

Mine Plan, Addendum MP-6 Subsidence Control Plan, Section MP.6.3 Subsidence Monitoring and Assessment and Section MP-6.4 Subsidence Control and Remediation, 48. The text states that subsidence monitoring would be discontinued if no evidence of subsidence occurred after six months after highwall mining. Please include a clarifying statement that the applicant would remediate subsidence up until bond release is approved, even if the subsidence was detected later than the six months of initial monitoring. (MDK)

Response MK 74 – Round 1

Please see revision to last paragraph of Addendum MP-6.

Comment MK 74 – Round 2

No comment received.

Response MK 74 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 106 – Round 2 (New Comment)

In Section MP.2.1.2 Change House and Equipment Service Shop, on Page MP-8, it states that wash down water will be routed to wastewater impoundment. As stated on Page MP-26, wastewater reservoirs are not currently planned as part of the mining operation. The text in this section should also clarify that wastewater reservoirs are not planned. (MDK)

Response MK 106 – Round 2 (New Comment)

The text in Section MP.2.1.2 was not revised. The text in Section MP.5.2 was changed to reflect that wastewater impoundment(s) will be required. Designs for the wastewater impoundment are provided in Addendum MP-2.

Comment MK 106 – Round 3

Response not accepted. The location of the wastewater impoundment is not shown in Exhibit MP.5- 1, as the map contains labels for only sedimentation ponds and flood control reservoirs. Exhibit 12 in Addendum MP-2 shows the design for a "typical facilities reservoir". The text in Section MP 5.2 should acknowledge that the location for the wastewater impoundment is not shown on Exhibit MP.5-1 and has not been determined yet, but the typical design is shown in Exhibit 12 in Addendum MP-2.

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Please make this correction or explain if my understanding of this issue is not accurate. (MDK)

Response MK 106 – Round 3

Text at the end of Mine Plan Section MP.5.2 has been revised, as requested. The text states the typical facilities reservoir location has yet to be determined and a typical design is included in Exhibit 12 of Addendum MP-2.

Comment MK 107 – Round 2 (New Comment)

In Section MP.5.2.1 General Design Criteria, there is a sentence: A discussion regarding the USLE method is provided in Section MP.6.1.1. As per to the response to Comment MK 65, Section MP.6.1.1 has been removed. Please remove the sentence that references Section MP.6.1.1. (MDK)

Response MK 107 – Round 2 (New Comment)

The sentence referencing the previously deleted Section MP.6.1.1 was removed.

Comment MK 107 – Round 3

Response accepted.

Comment MK 108 – Round 2 (New Comment)

In Section MP.6.1 Surface Water, there is a sentence on Page MP-42: *Any surface runoff to come in contact with mining disturbance will be treated in the pits or retained in sedimentation control structures in the vicinity of Hidden Water Creek to meet water quality standards before being discharged from the Permit Area.* As noted in the response to Comment MK 49, sedimentation impoundments are not currently planned as part of the mining operation. The text in this section should also clarify that sedimentation impoundments are not planned. (MDK)

Response MK 108 – Round 2 (New Comment)

The text in Section MP.6.1 was not revised. The text in Section MP.5.2 was changed to reflect that sedimentation reservoirs will be required for mining operations. The designs for sedimentation impoundments are provided in Addendum MP-2.

Comment MK 108 – Round 3

Response accepted.

Comment MK 109 – Round 2 (New Comment)

In Section MP.6.1 Surface Water, there is a sentence on Page MP-42: *As previously discussed, any runoff coming into contact with mining activities will be captured in a sedimentation impoundment or ASCM to meet water quality standards prior to discharge*

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from the Permit Area. As noted in the response to Comment MK 49, sedimentation impoundments are not currently planned as part of the mining operation. The text in this section should also clarify that sedimentation impoundments are not planned. (MDK)

Response MK 109 – Round 2 (New Comment)

The text in Section MP.6.1 was not revised. The text in Section MP.5.2 was changed to reflect that sedimentation reservoirs will be required for mining operations. The designs for sedimentation impoundments are provided in Addendum MP-2.

Comment MK 109 – Round 3

Response accepted.

Comment MK 110 – Round 2 (New Comment)

In Section MP.6.1 Surface Water, there is a sentence on Page MP-43: *Sedimentation impoundments will capture runoff that has come in contact with mining activities, and will treat the water to meet water quality standards before discharge.* As noted in the response to Comment MK 49, sedimentation impoundments are not currently planned as part of the mining operation. The text in this section should also clarify that sedimentation impoundments are not planned. (MDK)

Response MK 110 – Round 2 (New Comment)

The text in Section MP.6.1 was not revised. The text in Section MP.5.2 was changed to reflect that sedimentation reservoirs will be required for mining operations. The designs for sedimentation impoundments are provided in Addendum MP-2.

Comment MK 110 – Round 3

Response accepted.

Comment MK 111 – Round 2 (New Comment)

In Section MP.6.1 Surface Water, there is a sentence on Page MP-44: *Any runoff that does enter disturbed areas will be captured in a sedimentation pond or treated in the trenches to meet water quality requirements before being discharged from the Permit Area.* As noted in the response to Comment MK 49, sedimentation impoundments are not currently planned as part of the mining operation. The text in this section should also clarify that sedimentation impoundments are not planned. (MDK)

Response MK 111 – Round 2 (New Comment)

The text in Section MP.6.1 was not revised. The text in Section MP.5.2 was changed to reflect that sedimentation reservoirs will be required for mining operations. The designs for sedimentation impoundments are provided in Addendum MP-2.

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Comment MK 111 – Round 3

Response accepted.

Comment MK 112 – Round 2 (New Comment)

In Section MP.12.5 Mine Facilities, the first bullet is for a Sedimentation Pond. As noted in the response to Comment MK 49, sedimentation impoundments are not currently planned as part of the mining operation. The text in this section should also clarify that sedimentation impoundments are not planned. (MDK)

Response MK 112 – Round 2 (New Comment)

The bullet item in Section MP.12.5 was not deleted. The text in Section MP.5.2 was changed to reflect that sedimentation reservoirs will be required for mining operations. The designs for sedimentation impoundments are provided in Addendum MP-2.

Comment MK 112 – Round 3

Response accepted.

Comment MK 113 – Round 2 (New Comment)

In Section MP.12.5 Mine Facilities, the second bullet is for a Wastewater Reservoir. As stated on Page MP-26, wastewater reservoirs are not currently planned as part of the mining operation. The text in this section should also clarify that wastewater reservoirs are not planned. (MDK)

Response MK 113 – Round 2 (New Comment)

The bullet item in Section MP.12.5 was not deleted. The text in Section MP.5.2 was changed to reflect that wastewater reservoirs will be required for mining operations. The design for the wastewater impoundment is provided in Addendum MP-2.

Comment MK 113 – Round 3

Response accepted.

Comment MK 114 – Round 2 (New Comment)

In Section MP.12.5 Mine Facilities, the third bullet is for a Flood Control Reservoir. As stated on Page MP-29, flood control reservoirs are not currently planned as part of the mining operation. The text in this section should also clarify that flood control reservoirs are not planned. (MDK)

Response MK 114 – Round 2 (New Comment)

The text in Section MP.5.3 in the second paragraph was revised to reflect that flood control reservoirs will be required for mining operations within the first five years. The designs of these flood control reservoirs are provided in Addendum MP-2 and the

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locations in relation to the permit area are shown on Exhibit MP.5-1. Therefore, the text in Section MP.12.5 was not revised to remove "Flood Control Reservoir" from the list.

Comment MK 114 – Round 3

Response accepted.

Comment MK 115 – Round 2 (New Comment)

Mine Plan Addendum MP-1 commits to getting LQD approval and doing further sediment yield analysis for ASCMs that drain larger than 30 acres, as per LQD Guideline No. 15. It isn't clear from the Hydrologic Control Plan in Exhibit MP 5-1 if any of the currently proposed ASCMs drain more than 30 acres. Please indicate if any of the ASCMs shown in Exhibit MP 5-1 drain more than 30 acres. (MDK)

Response MK 115 – Round 2 (New Comment)

Exhibit MP.5-1 now shows the drainage areas for any ASCMs that drain more than 30 acres. Any ASCMs with drainage areas of more than 30 acres have designs provided in Addendum MP-2.

Comment MK 115 – Round 3

Response accepted.

Comment MK 116 – Round 2 (New Comment)

LQD Guideline No. 15 states that ASCMs should not be used for disturbed or reclaimed areas that are within one-half mile (channel distance) of Class 1 or Class 2 streams. Since the Tongue River and Goose Creek are Class 2 streams, please provide an analysis of the distance of the currently proposed ASCMs on Exhibit MP 5-1 to the Tongue River and Goose Creek. In accordance with LQD Guideline No. 15, more traditional sediment control methods (i.e., sedimentation impoundments) may be needed for disturbed areas that are close to the Tongue River and Goose Creek. (MDK)

Response MK 116 – Round 2 (New Comment)

Exhibit MP.5-1 now shows a half mile buffer from the Tongue River and Goose Creek. In those locations where ASCMs had been proposed within a half mile of either the Tongue River or Goose Creek, more robust methods of sediment control have been implemented (primarily sediment impoundments and collector ditches). Because several locations that require such sediment control measures are within the first five years of operations, sediment impoundments have been designed and these designs are provided in Addendum MP-2. The locations of the sediment impoundments and collector ditches in relation to the permit area are shown on Exhibit MP.5-1.

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Comment MK 116 – Round 3

Response not accepted. Thank you for providing the Class 1 and Class 2 Stream1/2 mile buffer on Exhibit MP 5-1 and for showing other forms of sediment control besides ASCMs in the buffer. However, the text should in this section should also state that the mine trenches will also serve as sediment control. This is important to demonstrate since there are some areas, for example in Section 18 near TR-6 and in Section 14 near TR-9A and TR-12 that are within the buffer to the Tongue River but sedimentation ponds will not be used. (MDK)

Response MK 116 – Round 3

The first paragraph of Section MP.5.1 has been revised to include discussion of mine trenches as a form of sediment control.

Comment MK 117 – Round 2 (New Comment)

LQD Guideline No. 15 provides monitoring guidance for ASCMs based on the drainage area upstream of the ASCM. For large receiving streams (drainage area greater than 1.0 square mile), monitoring should include repeated surveys of channel cross-sections and/or upstream and downstream sediment yield stations. Please provide a commitment to conduct this monitoring to evaluate the performance of the proposed ASCMs that drain to large receiving streams. (MDK)

Response MK 117 – Round 2 (New Comment)

A commitment has been added to the last paragraph of Section MP.5.1 that RAMACO will either monitor the stream channel cross sections or will have upstream and downstream sediment yield monitoring stations to ensure the ASCMs are functioning properly in areas that drain to receiving streams with a drainage area of greater than 1.0 square mile.

Comment MK 117 – Round 3

Response accepted.

Comment MK 123– Round 3 (New Comment)

MP.1.3 Acreage to Be Affected Annually. There is a sentence in the second paragraph of this section that is confusing and needs rewritten to improve clarity. The difference between disturbance boundary and affected area boundary would likely be confusing to the public and therefore a clear distinction should be made. The sentence states: The disturbance boundary includes all lands that will be physically disturbed during mining lands that are exclusive of the disturbance boundary but inclusive of the affected area boundary have the potential to be disturbed by mining. It is suggested that this be broken into two sentences: The disturbance boundary includes all lands that will be physically and directly disturbed during mining. The affected area

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MP.25 whether this disturbance would affect the essential hydrological functions of the AVF. (MDK)

Response MK 126 – Round 3 (New Comment)

Minor disturbance is planned within the Big Horn Mine AVF extent in Section 21of Township 57 North, Range 84 West. The disturbance would include placement of an overburden pile (OB-1) and a sediment pond (SP-1). The disturbance should not affect the essential hydrologic functions of the AVF on the Tongue River as the disturbed area is minimal in size and should not preclude the conveyance of flow. Discussion of the planned AVF disturbance has been added to the second paragraph of Section MP.25.

Comment MuK 32 – Round 1

Mine Plan, 32. Please provide an electronic copy of the groundwater model referenced in Addendum MP-3. In addition, please provide the GIS projection coordinate of the model files that will enable the LQD to plot the model results in GIS for the purposes of producing the CHIA (Cumulative Hydrologic Impact Assessment). The LQD review of the model files might potentially generate additional comments, clarifications or questions. (MK)

Response MuK 32 – Round 1

An electronic copy of the groundwater model will be provided under separate cover. The elements in the model are based on the Wyoming East Central NAD 83 state plane coordinate system. To convert from model Grid to the state plane coordinates the X offset is 1367387.512 and the Y offset is 1915004.382. There is no rotation from the model grid to the state plane coordinate system.

Comment MuK 32 – Round 2

Response conditionally accepted. Because of a version compatibility issue between the software used by the LQD and the mine, the LQD was not able to review the model files. The LQD has contacted Office of Surface Mining (OSM) to explore the options (if any) to update the Groundwater Vistas software to the latest version. OSM is looking into this issue and has not responded during the completion of the review. The LQD would also welcome any suggestions from the mine to resolve this issue. (MK)

Response MuK 32 – Round 2

RAMACO suggests that WDEQ/LQD obtain a "Student License" for Groundwater Vistas. A student license will allow WDEQ/LQD to view the model but not to make any changes to the model. The Brook Mine model cannot be saved to an older version of Groundwater Vistas without causing significant issues in the functionality of the model. The newer versions of Groundwater Vistas contain features vital to the functionality of the model that are not available in older versions of Groundwater Vistas.

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Comment MuK 32 – Round 3

Response not accepted. The LQD was able to obtain a newer version of Groundwater Vistas from the OSM. The model files provided in the initial submittal were attempted to run following the written instructions that came along with the model fi les. The steady state model ran and the results for mass balance were similar to the results provided in the application. However, the transient model results do not align with the results presented in the application. Please provide additional assistance and clarification to help the LQD replicate the model results. Depending on the results from this verification run, additional comments may be generated. In addition, please review comment# 74 on the revised model files.

Response MuK 32 – Round 3

During follow up discussions between WWC and Muthu Kuchanur it was discovered that from the time that the original model was developed and the time that the model files were reviewed at LQD, Groundwater Vistas had been updated. The model files provided to LQD were developed in Groundwater Vistas Version 6.43 Build 4. However LQD was using a later version of Groundwater Vistas (Version 6.78 Build 37. When the model files were run on the newer version of Groundwater Vistas they returned erroneous results. WWC downloaded the latest version of Groundwater Vistas (Version 6.80 Build1) available on December 1, 2015 and reconfigured the model to run on the latest version of Groundwater Vistas.

When the model files were configured to run on the later version of Groundwater Vistas, there were a few minor changes in the model results. While most of the differences in the model results were very minor, in order to ensure that the results reported in Addendum MP-3 matched the latest model simulations several pages in Addendum MP-3 were updated with the latest model results. Following are the pages in Addendum MP-3 that have been updated:

Executive summary, Page 4-the modeled drawdown to private wells was updated.

Executive summary, Page 5-the modeled drawdown to private wells was updated.

Section 3.1, Page 30-The version and build number used for the latest version of the model simulations was updated.

Table 4.7-1, Page 49, -The calibration Results were updated.

Figure 4.7-4, Page 54 -Model residuals on the figure were updated.

Table 4.8-1, Page 55-Model sensitivity results were updated.

Table 4.8-2 and Table 4.8-3 Page 56-Model sensitivity results were updated.

Table 4.8-4, Page 57- Model sensitivity results were updated.

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Section 4.9, Page 58- To accommodate a more efficient mine plan, in December 2015, RAMACO shifted the slot location between mine blocks 1 and 2 to the north approximately 630 feet. Since the footprint of the mine blocks are still generally similar, this small change in the location of the slot is not expected to significantly alter the groundwater model predictions. As a result, the groundwater model was not adjusted to specifically address this minor change to the mine plan. Additional text was added to this page to address the changes in the mine plan.

Table 4.9-1, Page 69 Maximum modeled drawdowns for adjacent wells were updated.

Section 4.9, Page 72 (Includes Table 4.9-2)-text and table describing pit inflows were updated.

Table 4.10-1, Page 77-Table was updated to include text denoting stress period and time step when values were measured and total inflow value for 5 years into mining were updated.

The latest model files configured to run on Groundwater Vistas Version 6.80, Build 1 are provided on a DVD with these comment responses.

Comment MuK 33 – Round 1

Mine Plan, MP.1.1 Type of Mine, 33. Page MP-1 states, "Below the Tongue River Member is the Lebo shale member of the Fort Union Formation which contains the Masters Seam (Cardno MM&A, October 2013)." This statement is not consistent with Table D5.3-1, Page D5-T1 and other descriptions in Appendix D5. Table D5.3-1 indicates Masters Coal seam is in the Tongue River Member. Please clarify and make appropriate changes throughout the submittal (Example: MP 4.4). (MK)

Response MuK 33 – Round 1

Revised text as requested.

Comment MuK 33 – Round 2

No comment received.

Response MuK 33 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 34 – Round 1

Mine Plan, MP.1.1 Type of Mine, 34. Major coal seams on the Brook Mine include: Dietz (1,2,3), Monarch, Upper Carney, Lower Carney and Masters.". Dietz (1,2,3) coal seam is not included in the description presented in Section D5.3.3.3, Appendix D5. Please clarify: (i) the seams that will be mined by the Brook Mine and (ii) include the description of all the coals seams as appropriate in Appendix D5 and Appendix D6. (MK)

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Response MuK 34 – Round 1

Please refer to Mine Plan Section MP.4.4.1 for targeted coal seams at the Brook Mine.

Comment MuK 34 – Round 2

No comment received.

Response MuK 34 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 35 – Round 1

Mine Plan, MP.5.8 Mine Pit Dewatering Plan, Consider using the groundwater model referenced in Appendix D-3 to provide a description for a range of estimates on anticipated dewatering rates/volumes and groundwater inflows to the mine pit. (MK)

Response MuK 35 – Round 1

The text in Section MP.5.8 is to indicate that water entering the pit from either groundwater or surface water will be controlled using sumps and treated prior to discharge.

Comment MuK 35 – Round 2

Response not accepted. Please provide a range of estimates of the expected groundwater inflows to the pit. The intent of this comment is to understand the volume/rate of water that will be dewatered to facilitate mine operations. In addition, please clarify if the groundwater model provides an estimate of this inflow to the pit. (MK)

Response MuK 35 – Round 2

Yes, the amount of water discharging from the drains to simulate mining can be used to estimate how much water would enter into the mine pits during the mining scenarios. The model predicted pit inflow rates are estimated to range between 0.3 gpm and 75 gpm depending on the location of the mine pits. Model predicted pit inflow rates have been added to Addendum MP-3 Section 4.9 (Table 4.9-2). Also, text describing the range of flows has been added to Section MP.5.8.

Comment MuK 35 – Round 3

Response accepted.

Comment MuK 36 – Round 1

Mine Plan, MP.5.8 Mine Pit Dewatering Plan, 36. Please clarify the anticipated effects of the faults on the dewatering plan or groundwater impacts during mining. (MK)

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Response MuK 36 – Round 1

Since the water will be collected in a sump, treated, and then discharged, the faults should have no effect.

Comment MuK 36 – Round 2

Response not accepted. It is acknowledged that the water will be collected in a sump. The intent of the comment is to get an understanding on the effects of faults on the inflows to the pit. For example, are the pit inflow rates sensitive to the location and permeability of the faults within the permit boundary? If yes, please provide a range of estimates to account for this sensitivity. (MK)

Response MuK 36 – Round 2

The faults do influence the inflow to the pits. As shown on MP-3 Figures 4.9-12, 4.9-13, and 4.9-14 the faults generally cause a shadow effect where the coals downstream of the faults dry out because the faults prevent efficient recharge of the coal aquifer downstream of the fault. An additional table added to Addendum MP-3 (Table 4.9-2) allows the influence of the faults on the pit inflows to be further evaluated. As shown on Table 4.9-2 the predicted pit inflow rates decline significantly between 2018 and 2019. Between 2018 and 2019 the mining moved closer to the fault located in the northeast side of the permit. The decline in pit inflow is partially due to the fact that the coals immediately downgradient of the fault are drier.

Comment MuK 36 – Round 3

Response accepted.

Comment MuK 37 – Round 1

Mine Plan, MP.5.9 Dewatering Wells, 37. Please provide a brief discussion on the anticipated quality of groundwater removed at various stages of mining. (MK)

Response MuK 37 – Round 1

Revised text as requested.

Comment MuK 37 – Round 2

Response not accepted. In addition to the reference to Appendix D6, please provide a description of any expected variability or trends in water quality of the groundwater removed as different coal seams are mined. Are there any expected groundwater constituents of concern based on Appendix D6? (MK)

Response MuK 37 – Round 2

The third paragraph of Section MP.5.9 now includes a short discussion summarizing information from Appendix D6. The discussion states some of reasons why water

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quality could vary during the progression of mining operations. However, the discussion also states that even with the variability, there are no expected groundwater constituents of concern that could cause problems during dewatering and surface containment. The following table is a summary of the information already provided in Appendix D6:

Constituent of Concern	Units	Acute Standard[1]	CRN	MST	CRN-MST
Priority Pollutants					
Arsenic, dissolved	mg/L	0.34	<0.005	<0.005	<0.005 - 0.007
Cadmium, dissolved	mg/L	0.002	<0.001	<0.001	<0.001 - 0.001
Copper, dissolved	mg/L	0.0134	<0.01 - 0.02	<0.01	<0.01
Lead, dissolved	mg/L	0.0646			<0.02
Mercury, dissolved	mg/L	0.0014	<0.001	<0.001	<0.001
Nickel, dissolved	mg/L	0.4682	<0.01	<0.01	<0.01
Selenium, dissolved	mg/L	0.02	<0.005 - 0.005	<0.005	<0.005 - 0.005
Zinc, dissolved	mg/L	0.1172	<0.01 - 0.01	<0.01 - 0.02	<0.01
Non-Priority Pollutants					
Ammonia	mg/L	varies[2]	<0.1 - 7.6	2 - 10.6	1 - 2.3
Chloride	mg/L	860	7 - 27	7 - 30	11 - 24
Fluoride	mg/L	2 [3]	0.5 - 1.9	0.5 - 1.5	1.7 - 2
Laboratory pH	s.u.	6.5-9.0	7.6 - 8.3	7.6 - 8.4	8.3 - 8.4
Nitrate/Nitrite	mg/L	10 [3]	<0.1 - 7.9	<0.1 - 8	<0.1 - 1.2
Barium, dissolved	mg/L	2 [3]	<0.1	<0.1	<0.1
Iron, dissolved	mg/L	0.3 [3]	<0.05 - 0.22	<0.05 - 0.68	<0.05 - 0.21

[1] WDEQ-WQD Rules and Regulations Chapter 1, Appendix B, Aquatic Life Acute Value
[2] WDEQ-WQD Rules and Regulations Chapter 1, Appendix C, Ammonia Toxicity is pH and Temperature Dependent
[3] WDEQ-WQD Rules and Regulations Chapter 1, Appendix B, Human Health Consumption of Fish and Drinking Water

As can be seen in this summary table, most constituents in the Carney and Masters coal seams fall below the acute standard. This table has not been included in the Mine Plan because this is baseline data that does not belong in the Mine Plan. This table has also not been added to Appendix D6 because the groundwater quality constituent concentrations are already summarized in Appendix D6. RAMACO has

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committed in the Mine Plan to monitoring groundwater quality during the course of operations in order to ensure that there are no constituents of concern that could cause issues while dewatering the mine pits in potential surface containment.

Comment MuK 37 – Round 3

Response accepted.

Comment MuK 38 – Round 1

Mine Plan, MP.5.9 Dewatering Wells, 38. If groundwater is discharged into a stream channel, anticipated discharge flow rate, water quality, and estimated seasonal discharge of the groundwater should be tabulated. The availability and suitability of this water for downstream water users should also be evaluated. Please clarify if this is an expected mechanism to discharge pumped groundwater. (MK)

Response MuK 38 – Round 1

Revised text as requested.

Comment MuK 38 – Round 2

No comment received.

Response MuK 38 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 39 – Round 1

Mine Plan, MP.5.8 Groundwater Rights, Please include a description on any expected degradation of groundwater quality caused by the mining operation (including lateral flow through spoils) in the adjudicated wells. (MK)

Response MuK 39 – Round 1

Revised text as requested.

Comment MuK 39 – Round 2

No comment received.

Response MuK 39 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 40 – Round 1

Mine Plan, MP.6.2.Groundwater, 40. Please provide a brief discussion on any hydrologic effects caused by anticipated changes in recharge to the aquifers during mining. (MK)

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Response MuK 40 – Round 1

Revised text as requested.

Comment MuK 40 – Round 2

Response not accepted. Not able to locate the revision made. Typically, the revisions from other operators are highlighted with bolded text or a different color to enable the reviewer to efficiently review the changes made. Without that tracking mechanism, it is difficult to review the exact revisions. Please consider using a distinct tracking mechanism in the future submittals. (MK)

Response MuK 40 – Round 2

RAMACO does not anticipate significant changes to recharge rates due to disturbance at the Brook Mine. Two sentences have been added to the end of Section MP.6.2.1 that state that RAMACO doesn't expect significant fluctuations in recharge rates, but commits to monitoring groundwater levels according to Section MP.7 and will report any significant fluctuations in groundwater levels that could be attributed to altered recharge rates.

Comment MuK 40 – Round 3

Response accepted.

Comment MuK 41 – Round 1

Mine Plan, MP.6.2.Groundwater, 41. Please provide an assessment of any subsidence effects (Addendum MP-6) on the hydrologic system during operations. (MK)

Response MuK 41 – Round 1

Revised text as requested.

Comment MuK 41 – Round 2

No comment received.

Response MuK 41 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 42 – Round 1

Mine Plan, MP.6.2.Groundwater, 42. Please discuss if there are any expected impacts on groundwater quality caused by subsidence. (MK)

Response MuK 42 – Round 1

Revised text as requested.

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Comment MuK 42 – Round 2

No comment received.

Response MuK 42 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 43 – Round 1

Mine Plan, MP.6.3.2 Plan to Mitigate the Impacts on Groundwater, 43. If the quality or quantity of adjudicated water supplies are affected, then an alternative source should be identified as part of the mitigation plan. Please provide a statement to meet this statutory requirement (W.S. § 35-11-415(b)(xii)). (MK)

Response MuK 43 – Round 1

Revised text as requested.

Comment MuK 43 – Round 2

No comment received.

Response MuK 43 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 44 – Round 1

Mine Plan, MP.7.2 Groundwater Monitoring, 44. Please clarify the lack of any shallow monitor wells near Hidden Water Creek, Goose Creek and Tongue River alluvium and if this will be an impediment to completely characterize the groundwater impacts during mining. (MK)

Response MuK 44 – Round 1

Hidden Water Creek has no alluvium therefore, no shallow well can be installed. Goose Creek in the area of the permit is through a reclaimed mine area (pre-law) therefore there is not alluvium. As discussed throughout we will not impact the Tongue River Alluvium. RAMACO will add wells in the Tongue River Alluvium.

Comment MuK 44 – Round 2

Response not accepted. Please provide a more detailed plan for installing the proposed alluvial monitoring well(s). (MK)

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Response MuK 44 – Round 2

See comments MK-21,22 (Round 2) responses. Discussion of the potential AVF impacts and proposed alluvial monitoring plan is presented in Mine Plan Section MP.25.

Comment MuK 44 – Round 3

Response accepted.

Comment MuK 45 – Round 1

Mine Plan, MP.7.2 Groundwater Monitoring, 45. Please clarify the possibility of any of the monitor wells shown in Exhibit MP.7-7 being discontinued due to any constraints in the proposed-mine plan (example: mined through). (MK)

Response MuK 45 – Round 1

Revised text as requested.

Comment MuK 45 – Round 2

No comment received.

Response MuK 45 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 46 – Round 1

Mine Plan, MP.8 Water use, 46. Page MP-47 states, "Industrial water will be obtained from groundwater wells or from water collected in sediment and flood control reservoirs." Please clarify if the groundwater wells mentioned in this statement are wells that will be exclusively used as industrial supply wells or if they are same as dewatering wells. (MK)

Response MuK 46 – Round 1

Revised text as requested.

Comment MuK 46 – Round 2

Response not accepted. Please provide additional description on the source aquifer for the proposed industrial supply wells. (MK)

Response MuK 46 – Round 2

Discussion regarding wells as a water source was removed from Section MP.8. Due to the coal seams being mostly dry and the only reliable aquifers being very deep, RAMACO will rely on surface water rights and water collected in the sediment and

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flood control reservoirs and other sources for supplying the quantities of water needed for industrial purposes. Refer to Table MP.8-1 for a summary of water quantity obtained from each source.

Comment MuK 46 – Round 3

Response accepted.

Comment MuK 47 – Round 1

Mine Plan, MP.8 Water use, 47. Page MP-48 states, "It is estimated that the total water use will be approximately 400 million gallons per year." Please provide a discussion comparing the reported water use by other mines of similar size in the Powder River Basin.

Response MuK 47 – Round 1

No record of reported water use was discussed in the annual reports submitted to WDEQ for several different mines within the Powder River Basin. As such, a comparison was unable to be made.

Comment MuK 47 – Round 2

Response not accepted. The SEO requires a submittal of the water use by the other mines. In addition, the coal review reports by the BLM also provide a summary of water use. Example: AECOM, Inc., 2014, Update of the Task 1B Report for the Powder River Basin Coal Review – Current Water Resources Conditions, prepared for Bureau of Land Management High Plans District Office and Wyoming State Office, http://www.blm.gov/pgdata/etc/medialib/blm/wy/programs/energy/coal/prb/coalreview/phase2/Task1B.Par.91805.File.dat/Task1B.pdf.

Response MuK 47 – Round 2

As discussed in the meeting between WDEQ and WWC on September 1, 2015, the AECOM report has been added as a reference to the Mine Plan. Water usage for the Brook Mine has been reevaluated and presented in Table MP.8-1. The fourth paragraph of Section MP.8 summarizes the expected water usage by the Brook Mine per year. This paragraph states that the approximate annual water usage at the Brook Mine will be 368 acre-feet which is on the lower end of water usage ranges provided in the report (300 to 920 acre-feet).

Comment MuK 47 – Round 3

Response accepted.

Comment MuK 48 – Round 1

Mine Plan, MP.8 Water use, 48. Page MP-48 states, "It is estimated that the total water use will be approximately 400 million gallons per year." Please provide a comparison of

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this estimated total water use against the various estimated water sources available during mining (Example: from dewatering wells). It will be very helpful to provide a discussion on contingency measures during extreme wet/dry years or if the proposed mine plan does not require extensive dewatering. (MK)

Response MuK 48 – Round 1

RAMACO is currently working to solidify the necessary water right for this water. The sources and associated amounts are in discussions and therefore not presented at this time.

Comment MuK 48 – Round 2

Response not accepted. The information will be reviewed as soon as it is made available to the LQD. (MK)

Response MuK 48 – Round 2

Table MP.8-1 has been added to the Mine Plan to outline the specific water uses with estimated quantities projected at the Brook Mine. Table MP.8-1 also shows the expected volume of water from each source. The fourth paragraph of Section MP.8 has been revised to state that the Brook Mine will use approximately 120 million gallons per year with an expected variability of plus or minus 20 percent. A statement was added to the fourth paragraph of Section MP.8 that enough water is available from the surface water rights that any variations in the quantities from other sources can be covered by the surface water rights.

Comment MuK 48 – Round 3

Response accepted.

Comment MuK 49 – Round 1

Mine Plan, MP.8 Water use, 49. Please clarify if there is any expected variability in this projected water use (example: is it closely related to the mine plan). (MK)

Response MuK 49 – Round 1

Revised text as requested.

Comment MuK 49 – Round 2

Response not accepted. The text indicates that the total water use will be approximately 400 million gallons per year. Please provide at least a range of expected variability in this projected annual water use. (MK)

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Response MuK 49 – Round 2

The water usage at the Brook Mine has been reevaluated. Table MP.8-1 has been added to the Mine Plan which summarizes the expected quantities of water usage per day by specific use. This table shows that the Brook Mine is expected to use approximately 328,200 gallons per day. The fourth paragraph of Section MP.8 states that this equates to approximately 120 million gallons per year (significantly less than originally reported). The text in the fourth paragraph of Section MP.8 also states that the water usage has an expected variability of plus or minus 20 percent.

Comment MuK 49 – Round 3

Response accepted.

Comment MuK 50 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 50. Page Addendum MP-3-19 states, "Since, most of the wells within the modeled domain are stock wells with intermittent pumping and completed in geologic strata below the Masters Coals, they are relatively inconsequential to the groundwater system modeled in this report." Please provide a Figure (or reference) to show these wells, their depths and discuss on why they are hydrogeologically isolated from the effects of the proposed mine. (MK)

Response MuK 50 – Round 1

All the groundwater rights are tabulated within Appendix B of the adjudication volume and Exhibits 5 and 8 in the adjudication volume show the locations of each respective groundwater right. Please note that adjudication Exhibits 5 and 8 include monitor wells in addition to stock and domestic wells so all the wells shown on the exhibits are not necessarily wells that are being used as water supply wells. In fact, almost all the completed water wells shown on Exhibit 5 of the adjudication volume within the Brook Mine permit area are actually monitor wells. The Cross Sections presented in Exhibit 2 of Addendum D5-3 show the depth of the coal seams at various locations within the Brook Mine Permit. For comparison, the depths of each well are listed in the tabulation in Appendix B of the adjudication volume.

The statement on Page MP-3-19 "they (the wells) are relatively inconsequential to the groundwater system modeled in this report" means that the wells are not believed to be significant stressors to the groundwater system because of their relatively low pumpage rates. This statement should not be interpreted to mean that all of the stock and domestic wells in the area are hydrologically isolated from the coals proposed for mining within the Brook Mine Permit area. In fact, Section 4.9 of Addendum MP-3 specifically describes 26 wells that, based on their depths and locations, are likely completed within the coals. The expected impacts to these wells were assessed as part of the modeling exercise. Based on a comparison between the reported depths in the water rights tabulation in Appendix B of the adjudication volume and the geologic cross sections in Addendum D5-3, the other stock and domestic wells in the area were

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determined to be completed either in the Tongue River alluvium, or deeper strata below the Carney coal and do not have a direct hydrologic connection to the coals proposed for mining in the Brook Mine and were not specifically evaluated in the groundwater model.

Along the eastern edge of the model domain there are a large number of CBM wells and, based on available data presented in the water rights tabulation in Appendix B of the Adjudication volume, these wells are likely pumping water from the Carney and Masters coal seams. The impacts from the CBM wells are described in detail within later sections of the report. However, the text on page MP-3-19 does not speak to the CBM wells. Minor changes to the text on page Addendum MP-3-19 and additional explanatory text have been added to this page to provide further clarification.

Comment MuK 50 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 50 – Round 2

Section 2.2 of Addendum MP-3 had previously been updated to incorporate this comment response. Additional explanatory text has also been added to Addendum MP-3 Section 2.3 to further incorporate the context of this response into the Permit Application.

Comment MuK 50 – Round 3

Response accepted.

Comment MuK 51 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 51. Page Addendum MP-3-20 states, "The faults are significant in lateral extent and form natural no flow boundaries". Please provide a discussion (or refer to a discussion) on how these faults were determined to be no flow boundaries. (MK)

Response MuK 51 – Round 1

Faulting within the permit area was mapped by B.E. Barnum on the USGS Monarch Quadrangle. As noted in Section D5.3.2, Barnum indicates fault displacements on the order of 50 feet within the mine area. Lithologic logs provided in Addendum D-5-3 demonstrate that the dominating lithology in the column is claystone and coal thicknesses are less than 20 feet. This offset geology from faulting results in a claystone hanging or footwall adjacent the coal aquifer and therefore discontinuity of the aquifer and an assumed hydrologic flow boundary.

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Comment MuK 51 – Round 2

Response not accepted. It is appreciated and acknowledged the note of lithologic logs. In addition, please clarify or substantiate if there is any hydrologic evidence to support the interpretation that the faults are no flow boundaries (Example: water levels, water quality or other hydrologic evidence). This will increase the validity of the no-flow assumption. (MK)

Response MuK 51 – Round 2

In addition to the lithological evidence discussed in the previous response that supports treatment of the faults as no flow barriers, comparisons of water levels in coal monitor wells on either side of the fault also demonstrate that the faults serve as no flow barriers. Exhibits D6.2-2 and D6.2-3 in Addendum D6 illustrate the potentiometric surface in Masters and Carney coal seams, respectively. As shown on Exhibits D6.2-2 and D6.2-3, within the northeastern portion of the Brook Mine permit area there are two monitor well clusters that straddle both sides of a fault (578408 and 578409). In the case of the Masters coal, the measured water level in the monitor well on the upper side of the fault (578408-MST) is 173 feet higher than the water level measured in the monitor well completed on the downblock side of the fault (578409-MST). Similarly, the measured water level difference across the fault in the Carney monitor wells is approximately 180 feet. The change in potentiometric head between the monitor wells on both sides of the fault is significantly higher than would be expected due to the natural gradient in this area. Therefore, the variation in the measured potentiometric head across the fault demonstrates that it does serve as a hydraulic barrier. Additional text has been added to Addendum MP-3 Section 2.4.1 to more fully describe the effects that the faults have on the conceptual flow model.

Supplemental analysis of water quality on opposite sides of the faults has been conducted to note any difference in water quality that would indicate that the faults serve as no-flow barriers. This analysis and discussion has been added to Addendum MP-3 in Section 2.4.1.

Comment MuK 51 – Round 3

Response accepted.

Comment MuK 52 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 52. Please clarify the reason for not estimating vertical hydraulic conductivity of the interburden using an aquifer test. (MK)

Response MuK 52 – Round 1

Response to this comment is partially clarified in responses to MK's Comments 18 and 19 above. During the aquifer test conducted at the 578409 well cluster no response was observed across the interburden, therefore, the vertical hydraulic conductivity of

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the interburden was too low to measure in the aquifer test. Furthermore, the static water levels in the Masters and Carney coal seams are different which demonstrates that the hydraulic conductivity of the interburden is very low. Therefore, literature values were utilized and adjusted within reasonable bounds to improve model calibration.

Comment MuK 52 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 52 – Round 2

The context of this response was incorporated into Addendum D6-8 "Pumping Test Report." The context was added into Section D6-8.4 "Determination of Aquifer Parameters."

Comment MuK 52 – Round 3

Response accepted.

Comment MuK 53 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 53. Page Addendum MP-3-25 states, "With no unnatural stresses on the system ..." Please provide a discussion of the CBM impacts on the water levels. It appears that the hydrographs presented in Appendix D6 do not show the impacts of CBM. (MK)

Response MuK 53 – Round 1

There are multiple CBM production wells located along the eastern side of the groundwater domain. In order for the CBM producers to be able to produce gas it is necessary to significantly lower the water levels in the coal to release the gas in the coal fractures. CBM production began in this area around 1999. Therefore, it was conservatively assumed that CBM production has already resulted in lowering the water levels in the coal aquifers to the top of the coal aquifer along the eastern edge of the model domain and the general head boundaries were set accordingly to simulate this effect. Even though water level data in the coal aquifer prior to CBM production is limited because of the lack of monitor well data, prior to CBM production, the potentiometric head in the coal was estimated to be significantly higher than the top of coal.

The hydrographs presented in Appendix D6-9 do not show the impacts of CBM because they show water level changes over a one year period roughly 13 years after CBM production began in the area, and if the wells were going to be impacted by CBM, it is likely that they have already been impacted. Please note that the model assumed that CBM production would continue into the future resulting in the water levels in the coal being maintained at unnaturally low levels. Therefore, the model has

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conservatively estimated the combined impacts from both CBM and the proposed coal mining activities. Currently, a large majority of the CBM wells are being plugged and abandoned which may result in higher than predicted water level recovery rates in the coal aquifer.

Text edits were made to page MP-3-25 to help clarify the discussion.

Comment MuK 53 – Round 2

No comment received.

Response MuK 53 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 54 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 54. There are two sub-sections for recharge, Section 2.5.3 and Section 2.6.1. Please clarify/consolidate. (MK)

Response MuK 54 – Round 1

The two subsections have been combined into one subsection under Section 2.6.1.

Comment MuK 54 – Round 2

No comment received.

Response MuK 54 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 55 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 55. Page Addendum MP-3-26 states, "... drain cells were placed in the model to simulate seeps from the outcrops." Please provide a discussion on the evidence for seeps (or reference) observed during field surveys. Were there any field data collected on the location and flow rates of these seeps? (MK)

Response MuK 55 – Round 1

Evidence of seeps from outcrops can be seen in Color Infrared Imagery (CIR), which is included in the permit as Exhibit D11.1-1. The areas of seepage are manifested on the CIR imagery as areas with more vegetation. Evapotranspiration from the vegetation growing along the seep removes all the water before it emanates from the formation into the drainage. Therefore, no measurements of the seepage rate at the outcrops were possible or are available. Additional discussion explaining the need for drain cells within the model is provided in Section D6.2.2. Also, text was added to Section D6.2.2 to clarify that no field flow measurements were available.

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Comment MuK 55 – Round 2

Response conditionally accepted. Please include the discussion on CIR into the permit application (MK)

Response MuK 55 – Round 2

Additional text describing the seeps was added to Addendum MP-3 Section 2.6 to incorporate the context of this response.

Comment MuK 55 – Round 3

Response accepted.

Comment MuK 56 – Round 1

Comment MuK 57 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 57. Please provide a discussion on any contribution of groundwater baseflow to the major surface water bodies within the permit boundary. (MK)

Response MuK 57 – Round 1

As described in the response to comment MuK 56, conceptually, very little groundwater base flow from the Carney and Masters coal seams are expected to contribute to the surface water bodies within the permit boundary. The mass balance table provided in response to comment MuK 73 demonstrates that much more water is expected to enter the groundwater system from the surface water bodies (river cells) than is contributed to the surface water bodies from groundwater baseflow.

Comment MuK 57 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 57 – Round 2

The context of this response has been added to Addendum MP-3 via additional text to address comments MuK 56 and MuK 73. Specifically, text additions to Addendum MP-3 Section 4.10 include the context of the Round 1 response.

Comment MuK 57 – Round 3

Response accepted.

Comment MuK 58 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 58. In section 3.2 MODFLOW Input Files, was aerial recharge used as an input file? Please clarify if evapotranspiration was considered as a discrete input or lumped into net aerial recharge. (MK)

Response MuK 58 – Round 1

Yes, the recharge package was used as an input file. Section 3.2 of Addendum MP-3 was updated to include a discussion of the recharge package. The evapotranspiration (ET) package was not utilized in the model. To address the effects of ET, the recharge rates were adjusted down in proportion to the estimated losses created by ET. Within most of the model domain where evapotranspiration would occur, the low permeability overburden between the surface and the coal seams of interest provide a hydrologic barrier so the evapotranspiration was ignored in these areas.

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Comment MuK 58 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 58 – Round 2

Addendum MP-3 Section 4.2.2 was updated to incorporate the context of the Round 1 response.

Comment MuK 58 – Round 3

Response accepted.

Comment MuK 59 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 59. Page Addendum MP-3-31 states, "Layer 1 – represents the coal overburden". Please clarify if the alluvial aquifer was included in the model. Please provide justification for not considering the alluvial aquifer in the model. (MK)

Response MuK 59 – Round 1

As described in the responses to comments MuK 56 and MuK 57, the only place within the model domain where there is potential for interactions between any alluvial aquifers and the coal seams of interest is where the coal is directly below the Tongue River alluvium or Slater Creek colluvium. Where the coal is in direct contact with alluvium/colluvium, layer 1 (the coal overburden) was assigned a higher vertical hydraulic conductivity to allow the layer to better emulate the alluvial/colluvial aquifer in this location. This zone of higher hydraulic conductivity in layer 1 is depicted on Addendum MP-3 Figure 4.2-1. Groundwater Vistas does not allow discontinuous layers throughout the model domain so this allowed the alluvium/colluvium to be effectively be modeled without the need to add an additional layer across the top of the entire model domain. This helped to improve the computational efficiency of the model. Since the overburden has a very low hydraulic conductivity and hydrologically separates the coals from the other alluvial/colluvial deposits within a large portion of the model domain, there is no reason to model any additional alluvial/colluvial deposits. To help clarify this comment Figure 4.2-1, was prepared and sections 2.5 and 4.2 of MP-3 have been updated.

Comment MuK 59 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

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Response MuK 59 – Round 2

With the addition of the text to address comments MuK 56 and Muk 57 as well as the text added to Addendum MP-3 Section 4.2.1, the context of this comment has been incorporated into Addendum MP-3.

Comment MuK 59 – Round 3

Response accepted.

Comment MuK 60 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 60. Page Addendum MP-3-31 states, "Layer 3- Carney Interburden. This interval is generally of low to very permeability in the western portion of the Project Area". Please clarify how the areas where Layer 3-Carney Interburden is absent are treated in the groundwater model. (MK)

Response MuK 60 – Round 1

Ground Water vistas does not allow discontinuous layers. Therefore, Layer 3 is continuous across the entire model domain. Where the coal seam coalesces on the east portion of the model, the Layer 3 interburden was modeled as coal by setting hydraulic properties of the layer equivalent to the values of the overlying and underlying coal seams. Additional text has been added to Section 4.2.1 of Addendum MP-3 to further describe how the hydraulic conductivities were assigned to layer 3.

Comment MuK 60 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 60 – Round 2

The context of the Round 1 response has been incorporated into Addendum MP-3 Section 4.2.1.

Comment MuK 60 – Round 3

Response accepted.

Comment MuK 61 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 61. Please include a discussion of the thickness of all model layers. (MK)

Response MuK 61 – Round 1

Addendum MP-3 Section 2.5 describes the thickness of the various coal seams. Additional text has been added to MP-3 Section 4.1 to generally describe the thickness of each layer. Following are the modeled thicknesses for each layer:

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- Layer 1-The thickness for this layer varies throughout the model domain. Near the western side of the model the layer is often absent where all the strata geologically younger than the Carney coal has been eroded off. These areas are generally represented as no flow cells in the model. Within the eastern portion of the model Layer 1 can be substantial. In the model the maximum thickness of Layer 1 in the eastern side of the model domain was approximately 1,100 feet.
- Layer 2-The Upper Carney coal was modeled with a constant thickness of 7 feet throughout the model.
- Layer 3-The Carney coal interburden layer varied in thickness from 4 feet up to 15 feet within the active portion of the model.
- Layer 4-The Lower Carney coal was modeled with a constant thickness of 8 feet within the model.
- Layer 5 The Carney/Masters coal interburden layer varied in thickness from 4 feet up to 107 feet within the model.
- Layer 6-The Masters coal was modeled with a constant thickness of 6 feet within the model.

Comment MuK 61 – Round 2

Response not accepted. It is acknowledged that Section 4.2.1 provides the thickness of the model layers. Also, the response states, "*Addendum MP-3 Section 2.5 describes the thickness of the various coal seams.*" Addendum MP-3, Section 2.5 does not describe the thickness but it is a section on hydraulic properties. Please clarify. (MK)

Response MuK 61 – Round 2

The previous sections reference was incorrect. Addendum MP-3 Section 2.5.1.3 provides a statement regarding the thickness of the Carney Coal. Addendum MP-3 Section 2.5.1.4 provides a statement regarding the thickness of the Masters Coal.

Comment MuK 61 – Round 3

Response accepted.

Comment MuK 62 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 62. Please include a justification for not considering the underlying zones beneath the Masters coal seam in the model. (MK)

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Response MuK 62 – Round 1

The Masters coal is underlain by the Lebo Shale. The Lebo Shale is a thick (Appendix D5 Section D5.2.3), regional confining interval in the project area as described in Mine Plan Addendum MP-3 Section 2.1. There are no aquifer units identified within the model domain within the Lebo Shale with direct hydrologic connection to any of the elements of the model. Since the Lebo Shale is a regional confining unit, if it had been included in the groundwater model, it would have been assigned hydraulic parameters typical of a shale interval (very low hydraulic conductivity) and it would have essentially been a no flow barrier to the more permeable Masters coal above it. Groundwater Vistas treats the bottom of the model as a no flow boundary. Therefore, the Lebo Shale is for all practical purposes included in the model as a confining interval with the way the model is currently defined.

Comment MuK 62 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 62 – Round 2

The second to last paragraph in Addendum MP-3 Section 4.1 incorporates the context of the Round 1 response.

Comment MuK 62 – Round 3

Response accepted.

Comment MuK 63 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 63. Please provide appropriate cross section(s) of the model grid overlaid with the drill hole data collected during baseline characterization. This will help the evaluation of the adequacy of model layer thicknesses against the stratigraphic field data. (MK)

Response MuK 63 – Round 1

As noted in Addendum MP-3 Section 4.1, the Groundwater model layers were developed from a 3D geologic model developed from drill hole data within the project area developed for the purposes of making volumetric coal estimates. Minor updates to the surfaces were made where new data provided by additional exploration drilling was completed. An additional figure was developed (Addendum MP-3 Figure 4.1-3) and included in Addendum MP-3 that depicts actual cross sections cut from the groundwater model. Addendum D5-3 of Appendix D5 includes geologic cross sections with drill hole data that can be compared back to the actual cross sections included in Figure 4.1-3 of Addendum MP-3.

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Comment MuK 63 – Round 2

No comment received.

Response MuK 63 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 64 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 64. Please clarify how the layers were modeled to represent the confined/unconfined aquifer types. (MK)

Response MuK 64 – Round 1

Groundwater Vistas has a "layer type" control that was set to #5: Confined/Unconfined, which allows the model to determine whether to use storativity or specific yield for the storage coefficient based on the elevation of the water elevation vs. formation tops. Groundwater Vistas handles the aquifer type classification without further inputs.

Comment MuK 64 – Round 2

Response not accepted. It is acknowledged and noted that GW Vistas handles it in an automated mode. Please provide a description on if there were any additional checks conducted on the results from the groundwater model to verify if the aquifer type used by GW Vistas is consistent with the conceptual model and field data. Example discussion: Are the deeper layers confined for the entire simulation or do they change from confined to unconfined due to mine operations? (MK)

Response MuK 64 – Round 2

Within the model domain the coal aquifers are relatively thin, ranging in thickness from 4 to 15 feet. Because the coal aquifers are relatively thin, during the model simulation the coals were typically either confined or dry. The only place where unconfined conditions occurred in the groundwater model simulations were near the outcrops or in the cells immediately adjacent to cells that went dry during the modeling simulations. Similarly, during mining simulations the cells immediately next to the mining areas became unconfined as well. When the water level in a cell drops below the top of the layer, Groundwater Vistas treats that cell as an unconfined aquifer which means that instead of using the specific storage term to calculate the amount of water in storage, the program uses specific yield to calculate the amount of water in storage. The total area of unconfined coal aquifer was relatively small as compared to the portion of the aquifer that was dry or fully saturated. Due to the relatively small area of potential unconfined aquifer, no specific analyses were conducted to determine whether changes in the specific yield in the unconfined aquifer would affect model calibration.

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Comment MuK 64 – Round 3

Response accepted.

Comment MuK 65 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 65. In addition to model calibration, please provide justification for the recharge rates applied in the model including any literature references. (MK)

Response MuK 65 – Round 1

The initial recharge rates utilized in the model were initially estimated based on a USGS study (Water-Resources Investigations Report 01-4278) conducted on the eastern side of the Powder River basin and the Black Hills area. The study entitled, "Estimated Recharge to the Madison and Minnelusa Aquifers in the Black Hills Area, South Dakota and Wyoming, Water Years 1931-98." was prepared by J.M. Carter and D.G. Driscoll. In the study Carter and Driscoll reported recharge rates varying from 0.04 inches per year to 2.93 inches per year. The 2.93 inch per year recharge rate was reported within the Madison limestone formation outcrops in the Black Hills while the lower range of recharge rates reported by Carter and Driscoll were estimated for areas in the eastern periphery of the Powder River Basin where the precipitation and soil types are similar in nature to the Brook Mine Permit area. Since calibrated recharge rates in the key recharge areas (the coal outcrops and the scoria outcrops) were within the range of values developed by Carter and Driscoll, the recharge rates used in the model are considered reasonable. Please note that the recharge rate throughout Layer 1 is much lower than the range of recharges developed by Carter and Driscoll. This is reasonable because much of Layer 1 has no hydrologic connection to the underlying coal seams. Additional justification for recharge rates applied in the model is discussed in response to comment BJ57.

Comment MuK 65 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 65 – Round 2

Addendum MP-3 Section 4.2.2 has been updated to incorporate the context of the Round 1 response.

Comment MuK 65 – Round 3

Response accepted.

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Comment MuK 66 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 66. Page Addendum MP-3-33 states, "Recharge is applied within the modeling software by applying the recharge to the highest active layer." Please clarify the presence of any modeled 'dry cells' in the model and the influence of applying the recharge to the layers below the dry cells. (MK)

Response MuK 66 – Round 1

As noted in the responses for comments MuK 59 and MuK 60, Groundwater Vistas does not allow for discontinuous layers across the model domain. Along the north and the west sides of the model there is a good portion of the model domain where the upper layers have been eroded off and do not actually exist. These areas of erosion were accounted for using no flow cells. As shown on Figures 4.4-1 through 4.4-4 of Addendum MP-3, the no flow cells in the top layer are the largest in areal extent while each underlying layer has a slightly decreased areal extent of no flow cells. In this case the no flow cell distribution was adjusted to match the outcrop of each layer. The fact that the software applies the recharge to the highest active layer was taken advantage of during the modeling process, since it is an effective way to apply recharge to an outcropping layer which is under another layer that is eroded away but due to software limitations is still present in the model.

Because CBM operations have generally removed most of the water from the coal seams, there are some locations within the model domain where dry cells during the modeling have caused cells in layer 1 to go dry and the recharge is applied to the next active layer below. While this could be problematic if a high recharge rate were assigned to the model cells, generally throughout the model domain the recharge rate is very low. Therefore, this results in a very minor amount of water coming into the model and did not significantly affect the model calibration.

Comment MuK 66 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 66 – Round 2

Addendum MP-3 Section 4.2.2 has been updated to incorporate the context of this response.

Comment MuK 66 – Round 3

Response accepted.

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Comment MuK 67 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 67. Table 4.2-3. lists model porosity values. Typically, MODFLOW (flow model) does not use porosity in its calculations. Please clarify the need for this input parameter. (MK)

Response MuK 67 – Round 1

Modflow does not utilize porosity as part of its calculations. However, other modules included in the Groundwater Vistas package such as MODPATH do utilize porosity. In the case of this model, no MODPATH simulations were conducted. Therefore, the porosity term as put into the model has no impact on the calculations. However, porosity is a hydraulic parameter of the aquifer and may be important for future modeling simulations, therefore, the porosity values developed for each aquifer/aquitard unit will be left in the model report. Minor changes to the text in Addendum MP-3 have been made to clarify the role of porosity in this model.

Comment MuK 67 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 67 – Round 2

The context of the Round 1 response was incorporated into Addendum MP-3 Section 4.2.3 as part of the first round of comment responses.

Comment MuK 67 – Round 3

Response accepted.

Comment MuK 68 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 68. The faults are not modeled in Layer 1. Please clarify the procedure for determining the vertical extents of the faults in the model. (MK)

Response MuK 68 – Round 1

The composition of Layer 1 is predominately claystone. Because Layer 1 is not composed of aquifer material and because the hanging and footwalls are composed of strata with similar hydraulic properties, displacement due to faulting does not substantially change the flow through the aquitard and placing Horizontal flow barriers in the model in layer 1 was not necessary.

Comment MuK 68 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

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Response MuK 68 – Round 2

Addendum MP-3 Section 4.4.1 was updated to incorporate the context of the Round 1 response.

Comment MuK 68 – Round 3

Response accepted.

Comment MuK 69 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 69. Please provide the input parameters used to model the horizontal flow barriers in the model and discuss their technical reasonableness. (MK)

Response MuK 69 – Round 1

Horizontal Flow Barriers were used in the model to simulate no-flow boundaries created by faulting within the project area. Horizontal flow barriers require two input parameters in Groundwater Vistas including wall thickness and hydraulic conductivity. The input parameter used in the model for wall thickness was 10 feet and a hydraulic conductivity of 1.0 x 10^-5 ft/day was used. The horizontal flow barrier parameters as applied will essentially limit all but a very minor amount of flow across the barrier. As described in the response to comment MuK 51, the coal seams within the project area are relatively thin as compared to the fault offsets so it is reasonable to assume that the faults will significantly impede flow in the aquifer units.

Comment MuK 69 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 69 – Round 2

Addendum MP-3 Sections 4.4.2, 4.4.3, and 4.4.4 were updated to incorporate the context of the Round 1 response.

Comment MuK 69 – Round 3

Response accepted.

Comment MuK 70 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 70. Page Addendum MP-3-40 states, "As the current, post-CBM potentiometric surface is considered the static level....." Please provide the implications of this assumption, on the model calibration of hydraulic parameters and the mode predicted hydrologic impacts (over estimation of drawdown vs. underestimation) (MK)

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Response MuK 70 – Round 1

Addendum MP-3 Sections 4.8.1, 4.10, and 4.11 all discuss the implications of CBM impacts. In addition, the response to comment MuK 53 also discusses CBM impacts to water levels. As discussed in the response to comment MuK 53, the model conservatively assumed that CBM operations have lowered the water levels in the eastern portion of the model domain to a level near the top of the coal seams. To simulate this drawdown, the elevations of each general head boundary on the east side of the model were set at an elevation just above the top of the coal seam. The general head boundaries elevations remained the same in both the steady state and the transient models. Essentially, this means that the model operated under the assumption that the post CBM impacts were permanent prior to and after the Brook Mine mining activities.

The assumption that the water levels have been permanently impacted by CBM did have a significant impact on model calibration. The severely depressed water levels caused by CBM operations have resulted in a large number of cells going dry. The hydraulic parameters of the aquifer units within the eastern portion of the model domain were not adjusted to eliminate the dry cells since it is reasonable to assume that, with the severe drawdown modeled, the coal seams could have been dewatered in these areas. Therefore, even though the effects of the CBM drawdowns were observed during calibration, no specific adjustments were made to the modeled aquifer characteristics to eliminate these impacts. The dry cells did complicate calibration of the model because they cause instability in the MODFLOW model calculations and results.

The model was developed to take into account impacts from the combined effects of CBM and the proposed coal mining. In general, CBM development impacts are significantly larger than the predicted impacts from the Brook Mine. Therefore, ignoring CBM impacts would have significantly under predicted the potentiometric surfaces within the model domain and overestimated the impacts that Brook Mine would have on the system.

Many of the CBM wells are actively being plugged and abandoned. If this trend continues, there is a chance that recovery of water levels from CBM impacts may begin which will result in recharging of the coal seams. If this happens, it is anticipated that the model conservatively over predicts the impacts to the region especially in the long term recovery scenarios.

Comment MuK 70 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

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Response MuK 70 – Round 2

Most of the discussion in the original comment has already been incorporated into Addendum MP-3 with the first round of comment responses. However, an additional concluding statement from this response was added to Addendum MP-3 Section 4.11 to incorporate the context of the Round 1 response into the permit application.

Comment MuK 70 – Round 3

Response accepted.

Comment MuK 71 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 71. It is noted that Table 4.7-1 summarizes the calibration residuals and statistics from the calibrated model. Please consider providing additional presentations of the calibrated model statistics. This will enable an easier evaluation of any spatial bias in the model calibration. (MK)

a. X-Y plot of observed vs. simulated water levels.

b. A map plotting the residuals to show the spatial distribution

c. Provide a summary statistics table with Mean Error, Mean Absolute Error, Sum of Squared residuals for the calibrated model. It is noted that some of these values are presented in the sensitivity analysis. However, a compiled summary statistics table would be very helpful.

Response MuK 71 – Round 1

As requested the following additions have been made to the groundwater model report:

A. An X-Y plot of observed versus simulated water levels has been added in the report as Addendum MP-3 Figure 4.7-1.

B. The residuals have been added to figures 4.7-2, 4.7-3, and 4.7-4 of Addendum MP-3.

C. Table 4.7-1 of Addendum MP-3 has been updated to include additional statistics.

Comment MuK 71 – Round 2

No comment received.

Response MuK 71 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 72 – Round 1

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Mine Plan, Addendum MP-3 Groundwater Model, 72. In addition, to the measured water levels, please clarify if there were any flow measurements used for model calibration. (MK)

Response MuK 72 – Round 1

There are no areas within the model domain where it was possible to collect any flow measurements that would support the modeling effort therefore, no flow measurement were used in the calibration.

Comment MuK 72 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 72 – Round 2

Discussion was added Addendum MP-3 Section 2.6 to clarify that no measurements of seepage at the outcrop were available. Also, text has been added to Section 4.7.2 clarifying that there are no measurements available for water that may leave or enter the Tongue River from the coal seams.

Comment MuK 72 – Round 3

Response accepted.

Comment MuK 73 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 73. Please provide a water budget table (in acre-feet per year or cubic-feet per day) showing all the inflows into the model and outflows from the model.

Response MuK 73 – Round 1

The following tables summarizes the inflows and outflows from the model domain during the steady state period, 5 years into mining, the end of mining, and at the end of recovery.

Mass Balance of Steady State Calibrated Model		
Source/Sink	Inflows (ft^3/d)	Outflows (ft^3/d)
General Heads	16,107	22,890
River	2,569	410
Drains	-	560

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Recharge	5,168	-
Total	23,846	23,860

Mass Balance 5 years into Mining		
Source/Sink	Inflows (ft^3/d)	Outflows (ft^3/d)
Storage	12,496	11,431
General Heads	16,130	22,904
River	2,688	385
Drains	-	1,774
Recharge	5,434	-
Total	36,749	36,494

Mass Balance End of Mining		
Source/Sink	Inflows (ft^3/d)	Outflows (ft^3/d)
Storage	3,670	4,146
General Heads	16,135	22,902
River	2,705	365
Drains	-	532
Recharge	5,430	-
Total	27,941	27,945

Mass Balance End of Recovery		
Source/Sink	Inflows (ft^3/d)	Outflows (ft^3/d)
Storage	1,698	2183
General Heads	16,138	22,901
River	2,714	363

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Drains	-	535
Recharge	5,427	-
Total	25,978	25,983

Comment MuK 73 – Round 2

Response conditionally accepted. Please incorporate the tables into the permit application. (MK)

Response MuK 73 – Round 2

Addendum MP-3 Section 4.10 has been updated to include the water budget. Specifically, Table 4.10-1 includes the mass balance throughout the mining simulations. A cross reference to the mass balance discussion in Addendum MP-3 Section 4.10 was also added to Addendum MP-3 Section 4.6 for clarity.

Comment MuK 73 – Round 3

Response accepted.

Comment MuK 74 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 74. Please provide a comparison of model simulated inflows and outflows against conceptual estimates of inflows and outflows. This comparison will act as another verification/check for the technical adequacy of the groundwater model (Example model GHB flows vs. reasonable estimated conceptual flows). (MK)

Response MuK 74 – Round 1

Response to comment MuK 73 includes tables that show the inflows and outflows from the model during the steady state period, 5 years into mining, the end of mining, and at the end of recovery. The five main categories of inflows and outflows include 1) storage, 2) general head boundaries, 3) river boundaries, 4) drains, and 5) recharge. Following is discussion regarding model predicted inflows and outflows for each category:

1) Storage – During the steady state model there is no inflow or outflow from storage so storage is not included in the first mass balance table in prepare for comment MuK 73. The model predicts that during active mining more water will come out of storage than will go into storage. Conceptually this is reasonable since during mining, water from the coals would be draining into the mined out areas. There is a trend of water continuing to come out of storage even after mining ceases. Even though the volume of water coming out of storage is quite low, it is contrary to the conceptualization of the system to have

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discharges to the Tongue River in this area so it makes sense that a small discharge to the River (rather than a large discharge) would be observed in the model. During mining, drains were added to the model to remove water from the mine pits. The tables indicate that during mining the discharges from the drains do increase as expected. After mining is complete, discharges from the drains return approximately to premining levels which is conceptually correct.

5) The recharge amount used in the model stays at relatively the same level throughout the simulations. Total recharge across the model area is approximately 28 gpm. As is described in comment #65 the recharge rates are reasonable based on available studies.

Comment MuK 74 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. In addition, clarify the reason for increased recharge from the steady state to transient models (5,138 vs 5,434 cu.ft/day).

Response MuK 74 – Round 2

Addendum MP-3 Section 4.10 was updated to include the context of the Round 1 response. The model was also reviewed to determine why there was a slight difference in the recharge rates during the steady state simulation and the transient simulation period (5,168 vs 5434 cu ft/day). During the review of the model it was found that one of the recharge options in the MODFLOW options dialogue box was incorrect. The check box in the dialogue box entitled "Apply recharge from stress period 1 to all stress periods" had not been checked. After checking the option, the model was rerun and during the subsequent run the recharge was the same during the steady state portion and the transient portion of the model. Other minor changes in the mass balance numbers presented in Table 4.10-1 were also noted and the numbers were updated to reflect the model predicted values after changing the recharge settings.

Comment MuK 74 – Round 3

Response not accepted. Please provide the revised model files for the LQD review and records.

Response MuK 74 – Round 3

New Groundwater Vistas files configured to run in Groundwater Vistas Version 6.80 Build 1 are provided on a DVD with this submittal. Please see response to Comment 32 for details.

Comment MuK 75 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 75. Page Addendum MP-3-40 states, "Due to a system of thin aquifers with similar sources and sinks and homogeneous hydraulic conductivities, the head values of the steady-state model were nearly

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identical between the separate coal layers as noted in Table 4.7-1." Please clarify whether this statement implies that the interburden (where present) between the coal seams is not a confining unit. (MK)

Response MuK 75 – Round 1

This statement is an observation only based on review of modeled values and does not suggest a lack of confinement exists. Pumping tests conducted in separate aquifers demonstrated that the interburden provides confinement between the Carney and Masters aquifers as described in Section D6-8.3.2.3 of Appendix D6. In addition, Table 4.7-1 of Addendum MP-3 shows that at each cluster where both coal seams contained measureable water, the difference in measured water levels between the coal seams was higher than the modeled difference. This suggests that the vertical hydraulic conductivity assigned to the interburden in the model may be higher than the actual hydraulic conductivity of the interburden in the field. The use of a higher hydraulic conductivity for the interburden in the model will overestimate the drawdown in the other coal seam therefore, the predicted drawdown will be conservative.

Comment MuK 75 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 75 – Round 2

The last sentence in the first paragraph of Addendum MP-3 Section 4.7.2 has been revised for clarification. The Round 1 responses have been incorporated into Addendum MP-3.

Comment MuK 75 – Round 3

Response accepted.

Comment MuK 76 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 76. In figures 4.7-1, 4.7-2 and 4.7-3, please consider including the observed/interpreted water level contours and the measured water level elevations. This will enable to visually evaluate the observed vs. simulated water levels. (MK)

Response MuK 76 – Round 1

Figures 4.7-1, 4.7-2, and 4.7-3 of Addendum MP-3 have been updated to include both observation wells and observed elevations as well as observed potentiometric contours. Please note that in response to Comment MuK 71 an additional figure was added to this section (Figure 4.7-1) and these figures have since been renumbered to 4.7-2, 4.7-3, and 4.7-4.

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Comment MuK 76 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 76 – Round 2

The figures previously added to the report (4.7-2, 4.7-3, and 4.7-4) during the first round of comment responses incorporate the context of the Round 1 response into Addendum MP-3.

Comment MuK 76 – Round 3

Response accepted.

Comment MuK 77 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 77. Page Addendum MP-3-45 states, ".....and if CBM production ceases, recovery rates will likely be higher than estimated in the model." Please clarify if this statement implies that currently, there are CBM wells that are operational in the area and are pumping out groundwater. (MK)

Response MuK 77 – Round 1

Although substantially less than past years, some CBM wells in the area are still producing groundwater. Since CBM production has been ongoing for the last 15+ years the CBM operations have significantly lowered the water levels in the coals as is noted in the report. Records of groundwater withdrawals can be found on the Wyoming Oil and Gas Conservation Commission's (WOGCC) online database at: wogcc.state.wy.us. According to WOGCC records there has been no groundwater production associated with CBM in Townships 57 and 58N Range 84W since 2012. However production is still occurring in Townships 57 and 58N Range 83W as well as Township 56N Range 83 and 84W. The portions of the model domain where CBM production may occur are located in Townships 56 and 57N Range 84W.

Comment MuK 77 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 77 – Round 2

Additional text was added to Addendum MP-3 Section 2.3 to describe the timeframe over which CBM wells have been in operation. Also Addendum MP-3 Section 4.8.1 was updated to further capture the context of the Round 1 response.

Comment MuK 77 – Round 3

Response accepted.

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Comment MuK 78 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 78. Please consider removing the model sensitivity to storage coefficients and porosity. Steady state groundwater model equations do not include these parameters in any of the model calculations. (MK)

Response MuK 78 – Round 1

As noted in this comment, the final model did not include a transient calibration and a sensitivity analysis on storage coefficient and porosity is not appropriate. The section and discussion regarding model sensitivity to the storage coefficient and porosity has been updated and removed as appropriate.

Comment MuK 78 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 78 – Round 2

Addendum MP-3 Section 4.8.5 (last two sentences) was previously updated during the first round of comment responses to incorporate the context of the Round 1 response.

Comment MuK 78 – Round 3

Response accepted.

Comment MuK 79 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 79. Please clarify if the faults in the model and their parameters were considered in any of the sensitivity analyses. If not, please consider performing a detailed and thorough sensitivity analysis, as the faults appear to influence the drawdowns simulated by the groundwater model. (MK)

Response MuK 79 – Round 1

The faults do influence the drawdowns and flow patterns simulated in the groundwater model. However, as noted in the response to comment MuK 51 the displacement observed in the faults roughly 5 times as thick as the modeled coal seams. Given the fact that the dominant lithology in the area is low permeability claystone/siltstone, it is very likely that where faulting has occurred the displacement has resulted in coals being immediately adjacent to the low permeability strata. Therefore the faults are assumed to be hydrologic barriers to water flow. Based on the best available mapping, these faults have been placed into the model. Because the faults are physical parameters that were developed along with development of the geological model (i.e. elevations and thicknesses of the geological layers), a sensitivity analysis was not performed on the faults.

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Part of the reason that the faults influence the groundwater responses in the groundwater model to the degree that they do is because of the CBM impacts. Because the CBM operations have significantly lowered the water levels in the coal seams, the faults create a shadow effect that results in many of the cells immediately downstream of the faults going dry. If there had not been any CBM dewatering operations performed in the coals, the water levels would be significantly higher and the effects of the faults would not be as pronounced.

Comment MuK 79 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 79 – Round 2

The context of the Round 1 response has been added to Addendum MP-3 Section 2.4.1.

Comment MuK 79 – Round 3

Response accepted.

Comment MuK 80 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 80. In addition to the simulated drawdown maps, please consider providing hydrographs at strategically selected locations. This will enable a better presentation of the impacts over time. (MK)

Response MuK 80 – Round 1

As suggested, Appendix A has been added to Addendum MP-3 which depicts the modeled water elevations during the model simulation period at all the water supply wells identified within the model domain (CBM wells excepted) and at selected alluvial target locations within the model domain.

Comment MuK 80 – Round 2

Response not accepted. Appendix A is missing with the electronic files provided to the Cheyenne Office. The hydrographs will be reviewed after the receipt of this Appendix A. (MK)

Response MuK 80 – Round 2

All the appendices for Addendum MP-3 for the first round of comment responses were inadvertently left out of the submittal. Both Appendix A and B are included in this round of comment responses.

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Comment MuK 80 – Round 3

Response accepted.

Comment MuK 81 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 81. Please clarify if the three wells listed in Table 4.9-1 are the only wells considered for the analysis. Also, provide a discussion on the methodology to narrow down the analysis from several wells shown in the groundwater rights maps to these three wells. (MK)

Response MuK 81 – Round 1

Additional wells beyond those originally presented in Table 4.9-1 were considered in the analysis. Table 4.9-1 has been updated to include all the wells considered in the analysis. To determine which wells were included in the analysis, completions were compared to modeled surfaces to estimate which formation in which the well was completed. Those thought to be completed in the Carney/Masters sequence were included. Please note that the wells included in Table 4.9-1 error on the side of being over inclusive. Some of the wells are believed to be completed in multiple zones but the analysis assumes that they are only completed in the coal seams of interest. In addition, the well depths were determined based on the State Engineer's database and in many cases well depth data was left blank or was questionable. If there was a question whether a well was actually completed in the coal aquifer of interest the well was assumed to be completed in the coal. Therefore, the well list may include some wells that are not completed in the coals of concern.

Comment MuK 81 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 81 – Round 2

The context of the Round 1 response was added to Addendum MP-3 Section 4.9 during the first round of comment responses. In addition to updating Table 4.9-1, the text was also updated with verbiage from the round 1 comment response to describe how the wells were chosen for inclusion into the model.

Comment MuK 81 – Round 3

Response accepted.

Comment MuK 82 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 82. Please provide (or reference) a discussion about the three wells listed in Table 4.9-1, their depths, screened intervals and other pertinent information. (MK).

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Response MuK 82 – Round 1

Table 4.9-1 has been updated to include total depth as well as the screen intervals for all the wells. Additional details on the wells can be found in Adjudication Appendix B.

Comment MuK 82 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 82 – Round 2

Addendum MP-3 Table 4.9-1 was previously updated as noted in the round 1 comment responses. Between the updated text in response to comments and this table, the context of this comment response have been captured in Addendum MP-3.

Comment MuK 82 – Round 3

Response accepted.

Comment MuK 83 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 83. Page Addendum MP-3-60 states, " To measure the impacts to the Tongue River and Goose Creek, a series of targets were placed along these drainages in Layer 1" Please define the term target. Also, clarify if these targets are located in the alluvial aquifer. (MK)

Response MuK 83 – Round 1

The targets as used in Groundwater Vistas are simply locations where heads are measured and compared with measured heads (if there are any available). Ground Water Vistas generates a hydrograph throughout the transient period of mining and recovery for each target. These targets were placed in Layer 1 to estimate the impacts of mining to surface water bodies. These targets are located where the alluvial aquifer is simulated in Layer 1. Targets representing existing well locations were also put in layers 4 and 6 as well as discussed in Comment MuK 81.

Comment MuK 83 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 83 – Round 2

Additional text was added to Addendum MP-3 Section 4.9 to define what a target is. Also, the inclusion of Appendix A has been included with this round of comment responses, which was inadvertently left out of the first round of comments. The appendix should also help incorporate the context of the Round 1 response.

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Comment MuK 83 – Round 3

Response accepted.

directly contribute water to the coals below and the model is expected to overestimate the impacts to the Tongue River in these locations.

Comment MuK 84 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. The comment will be reviewed after the receipt of Appendix A. (MK)

Response MuK 84 – Round 2

Additional text was added to Addendum MP-3 Sections 2.6.3 and 4.9 to incorporate the context of the Round 1 response. Also, text was added to Section 4.10 in response to Comment MuK 73 which helps capture the context of the Round 1 response.

Comment MuK 84 – Round 3

Response accepted.

Comment MuK 85 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 85. Please provide a statement on any hydrologic impacts predicted by the groundwater model to areas outside the Brook mine permit boundary. (MK)

Response MuK 85 – Round 1

The only impacts outside of the Brook Mine Permit Boundary would be observed at the existing water supply wells. Table 4.9-1 describes the estimated impacts at all the water supply wells in the Model domain that will be impacted both inside and outside of the Brook Mine Permit Boundary. Please note that most of these wells are located outside of the Brook Mine permit boundary. As shown on Table 4.9-1 the largest model predicted impact seen at any existing well outside of the Brook Mine Permit boundary is 20 feet which would be observed at P48251W. As shown in the hydrograph for this well in Addendum MP-3 Appendix A, this impact is estimated to be short lived (approximately 4 years). Model predicted drawdowns at the rest of the wells are less than 5 feet. At many of the wells predicted drawdowns are less than 1 foot over the life of the mine.

Comment MuK 85 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. The comment will be reviewed after the receipt of Appendix A. (MK)

Response MuK 85 – Round 2

Additional text to capture the context of the Round 1 response has been added to Addendum MP-3 Section 4.11.

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Comment MuK 85 – Round 3

Response accepted.

Comment MuK 86 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 86. Please provide a discussion on the simulated impacts caused by mining to surface water – groundwater interaction within the model domain. (MK)

Response MuK 86 – Round 1

Please see the response to comment MuK 84.

Comment MuK 86 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. The comment will be reviewed after the receipt of Appendix A. (MK)

Response MuK 86 – Round 2

Additional text has been added to Addendum MP-3 to incorporate the context of the Round 1 response (also see response to MuK 84).

Comment MuK 86 – Round 3

Response accepted.

Comment MuK 87 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 87. Please compare the model simulated water balance between pre-mining, during mining and post mining conditions. Consider including a table that presents the water balance during select periods showing the flows from all sources and discharges to all the sinks within the model domain. Provide a detailed discussion addressing any changes in the model simulated water balance between pre-mining, during mining and post mining conditions. (MK)

Response MuK 87 – Round 1

Please see responses to comments MuK 73 and MuK 74. A detailed discussion is included in the responses to these comments.

Comment MuK 87 – Round 2

Response accepted. (MK)

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Response MuK 87 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 88 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 88. In addition to the maps presented on the recovery estimates, please provide hydrographs at strategically selected locations. This will enable a better presentation of recovery over time. (MK)

Response MuK 88 – Round 1

As described in response to Comment MuK 80, an appendix (Appendix A) has been added to Addendum MP-3 which depicts the modeled water elevations at a number of well and target locations within the model domain.

Comment MuK 88 – Round 2

Response not accepted. Appendix A is missing with the electronic files provided to the Cheyenne Office. The hydrographs will be reviewed after the receipt of this Appendix A. (MK)

Response MuK 88 – Round 2

Appendix A will be included with this second round of comment responses.

Comment MuK 88 – Round 3

Response accepted.

Comment MuK 89 – Round 1

Mine Plan, Addendum MP-3 Groundwater Model, 89. The modeling documentation lacks discussion on the backfill aquifer. In the recovery model, please clarify how the model treats the backfill aquifer (spoils aquifer) and its resaturation. Please provide a discussion (or reference) to the hydraulic properties of the backfill materials used to create the backfill aquifer and the aerial extent of the backfill aquifer. (MK)

Response MuK 89 – Round 1

Mine Plan Section 4.10 discusses the backfill aquifer. Within the areas where the highwall miner is used for mining, an open cavern will be left behind. Unless the mined out areas collapse, the backfill aquifer is essentially an open cavern with 100% porosity. The modeling software used for this effort does not have the ability to transiently change aquifer properties, and during resaturation of the mined areas the assigned storage coefficients remained the same as the original aquifer properties. As a result, the model may underestimate the time that it takes for the aquifer to resaturate where the mining methods have increased the porosity and thereby resaturation volume. Inversely, in the slots mined with traditional open cut mining

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With the exception of the open cut for mine block 5, all of the open cuts are oriented so that they will have minimal impacts on the natural flow gradients in the wellfield or are located within or adjacent to dry areas. As previously noted, the open cut near mine block 5 is located adjacent the drainage divide so it will not significantly change the water flow within the aquifer.

Due to the fact that much of the mined area is dry, the actual area mined that is below the water table is relatively small, and that the open cuts are oriented such that they have minimal impacts to groundwater flow, the recovery analysis performed by the model is reasonable. Also, as noted, the areas where underground mining is employed and the model overestimates the rate at which the aquifer is resaturated are counterbalanced by the areas of open cuts where the aquifer will not be replaced and the model underestimates the time it takes for the strata to resaturate.

Comment MuK 89 – Round 2

Response conditionally accepted. Please incorporate the context of the response into the permit application. (MK)

Response MuK 89 – Round 2

Text from this comment response was added to Addendum MP-3 Section 4.10 to capture the context of the Round 1 response.

Comment MuK 89 – Round 3

Response accepted.

Comment MuK 90 – Round 1

Mine Plan, Addendum MP-6 Subsidence Control Plan, 90. Figure MP6.1-1 shows "Monarch Seam Surface Only Mining". Please clarify if the Monarch seam is targeted for mining in the appropriate sections of Appendix D5, Appendix D6 and mine plan. (MK)

Response MuK 90 – Round 1

The appropriate sections of Appendix D5 and D6 have been updated.

Comment MuK 90 – Round 2

No comment received.

Response MuK 90 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MuK 98 – Round 3 verbal comment via phone call with WWC 12-2-15

Please provide additional clarification describing why the model predicted discharge from the Tongue River to the underlying layers using the River Cells is conservatively over estimated.

Response MuK 98 – Round 3 verbal comment via phone call with WWC 12-2-15

The text in Addendum MP-3 Section 4.7.2 (Page 50) has been updated to further clarify that the model predicted discharge from the Tongue River to the underlying layers is conservatively high. Please also see Addendum MP-3 Section 2.6.3 (pg 29) for additional discussion on the contribution of water from the Tongue River to the groundwater system.

Reclamation Plan

Comment BJ 57 – Round 1

Volume 12, Reclamation Plan, Section RP.8.3, Pg. RP-37, The narrative describes the sources of recharge to the coal seams. One lithology mentioned as a positive recharge contributor is the overlying burn, scoria, or clinker material, generated by coal fires. It is a common misunderstanding that the scoriaceous material recharges coal or overburden. It would appear, at first glance, that the broken, vuggy material would be capable of conveying large amounts of water from the surface to materials beneath. That is not the case, however, as the coal/scoria interface has a zone of partially metamorphosed coal ash that lies between the burned material and the remnant coal. I have seen this zone many times during my 25 year career in the coal mines when supervising coal and overburden removal. This zone is characterized by a white to light gray, clay band that ranges in thickness from 6 inches to a foot or more. It is the same high silica ash found in the bottom ash of the local power plants that burn PRB coal. This ash band acts as an aquaclude, preventing water from entering or escaping the coal. Because of this, any recharge models that were run using the scoria as a recharge source must be reevaluated using new layers that do not include the scoria. Rerun recharge models if needed.

Response BJ 57 – Round 1

It is true that the partially metamorphosed coal ash layer between the coal and the scoria has the potential to limit recharge from the scoria to the coal. However, even though the permeability of this layer is low, there will be areas where the coal has collapsed or other geologic variances such as a thinning section which will allow for water from the scoria to come into contact with the coal. Therefore, even though the scoria may not be directly in contact with the coal, there is still a recharge component to the scoria, albeit; significantly lower than if the scoria and coal were in direct contact. This low recharge rate is reflected in the groundwater model. The calibrated recharge rate used in the groundwater model for the areas covered by scoria was 0.35

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inches per year. For comparison purposes, the recharge rates assigned to the Carney and Masters outcrops, where no scoria was present, varied from 0.2 to 0.88 inches per year. Considering that in the scoria areas a very large percentage of direct precipitation is expected to infiltrate into the scoria, the 0.35 inch per year recharge rate represents a significant reduction in the amount of water available (which could be upwards of 10 inches per year) to infiltrate into the coal seams. Therefore, the calibrated recharge rate included in the groundwater model does take into account the low permeability layer between the coal and the scoria.

Comment BJ 57 – Round 2

No comment received.

Response BJ 57 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 58 – Round 1

Volume 12, Reclamation Plan, Section RP.8.3, Pg. RP-39, The second sentence in the first paragraph has an odd, difficult to understand syntax. Please rewrite the sentence for clarity.

Response BJ 58 – Round 1

Revised page RP-39 text as requested. The sentence will now read "The mine will consult with WDEQ/LQD to determine the number of spoil wells that will be tested".

Comment BJ 58 – Round 2

No comment received.

Response BJ 58 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 65 – Round 1

EXHIBITS, Reclamation Plan, Exhibit RP.6-1, The permit boundary on this map is inaccurate. Please recreate the permit boundary layer.

Response BJ 65 – Round 1

Revised Exhibit RP. 6-1 as requested.

Comment BJ 65 – Round 2

No comment received.

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Response BJ 65 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment BJ 66 – Round 1

EXHIBITS, Reclamation Plan, Exhibit RP.8-3 and Exhibit RP.8-4, The post mining potentiometric surfaces for the Carney and Masters beds are suspended in mid-air over Slater Creek. Please terminate the contour lines at the outcrop or use a dotted line to indicate the calculated potentiometric surface.

Response BJ 66 – Round 1

Revised Exhibit RP.8-3 and RP.8-4 as requested.

Comment BJ 66 – Round 2

No comment received.

Response BJ 66 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 24 – Round 1

Reclamation Plan, Section RP.4. This brief section discusses what is considered spoil material to be removed during mining. The section states that spoil does not include coal, but there are some very narrow coal seams with numerous stringers of clay or of such low quality that will probably not be mined and will be placed in backfill. Also, the top layers of most coal seams are quite "dirty" and would also be removed and backfilled. In order to provide the readers with a more accurate description of the mining and reclamation processes, please revise the text to show that some coal-laden materials will also be considered spoils and will be backfilled during reclamation.

Response DS 24 – Round 1

Revised text as requested.

Comment DS 24 – Round 2

No comment received.

Response DS 24 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment DS 25 – Round 1

Reclamation Plan, Section RP.5.2. Please provide a description of the methods used to control topsoil depth during replacement. Most mining operations use stakes with surveyed marks as guides for controlling soil application depths.

Response DS 25 – Round 1

See Section RP.5.4 for a description of the methods used to control topsoil depth during replacement.

Comment DS 25 – Round 2

No comment received.

Response DS 25 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 26 – Round 1

Reclamation Plan, Section RP.5.4. Variability in topsoil depth cannot be avoided due to limitations imposed by the equipment used and the pre-application preparations which may include ripping of the compacted overburden surface. Typically, the depth of topsoil application may vary 25%, but the average depth should be closely monitored and should not exceed the average availability. Also, because some soils exhibit unsuitable characteristics and will not be used for reclamation, discussion of the use of substitute topsoil materials is warranted in this section.

Response DS 26 – Round 1

Revised text as requested. Added discussion about substitute topsoil being an option if not enough suitable topsoil is salvaged.

Comment DS 26 – Round 2

No comment received.

Response DS 26 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 27 – Round 1

Reclamation Plan, Section RP.5.6. Sediment control measures will be required to prevent untreated runoff from exiting reclaimed lands onto adjacent native lands. Please provide a discussion of the sediment control measures to be used.

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DEQ 34-208

Response DS 27 – Round 1

Revised text as requested.

Comment DS 27 – Round 2

Response is not adequate. Use of ASCMs during mining and following reclamation as sediment control must follow the requirements of Guideline 15. Brook Mine must provide some detail about how the ASCMs will be sized, certified, permitted and terminated. ASCMs may not be used within ½ mile of the Tongue River. Please provide requested information in the Mine Plan.

Response DS 27 – Round 2

In response to Comment MK 116 (Round 2), ASCMs have been removed as the primary form of sediment control within half of a mile of the Tongue River and Goose Creek. In the place of ASCMs within the half-mile buffer, sediment impoundments have been designed. These designs are now provided in Addendum MP-2. Design standards for ASCMs, inspection and maintenance standards for ASCMs, and ASCM removal and site reclamation standards are provided in Addendum MP-1.

Comment DS 27 – Round 3

Response is not adequate. The text in Section 5.6 is not adequate. ASCMs or sediment reservoirs/sumps must be used to control sedimentation from disturbed/reclaimed lands onto adjacent native lands until Phase 2 Bond Release Verification has been approved. The text must be changed to clearly show the types of sediment control that will be used until Phase 2 Bond Release Verification has been approved.

Response DS 27 – Round 3

The text has been revised in Section RP.5.6 to state that sediment measures will be in place until sediment control release has been obtained.

Comment DS 28 – Round 1

Reclamation Plan, Section RP.8.2. This section states only that impoundments will require Landowner, LQD and SEO approval. Prior to construction of post mining impoundments, SEO approved plans for the impoundments must be submitted for inclusion in the permit Reclamation Plan. Please include a statement that a Reclamation Plan revision will be approved by the LQD prior to construction of impoundments.

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DEQ 34-209

Response DS 28 – Round 1

Revised Section RP.8.2 to include a statement regarding LQD approval before the construction of postmine impoundments.

Comment DS 28 – Round 2

No comment received.

Response DS 28 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 29 – Round 1

Reclamation Plan, Section RP.11.1. The primary final land use for the permitted acreage will be grazing and wildlife. Only areas where the current use is industrial will remain industrial land uses after mining is completed. Therefore, in order for any constructed buildings or railroad access to remain following mining, and a permit revision to change the land use will be required. It is not just a matter of demonstrating usefulness to the LQD and receiving landowner consent. This will be a major revision to the permit that will require public notice. Clarification should be provided concerning the steps involved to allow building to remain.

Response DS 29 – Round 1

Revised text as requested. Eliminated discussion in Section RP.11 regarding leaving any buildings, facilities, and equipment following completion of mining.

Comment DS 29 – Round 2

No comment received.

Response DS 29 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 30 – Round 1

Reclamation Plan, All Mine Plan Maps with progressions must show the actual years of the initial disturbance or mining activity, or the progression must be linked to a specific year in Reclamation Plan text. The maps must also include the contour interval.

Response DS 30 – Round 1

See Mine Plan MP.1.6 for a description of permit terms and initial year. Revised text in Reclamation Plan Section RP.13 to reference Mine Plane MP.1.6. Revised Exhibit RP.5-1 adding "Note: Year 3 corresponds to the year 2019" in Legend.

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Comment DS 30 – Round 2

No comment received.

Response DS 30 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DS 33 – Round 2 (New Comment)

New Comment: Reevaluate the average topsoil replacement depth based on salvage depth estimates shown in Appendix D7 and expected disturbance of each soil series during mining. 18 inches may not be adequate.

Response DS 33 – Round 2 (New Comment)

The topsoil depth has been revised in the first paragraph of Section RP.5.4.

Comment DS 33 – Round 3

No comment received.

Response DS 33 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment DE 19 – Round 1

Reclamation Plan, Section RP.5.1, page RP-6 – RAMACO states that the contoured surface will be scarified or ripped, if necessary. The mine should commit to scarifying or ripping all surfaces prior to topsoil replacement.

Response DE 19 – Round 1

Revised text as requested. Remove "if necessary" from sentence.

Comment DE 19 – Round 2

No comment received.

Response DE 19 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 20 – Round 1

Reclamation Plan, Section RP.5.6, page RP-8 - The 1st sentence of the 2nd paragraph doesn't make sense. Please correct.

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Response DE 20 – Round 1

Revised text as requested. The sentence now reads "Rills and gullies occurring in redistributed soil precluding the achievement of the approved postmining land use or the reestablishment of vegetative cover will be rectified".

Comment DE 20 – Round 2

No comment received.

Response DE 20 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment DE 21 – Round 2 (New Comment)

There still has been no Reclamation Bond Estimate submitted at this time so there is nothing to review.

Response DE 20 – Round 2 (New Comment)

Reclamation Bond calculations are pending.

Comment DE 21 – Round 3

The applicant still has not submitted any reclamation bond but Western Water has scheduled a meeting to discuss the bond for November 5, 2015. I cannot recommend approval of this permit application until an adequate reclamation bond has been submitted.

Response DE 20 – Round 3

A reclamation bond estimate has been provided as part of the Round 3 response package.

Comment JJ 5 – Round 1

Reclamation Plan, 5. Exhibit RP 6-1 also displays permit boundary discrepancies in regards to the section lines on it and those located on the Adjudication Exhibit 1. Please update accordingly.

Response JJ 5 – Round 1

See response to comment BJ 65. Revised Exhibit RP.6-1 as requested.

Comment JJ 5 – Round 2

No comment received.

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Response JJ 5 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment JJ 6 – Round 1

Reclamation Plan, 6. Table RP 6-1 states that there are 11.6 acres of wetlands and other aquatic resources. Please discuss where these acres are to be reclaimed and show them on the Exhibit RP. 6-1 which displays the reclaimed vegetation communities and their locations.

Response JJ 6 – Round 1

Revised Section RP.9 to include reference to Exhibit RP.6-1 for location of reclaimed wetlands and OAR. Revised Exhibit RP.6-1 to include reclaimed wetlands and OAR locations.

Comment JJ 6 – Round 2

No comment received.

Response JJ 6 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 24 – Round 1

Reclamation Plan, Section RP.10 Reestablishment of Essential Hydrologic Functions and Agricultural Utility on Alluvial Valley Floors, Assuming the Tongue River is an AVF, this section should discuss how the essential hydrologic functions will be maintained and/or reestablished, as required by LQD Coal Rules and Regulations, Chapter 5, Section 3(c)(ii). As noted in Comment No. 21, the essential hydrologic functions of the Tongue River AVF need to be identified and a monitoring system needs to be installed. (MDK)

Response MK 24 – Round 1

Revised text as requested in Section RP.10.

Comment MK 24 – Round 2

Response not accepted. Please provide a more thorough discussion for each identified essential hydrologic function to demonstrate that the functions will be maintained throughout the mining operation. In particular, since mining is predicted to cause some amount drawdown in the Tongue River alluvium (Mine Plan Addendum MP-3), this needs specific discussion to demonstrate that the essential hydrologic functions will be maintained and/or reestablished.

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Please also provide more detail on the plan and frequency of analyzing the aerial imagery. In addition, please note that given that Mine Plan Addendum MP-3 predicts some amount of drawdown in the alluvium of the Tongue River, installation of alluvial monitoring wells would be required to monitor the AVF. Otherwise there will be no way to assess the validity of the predicted drawdowns. Please provide a more detailed plan for installing the alluvial monitoring well(s). (MDK)

Response MK 24 – Round 2

The text at the end of Section RP.10 has been revised to include the pertinent details on the essential hydrologic function monitoring plan. The plan includes obtaining infrared photography every 5 years and photo documentation annually, as well as installing and monitoring alluvial wells on the Tongue River and Goose Creek during mining and reclamation periods. Exhibit RP.8-5 has been revised to include the proposed locations of the alluvial wells. Also, Guideline 9 Alluvial Valley Floors has been added to the Reference Section RP.17.

Comment MK 24 – Round 3

Response not accepted. Please see review of the response to Comment MK 21 and state in the text in Section RP.10 that the three proposed wells will be installed prior to commencing any mining-related disturbance. (MDK)

Response MK 24 – Round 3

A sentence stating alluvial monitoring wells will be installed prior to commencing mining related disturbance was added to Section RP.10.

Comment MK 25 – Round 1

Reclamation Plan, Section RP.10 Reestablishment of Essential Hydrologic Functions and Agricultural Utility on Alluvial Valley Floors, 25. As noted in Comment No. 21, the adjacent Goose Creek AVF also needs a monitoring system to demonstrate essential hydrologic functions are maintained and/or reestablished as required by LQD Coal Rules and Regulations, Chapter 5, Section 3(c)(i) and (ii). (MDK)

Response MK 25 – Round 1

Revised text as requested in Section RP.10.

Comment MK 25 – Round 2

Response not accepted. Please revise the discussion on the Goose Creek AVF monitoring system as per the response to Comment MK 24. (MDK)

Response MK 25 – Round 2

See response MK 24 for discussion on the Goose Creek AVF monitoring system.

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Comment MK 25 – Round 3

Response accepted.

Comment MK 26 – Round 1

Reclamation Plan, Section RP.10 Reestablishment of Essential Hydrologic Functions and Agricultural Utility on Alluvial Valley Floors, 26. This section may also need to be addressed if the LQD finds that other AVFs exist on or near the permit area. If AVFs are determined to be present, the essential hydrologic functions must be maintained and/or reestablished as required by LQD Coal Rules and Regulations, Chapter 5, Section 3(c)(i) and (ii). (MDK)

Response MK 26 – Round 1

Revised text as requested in Section RP.10.

Comment MK 26 – Round 2

No comment received.

Response MK 26 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 75 – Round 1

Reclamation Plan, Section RP.3.3 Postmine Slope Analysis, 49. Please provide a discussion that compares the pre-mine vs. post-mine slope characteristics. A table would be helpful that compared the minimum, maximum, and average slopes under pre-mine and post-mine conditions. (MDK)

Response MK 75 – Round 1

Added Table RP.3-1 comparing premining and postmining slopes. Updated Section RP.3.3 of text to include reference to the new table.

Comment MK 75 – Round 2

No comment received.

Response MK 75 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 76 – Round 1

Reclamation Plan, Section RP.3.5 Drainage Reestablishment, 50. It is stated that mining will disturb portions of the Slater Creek channel and the reclamation will entail reconstruction. However, the Mine Plan PHC (Section MP.6.1) stated that Slater Creek

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"will still flow naturally around the trench", and "Because Slater Creek's flow will not come into contact with mining activities, no impact will be made to water quality". Please provide a clear and explicit description of the extent of direct disturbance to the Slater Creek channel. This description should be consistent between the Mine Plan and Reclamation Plan. (MDK)

Response MK 76 – Round 1

As stated in the revised Section MP.6.1 of the Mine Plan, the only anticipated surface disturbance to Slater Creek during mining will be the redirection of the channel through a culvert under a proposed haul road. No text was edited in response to this comment.

Comment MK 76 – Round 2

No comment received.

Response MK 76 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 77 – Round 1

Reclamation Plan, Section RP.4.2 Mitigation of Unsuitable Material , 51. Minor channels are defined as ephemeral streams but there is no definition provided for "major channels". Please provide a definition and also illustrate an example of a major channel within the proposed permit boundary that would fit into this category. (MDK)

Response MK 77 – Round 1

Revised text in Section RP.4.2 to provide the definition of major channels.

Comment MK 77 – Round 2

No comment received.

Response MK 77 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 78 – Round 1

Reclamation Plan, Section RP.5.6 Erosion Control and Conservation Practices, 52. The first sentence of the second paragraph..."Rills and gullies..." needs revised, as it appears to be missing one or more words. (MDK)

Response MK 78 – Round 1

See response to Comment DE 20. Text revised as requested.

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Comment MK 78 – Round 2

No comment received.

Response MK 78 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 79 – Round 1

Reclamation Plan, Section RP.7.4 Aquatic Habitat, 53. The second sentence discusses stockponds possibly being disturbed by mining activities. The Mine Plan PHC did not mention that any existing stockponds would be disturbed by mining activities. If stockponds are to be disturbed by the mining operation, this should be discussed in the Mine Plan PHC. (MDK)

Response MK 79 – Round 1

The text in the Mine Plan PHC has been revised to clarify the disturbance to stockponds within the permit area. Section RP.7.4 has been revised to clarify the anticipated aquatic habitat locations.

Comment MK 79 – Round 2

No comment received.

Response MK 79 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 80 – Round 1

Reclamation Plan, Section RP.7.4 Aquatic Habitat, 54. The text states that two additional postmine impoundments will be constructed and their location is shown in Exhibit RP.3-1. This Exhibit shows ten permanent impoundments, both on and adjacent to the proposed permit area. Please revise this discrepancy in the text or change the symbology in the Exhibit to clearly show the two permanent post-mine impoundments. (MDK)

Response MK 80 – Round 1

Revised text in Section RP.7.4. to clarify the postmine impoundment locations.

Comment MK 80 – Round 2

No comment received.

Response MK 80 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 81 – Round 1

Reclamation Plan, Section RP.8.1 Drainage Basin Reconstruction, 55. Please add the major stream name labels (Tongue River, Goose Creek, East Fork Earley Creek, Slater Creek, Hidden Water Creek) to Exhibit RP.8-1. (MDK)

Response MK 81 – Round 1

Revised Exhibit RP.8-1 as requested.

Comment MK 81 – Round 2

No comment received.

Comment MK 81 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 82 – Round 1

Reclamation Plan, Section RP.8.1 Drainage Basin Reconstruction, 56. Please explain in the text how the postmine drainage basin parameters in Table RP.8-1 were determined. (MDK)

Response MK 82 – Round 1

Revised text in Section RP.8.1 as requested.

Comment MK 82 – Round 2

No comment received.

Response MK 82 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 83 – Round 1

Reclamation Plan, Section RP.8.1 Drainage Basin Reconstruction, 57. The text states that a comparison of drainage basin parameters in Table RP.8-1 and Exhibit RP.8-1 show that the overall hydrologic balance will remain largely unchanged. This conclusion is not obvious from the Table and Exhibit. How similar are the postmine drainage basin parameters to the pre-mine parameters? Which sub-drainages show the largest change from pre-mine conditions? The text needs to include a more thorough discussion to demonstrate to the reader why exactly the postmine hydrologic balance will be unchanged. (MDK)

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Response MK 83 – Round 1

Revised text to include reference to Appendix D6 tables and exhibits regarding drainage basin parameters. Minor disturbance and mining methods contribute to the largely unchanged postmine drainage basin parameters.

Comment MK 83 – Round 2

No comment received.

Response MK 83 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 84 – Round 1

Reclamation Plan, Section RP.8.1.1 Discharge Estimates, 58. The text provides no discussion of the comparison between the pre-mine and postmine modelled discharge values. Please provide this discussion so the reader can determine if the differences are minor or major. (MDK)

Response MK 84 – Round 1

Revised text in Section RP.8.1.1 as requested.

Comment MK 84 – Round 2

No comment received.

Response MK 84 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 85 – Round 1

Reclamation Plan, Section RP.8.1.1 Discharge Estimates, 59. Please add the year to the Miller reference within the text (2003) and add this citation to the references list in Section RP.17. (MDK)

Response MK 85 – Round 1

Revised text as requested.

Comment MK 85 – Round 2

No comment received.

Response MK 85 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 86 – Round 1

Reclamation Plan, Section RP.8.1.1 Discharge Estimates, 60. Similar to Comment No. 8 made for Appendix D6, the HEC-HMS runoff estimates in Table RP.8.4 are much higher than the Miller (2003) equations. Please provide a discussion in the text as to the reasonableness of the HEC-HMS estimates and why the HEC-HMS estimates are so much higher than the Miller (2003) regression equations.

Response MK 86 – Round 1

See response to Comment MK 34. No revisions to the text were made.

Comment MK 86 – Round 2

No comment received.

Response MK 86 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 87 – Round 1

Reclamation Plan, Section RP.8.1.2 Channel/Floodplain Design, The last sentence in the first paragraph states that stream reaches for which designed cross sections are provided are identified in plan on Exhibit RP.8-1. There is nothing on this Exhibit that shows which stream reaches have designed cross sections, nor which stream channels are being reconstructed. Please clearly identify this information on this Exhibit. (MDK)

Response MK 87 – Round 1

Exhibit RP.8-1 has been revised as requested.

Comment MK 87 – Round 2

No comment received.

Response MK 87 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 88 – Round 1

Reclamation Plan, Section RP.8.1.2 Channel/Floodplain Design, 62. Exhibit RP.8-2 shows that the main Slater Creek channel will not be disturbed. Please consider this in light of Comment No. 50 that requested clarification on the extent of disturbance to the Slater Creek channel. (MDK)

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Response MK 88 – Round 1

See response to Comment MK 76(referred to as Comment No. 50). Revised Exhibits RP.8-1 RP.8-2 as requested. A reconstructed Slater Creek (Figure RP.8-9) cross section has been added to reflect the correct disturbance boundary.

Comment MK 88 – Round 2

No comment received.

Response MK 88 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 89 – Round 1

Reclamation Plan, Section RP.8.1.2 Channel/Floodplain Design, 63. On Page RP-35, second paragraph, it references "reclaimed Slater Creek channel" and channel hydraulics are presented in Table RP.8-5. It is not clear why channel hydraulics are presented for Slater Creek when it will not be disturbed. Is this because reclaimed tributaries to Slater Creek are changing such that the main channel of Slater Creek is expected to be change? Please clarify this in the text. (MDK)

Response MK 89 – Round 1

Slater Creek is included Table RP.8-5 to show that the postmine Slater Creek Channel will be hydraulically similar to premine conditions after mining and reclamation operations have been completed as reclamation of a portion of Slater Creek is expected.

Comment MK 89 – Round 2

No comment received.

Response MK 89 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 90 – Round 1

Reclamation Plan, Section RP.8.2 Permanent Impoundments, 64. It is unclear exactly how many new postmine impoundments will be constructed. Table RP.8-6 identifies two impoundments (Enhancement Stock Pond 1 and Replacement Stock Pond 1), and these are shown in Exhibit RP.3-1. Exhibit RP.3-1 shows eight other permanent impoundments. Please identify if these are new features to be constructed or if they are existing stockponds that may be affected by the mining operation. (MDK)

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Response MK 90 – Round 1

The text in Section RP.8.2 has been revised to clarify that only the new features to be constructed are displayed in Table RP.8-6. Affected existing stockponds will be constructed approximately to premine conditions.

Comment MK 90 – Round 2

No comment received.

Response MK 90 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 91 – Round 1

Reclamation Plan, Section RP.8.2 Permanent Impoundments, 65. Please identify in this section if there will be a net increase or decrease in post-mine water storage capacity relative to pre-mine capacity. (MDK)

Response MK 91 – Round 1

Revised text in Section RP.8.2 to clarify a net increase in water storage capacity is expected due to the addition of two postmine impoundments.

Comment MK 91 – Round 2

No comment received.

Response MK 91 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 92 – Round 1

Reclamation Plan, Section RP.8.2 Permanent Impoundments, 66. As mentioned Comment No. 47, it is advised that the applicant discuss with the SEO-Interstate Streams Division any implications for the Yellowstone Compact if new water storage features are proposed that potentially decrease water quantity to the Tongue River. (MDK)

Response MK 92 – Round 1

See response to Comment DS 28(Comment No. 47 mentioned above). Revised text as requested.

Comment MK 92 – Round 2

Response not accepted. The response referenced Comment DS 28, which did not mention consulting with the SEO about the Yellowstone Compact. As indicated in the

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response to Comment MK 73, RAMACO is aware of the Yellowstone Compact and will act in accordance with the guidelines outlined. Please add a similar statement to Section RP.8.2. (MDK)

Response MK 92 – Round 2

The text in Section RP.8.2 Permanent Impoundments has been revised in the second paragraph to acknowledge that RAMACO will obtain a permit from the SEO, therefore any implications to the Yellowstone Compact will be analyzed by the SEO.

Comment MK 92 – Round 3

Response accepted.

Comment MK 93 – Round 1

Reclamation Plan, Section RP.8.4.2 Surface Water Monitoring, 67. The text on Page RP-40 states that the surface water monitoring stations are shown on Exhibit RP.8-4. However, the stations are not shown on this Exhibit. It may be make the most sense to add these to Exhibit RP.8-5 and rename the Exhibit "Postmine Hydrologic Monitoring Locations" so the surface water stations and monitoring wells are on one Exhibit. (MDK)

Response MK 93 – Round 1

Revised the reference in text to state "locations of these sites are shown on Exhibit RP.8-5". Exhibit RP.8-5 was revised to include surface water monitoring stations and renamed as requested. Table RP.8-9 was edited to include all planned surface water stations including postmine impoundment monitoring sites.

Comment MK 93 – Round 2

No comment received.

Response MK 93 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 94 – Round 1

Reclamation Plan, Section RP.8.4.3 Postmine Impoundments, 68. The text on Page RP-41 states that water quality samples will be collected at each of the postmine impoundments listed in Table RP.8-6 and presented on Exhibit RP.3-1. Please clarify in the text that this sampling list includes all ten impoundments shown. (MDK)

Response MK 94 – Round 1

Revised text in Section RP.8.4.3 to reference Table RP.8-9 and Exhibit RP.8-5 for postmine surface water monitoring sites including postmine impoundments.

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Comment MK 94 – Round 2

No comment received.

Response MK 94 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 95 – Round 1

Reclamation Plan, Section RP.8.4.3 Postmine Impoundments, 69. Please add the list of impoundments to be sampled to Table RP.8-9 "Surface Water Monitoring Sites". (MDK)

Response MK 95 – Round 1

Revised Table RP.8-9 as requested.

Comment MK 95 – Round 2

No comment received.

Response MK 95 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 96 – Round 1

Reclamation Plan, Section RP.8.4.3 Postmine Impoundments, 70. The postmine impoundments to be sampled appears to be slightly different from the impoundments listed in Mine Plan Table MP.7-1 "Operational Surface Water Monitoring Locations". Table MP.7-1 lists three impoundments (Hall Reservoir, Black Mountain No. 1 Stock Reservoir, and Legerski Bros #1 Stock Reservoir) that are not listed as postmine impoundments to be sampled. Please explain why there is a difference in the operational monitoring and postmine monitoring of some impoundments. (MDK)

Response MK 96 – Round 1

Black Mountain No.1 Stock Reservoir has been added as a postmine impoundment that will be monitored. Legerski No. 1 Stock Reservoir and Hall Reservoir are outside of the areas planned for mining disturbance, however in an effort to further monitor the surface water of the Brook Mine permit area, the reservoirs were added to be sampled quarterly during mining. Table RP.8-9 and Exhibit RP.8-5 have been updated to include Black Mountain Reservoir No. 1 Stock Reservoir.

Comment MK 96 – Round 2

No comment received.

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Response MK 96 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 97 – Round 1

Reclamation Plan, Section RP.8.4.3 Postmine Impoundments, 71. In the second full paragraph on Page RP-41, "The water quality samples.." please also state that the water quality samples will be compared against WDEQ/WQD Class III groundwater standards, as suggested by LQD Guideline No. 17 for replacement and enhancement stockponds. (MDK)

Response MK 97 – Round 1

Revised text as requested in Section RP.8.4.3.

Comment MK 97 – Round 2

No comment received.

Response MK 97 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 98 – Round 1

Reclamation Plan, Section RP.8.5.2 Surface Water, 72. At the end of the first paragraph on Page RP-44, it predicts a "slight change" in event peaks and volumes. Please further discuss what is meant by a "slight change", i.e., what is the magnitude of the increase or decrease? (MDK)

Response MK 98 – Round 1

Section RP.8.5.2 has been updated to reflect the change in event peaks and volumes will be less than one percent when compared to premining conditions.

Comment MK 98 – Round 2

No comment received.

Response MK 98 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 99 – Round 1

Reclamation Plan, Section RP.8.5.2 Surface Water, 73. In the second paragraph on Page RP-44, please clarify the extent of direct mining disturbance to Slater Creek versus tributaries of Slater Creek. This comment relates to previous Comments No. 50 and 62. (MDK)

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Response MK 99 – Round 1

See response to Comments MK 76 (comment No. 50) and Mk 88 (Comment No. 62).

Comment MK 99 – Round 2

No comment received.

Response MK 99 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 100 – Round 1

Reclamation Plan, Section RP.8.5.2 Surface Water, 74. Please provide a discussion as to whether the planned postmine impoundments will affect surface water quantity on or downstream of the proposed permit area. (MDK)

Response MK 100 – Round 1

Section RP.8.5.2 has been revised to include discussion of the effect of postmine impoundments to the surface water quantity on and downstream of the proposed permit area.

Comment MK 100 – Round 2

No comment received.

Response MK 100 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 101 – Round 1

Reclamation Plan, Section RP.9.1 Introduction, 75. The second paragraph references Appendix D8. Should this be Appendix D10 (Wetlands)? Please revise this if necessary. (MDK)

Response MK 101 – Round 1

The reference has been revised to D10 as requested.

Comment MK 101 – Round 2

No comment received.

Response MK 101 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

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Comment MK 102 – Round 1

Reclamation Plan, Section RP.9.1 Introduction, 76. Please add a statement up front in the Wetland Mitigation section that the USACE has not yet issued a jurisdictional determination for the proposed Brook Mine. Please also provide a statement in the text that the information in Section RP.9 may be subject to change pending the USACE determination. The USACE jurisdictional determination should also be incorporated somewhere into the Mine Permit once that is received by the Brook Mine. (MDK)

Response MK 102 – Round 1

Sections RP.9.1 has been revised as requested.

Comment MK 102 – Round 2

No comment received.

Response MK 102 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MK 103 – Round 1

Reclamation Plan, Section RP.14 Bond Release, 77. The LQD no longer requires a bond release verification for "sediment control release". This is now termed "surficial stability verification". More information is available in LQD Guideline No. 23. Please revise the text for this change. (MDK)

Response MK 103 – Round 1

The text in Section RP.14 has been revised by removing the reference to sediment control release.

Comment MK 103 – Round 2

Response accepted. However please note that RAMACO may wish to also cite LQD Guidelines No. 20, 21, 22, 23, and 25, as these are key documents for assisting operators with bond release procedures. (MDK)

Response MK 103 – Round 2

The text in Section RP.14 Bond Release has been revised to include discussion of WDEQ/LQD Guidelines No. 20, 21, 22, 23 and 25 for bond release. In addition, the Guidelines mentioned above have been added to Section RP.17 References.

Comment MK 103 – Round 3

No comment received.

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Response MK 103 – Round 3

Round 2 response assumed to be adequate. No response is necessary.

Comment MK 118 – Round 2 (New Comment)

In Section RP.3.4 Erosion and Sedimentation Control Practices, the first sentence on Page RP-4 references sedimentation impoundments. As noted in the response to Comment MK 49, sedimentation impoundments are not currently planned as part of the mining operation. The text in this section should also clarify that sedimentation impoundments are not planned. (MDK)

Response MK 118 – Round 2 (New Comment)

The Mine Plan has been revised to state that sedimentation impoundments will be required. Designs for sedimentation impoundments required in the first five years of operations are now provided in Addendum MP-2. Therefore, the reference to sedimentation impoundments in the Reclamation Plan has been left in place.

Comment MK 118 – Round 3

Response accepted.

Comment MK 119 – Round 2 (New Comment)

In Section RP.8.5.2 Surface Water, the third sentence of the last paragraph on Page RP-46 references sedimentation reservoirs. As noted in the response to Comment MK 49, sedimentation reservoirs are not currently planned as part of the mining operation. The text in this section should also clarify that sedimentation reservoirs are not planned. (MDK)

Response MK 119 – Round 2 (New Comment)

The Mine Plan has been revised to state that sedimentation impoundments will be required. Designs for sedimentation impoundments required in the first five years of operations are now provided in Addendum MP-2. Therefore, the reference to sedimentation impoundments in the Reclamation Plan has been left in place.

Comment MK 119 – Round 3

Response accepted.

Comment MK 127– Round 3 (New Comment)

RP.10 Reestablishment of Essential Hydrologic Functions and Agricultural Utility on Alluvial Valley Floors. Although no mining is planned on the AVFs on the Tongue River and Goose Creek, the disturbance boundary is within a small part of the Big Horn Mine AVF extent (Exhibit D11.6-1). It appears that this area includes the SP-1, OB-1, and OB-2 features in Section 21 on Exhibit MP.5-1, which was updated for this

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round. Please include a statement in the text of Section RP.10 that there is some minor disturbance proposed within the AVF extent. Please also discuss in the text of Section RP.10 whether this disturbance would affect the essential hydrological functions of the AVF. (MDK)

Response MK 127 – Round 3 (New Comment)

Minor disturbance is planned within the Big Horn Mine AVF extent in Section 21of Township 57 North, Range 84 West. The disturbance should not affect the essential hydrologic functions of the AVF on the Tongue River as the disturbed area is minimal in size and should not preclude the conveyance of flow. AVF areas disturbed will be replaced to mimic premine conditions. Discussion of the reclamation of the disturbed AVF areas has been added to the second paragraph of Section RP.10.

Comment MuK 91 – Round 1

Reclamation Plan, RP 8.5.3 Groundwater, 91. Section 8.3, page RP-38 states, "The estimated Postmine Potentiometric surfaces for the reclaimed aquifer for the Masters and Carney Seams are presented respectively in Exhibit RP.8.3 and Exhibit RP.8-4. Please provide a summary comparing and contrasting the premine potentiometric surfaces vs. post mine potentiometric surfaces. This comparison should also consider any changes in the hydraulic properties (hydraulic conductivity, storativity, recharge capacity) of the premine aquifers vs. post mine aquifers. (MK)

Response MuK 91 – Round 1

Section RP.8.5.3 has been revised to include discussion regarding the comparison of premine and postmine potentiometric surfaces.

Comment MuK 91 – Round 2

No comment received.

Response MuK 91 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 92 – Round 1

Reclamation Plan, RP 8.5.3 Groundwater, 92. Please discuss any changes in the interaction between the surface water and groundwater systems from the premining through the postmining phases of the operation. (MK)

Response MuK 92 – Round 1

The response to Comment MuK 84 describes interaction between the surface water and groundwater systems from the premining through the postmining phases of operation. In general the changes between the surface water systems and the groundwater systems are expected to be minimal. For a short time during mining it is

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anticipated that there will be a small (less than 6%) increase in the amount of water that recharges the coal seams from the Tongue River. Once the water levels in the coals recover, no further impacts are expected.

Comment MuK 92 – Round 2

No comment received.

Response MuK 92 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 93 – Round 1

Reclamation Plan, RP 8.5.3 Groundwater, 93. Please discuss the intersection of the postmining topographic and potentiometric surfaces and their effects on the location and size of groundwater-fed water bodies. (MK)

Response MuK 93 – Round 1

Revised Section RP.8.5.3 as requested.

Comment MuK 93 – Round 2

No comment received.

Response MuK 93 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 94 – Round 1

Reclamation Plan, RP 8.5.3 Groundwater, 94. Section 8.5.3, page RP-46 states, "These water quality changes can be qualitatively predicted from the overburden mineralogy and projected post mine hydrology." Please expand this discussion on projected groundwater quality. Provide a discussion on the estimated/ projected post mining groundwater quality. A detailed description of potential changes in water quality from flow through backfill/mined out areas should be included. Any potential changes to water quality in adjacent aquifers should be discussed with respect to the potential for offsite material damage. (MK)

Response MuK 94 – Round 1

Revised Section RP.8.5.3 text as requested.

Comment MuK 94 – Round 2

No comment received.

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Response MuK 94 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 95 – Round 1

Reclamation Plan, RP 8.5.3 Groundwater, 95. Please provide a discussion on any anticipated water use during the reclamation period. (MK)

Response MuK 95 – Round 1

As discussed in Addendum MP-3, the only anticipated groundwater uses during the reclamation period are at existing water supply wells. Section RP.8.5.3 has been revised to include additional discussion.

Comment MuK 95 – Round 2

No comment received.

Response MuK 95 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment MuK 96 – Round 1

Reclamation Plan, RP 8.5.3 Groundwater, 96. Please address (or reference) any expected post-reclamation subsidence effects on the hydrologic system (both quantity and quality) and the plan to minimize these effects. (MK)

Response MuK 96 – Round 1

Section RP.8.5.3 has been revised to include discussion of expected postmine subsidence effects on the hydrologic system.

Comment MuK 96 – Round 2

No comment received.

Response MuK 96 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 7 – Round 1

Reclamation Plan, Page RP-13. Section RP.6.2.6. In the last sentence please add that substitutions to the seed mix will be made only with WDEQ approval.

Response SP 7 – Round 1

Revised text in Section RP.6.2.6 as requested, the statement will now read "In the event that seed for primary species is not available, alternatives will be considered

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which match the life form and morphology of the primary choice only with WDEQ approval."

Comment SP 7 – Round 2

No comment received.

Response SP 7 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 7 – Round 3

The response is satisfactory. A commitment to notify the DWEQ for seed mix substitutions has been added.

Comment SP 8 – Round 1

Reclamation Plan, Page RP-16. Section RP.6.4.1. To demonstrate that all of the unaffected acres of each vegetation community are sufficient for an extended reference area please create a table with total acres and affected acres and reference this table in this section.

Response SP 8 – Round 1

Table RP.6-6 has been created to display the number of extended reference acres for the respective vegetation communities. The text in Section RP.6.4.1 has been revised to include a reference to the newly created table.

Comment SP 8 – Round 2

No comment received.

Response SP 8 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 8 – Round 3

Table RP6-6. This table should use the acreage within the permit boundary since the mine has control over management of the land in the permit. Please revise the first column of this table from Brook Mine Study Area to Brook Mine Permit Area and use the acreages from Table D8.2-1. For the second column please title it Disturbed Acreage. When the subtraction for the final column occurs there will be very little acreage for the Agricultural Land but historic or county production numbers can be used.

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Response SP 8 – Round 3

Table RP.6-6 has been revised with the permit area acreages from Table D8.2-1 in the first column and the second column has been renamed from Postmining Disturbed Areas to Disturbed Acreage.

Comment SP 9 – Round 1

Reclamation Plan, Page RP-17. Section RP.6.4.1. Please add to the Ch. 4 reference in the first sentence on this page that the Handbook of Approved Sampling and Statistical Methods for Evaluation of Revegetation Success on Wyoming Coal Mines.

Response SP 9 – Round 1

Revised Section RP.6.4.1 as requested.

Comment SP 9 – Round 2

No comment received.

Response SP 9 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 9 – Round 3

The response is satisfactory. A reference to the Handbook of Approved Sampling and Statistical Methods for Evaluation of Revegetation Success on Wyoming Coal Mines has been added.

Comment SP 10 – Round 1

Reclamation Plan, Page RP-17. Section RP.6.4.1. Please remove the first sentence in the third paragraph. It appears in conflict with the next sentence which cites Ch. 4.Sec. 2(d)(ii)(B).

Response SP 10 – Round 1

Removed sentence as requested in Section RP.6.4.1.

Comment SP 10 – Round 2

No comment received.

Response SP 10 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 10 – Round 3

The response is satisfactory. The conflicting citation has been removed.

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Comment SP 11 – Round 1

Reclamation Plan, Page RP-19. Section RP.6.4.5.1. Please add a third sentence to the first paragraph to Pastureland land use with a full shrub density greater than 1 shrub/m2 is also eligible.

Response SP 11 – Round 1

Sentence including pastureland land use as eligible added to Section RP.6.4.5.1 as requested.

Comment SP 11 – Round 2

No comment received.

Response SP 11 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 11 – Round 3

The response is satisfactory. Pastureland with greater than 1 shrub/m2 has been corrected to be eligible.

Comment SP 12 – Round 1

Reclamation Plan, Page RP-24. Please revise the sentence after the • Shrub density bullet to "Additionally, a species list will be prepared" and delete the remainder of the sentence.

Response SP 12 – Round 1

Revised text as requested.

Comment SP 12 – Round 2

No comment received.

Response SP 12 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 12 – Round 3

The response is satisfactory. The sentence has been revised.

Comment SP 13 – Round 1

Reclamation Plan, Page RP-25. Section RP.6.7.3. Under Sampling Frequency in Guideline 14 the third sample may be included as part of your revegetation success (bond release) sampling which can begin in year seven. You may add more flexibility

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to your sampling interval such as beginning year 3 or 4, with the second sampling in year 5, 6 or 7 and then the third may be year 7 – 13 and may be used for revegetation success.

Response SP 13 – Round 1

Revised text per recommendations.

Comment SP 13 – Round 2

No comment received.

Response SP 13 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 13 – Round 3

This is confusing. Please use the following language for the section. Sampling will begin in year 3 or 4 after seeding. The second sampling will occur in year 6 or 7 after seeding and the third sampling which may be used for final revegetation success will occur by year 13 or 14 after seeding. In the event the bond period for specific monitoring areas exceeds ten years, additional sampling will occur every five years after the third sample until final bond release.

Response SP 13 – Round 3

RAMACO acknowledges that the text may be confusing. Reclamation Plan text will remain as is.

Comment SP 14 – Round 1

Reclamation Plan, Page RP-29. Section RP.7.2. There is a reference to RP.8 in this section. Please correct the reference if it is not correct.

Response SP 14 – Round 1

Revised text to reference Section RP.6 for seed mixtures and revegetation operations.

Comment SP 14 – Round 2

No comment received.

Response SP 14 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 14 – Round 3

The response is satisfactory. The reference has been corrected.

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Comment SP 15 – Round 1

Reclamation Plan, Table RP6.1. Could you please add a footnote listing the disturbances that are included in the 87.3 acres of Disturbance and what the disturbances will be postmining in the 56.1 acres.

Response SP 15 – Round 1

Added footnote describing disturbance for premining and postmining to Table RP.6-1 as requested.

Comment SP 15 – Round 2

No comment received.

Response SP 15 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 15 – Round 3

The response is satisfactory. The types of disturbance have been listed.

Comment SP 16 – Round 1

Reclamation Plan, Exhibit RP.2-1. Postmining the landuse will be Grazingland and Fish and Wildlife Habitat (937.7 acres) and Cropland (3.7 acres) with 56.1 acres of disturbance, 4.9 acres of water and 11.6 acres of wetland. These landuses will match the landuses on Exhibit D1.1-1. With just minor acreage changes shown in Table RP.6-1. Since the railroad and major roads are identified and Taylor Quarry is going to be reclaimed to Grazingland and Fish and Wildlife Habitat, the Industrial commercial stippling is not needed on these areas.

Response SP 16 – Round 1

Revised exhibit as requested.

Comment SP 16 – Round 2

No comment received.

Response SP 16 – Round 2

Round 1 response assumed to be adequate. No response is necessary.

Comment SP 16 – Round 3

The response is satisfactory. Exhibit RP.2-1 has been revised to Grazingland for the reclamation of the Taylor Quarry.

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Comment SP 17– Round 3 (New Comment)

Please correct tables or text that list the new affected area. This acreage should match the acreage listed on your Form 1.

Response SP 17 – Round 3 (New Comment)

Tables RP.6-3 has been revised to include a note stating the affected area acreage outside the disturbance boundary has been excluded from shrub density calculations because this acreage will be undisturbed during mining operations except for potential subsidence. No other tables have been revised in response to this comment. Form 1 has been updated with the revised affected area acreage in Adjudication.

Comment SP 18– Round 3 (New Comment)

The shrub density standard is based on the affected acreage which is listed on your Form 1. Please make any needed changes to your shrub density tables and maps.

Response SP 18 – Round 3 (New Comment)

Tables RP.6-3 has been revised to include a note stating the affected area acreage outside the disturbance boundary has been excluded from the shrub density calculations because this acreage will be undisturbed during mining operations except for potential subsidence. Form 1 has been updated with the revised affected area acreage in Adjudication.

Other Comments

Comment MK 27 – Round 1

Items Requested in Electronic Format for Preparation of CHIA, 1. Please provide a CAD or ArcGIS shapefile that contains the proposed permit boundary for the Brook Mine. This file will be used to prepare maps in the CHIA. This file can be emailed to: matthew.kunze@wyo.gov. (MDK)

Response MK 27 – Round 1

See response to comment MK 28.

Comment MK 27 – Round 2

Response to the comment is pending. Review of the response to this comment will be completed when the information is received. (MDK)

Response MK 27 – Round 2

The permit boundary in CAD format was provided as an attachment in an e-mail dated September 1, 2015.

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Comment MK 27 – Round 3

Response accepted.

Comment MK 28 – Round 1

Items Requested in Electronic Format for Preparation of CHIA, 2. Please provide the baseline surface and groundwater data collected to support baseline characterization for the permit application. All data can be submitted on Excel templates (Attachments) found on the LQD website for the Coal Annual Report Format (CARF): http://deq.wyoming.gov/lqd/coal/resources/annual-report-3/.

• Please provide all surface water flow and water quality data for the following surface water stations: SM578415-SW-1, SM578409-SW-1, SM578418-SW-1, and SM578512-SW-1.

• Please provide all groundwater level and water quality data for all Brook Mine monitoring wells shown in Table D6.2-1.

Response MK 28 – Round 1

The electronic data requested is being compiled in the requested format and will be provided when it is completed.

Comment MK 28 – Round 2

Response to the comment is pending. Review of the response to this comment will be completed when the information is received. (MDK)

Response MK 28 – Round 2

The electronic data in CARF format was provided as an attachment in an e-mail dated September 1, 2015.

Comment MK 28 – Round 3

Response accepted.

Comment MuK 97 – Round 2 (New Comment)

In the next submittal, please consider providing a text tracking mechanism that will highlight the changes that are made in response to the comments. Typically, it can be a bolded font for all the text that is revised. This will help the reviewer to review the appropriate revised text. Without this bold font or some distinct highlight for the revised text, the reviewer has to compare against the initial submittal to get a handle on the changes that were made in response to the LQD comments.

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Response MuK 97 – Round 2 (New Comment)

RAMACO will coordinate with WDEQ to facilitate review in anyway once WDEQ has determined the method that is most suitable (as per the meeting on September 1, 2015). In the meantime, RAMACO has attempted to make it as clear as possible in comment responses what the location of textual changes has been. Additionally, please refer to the Change Index for locations of replaced or added text, tables, and figures. Also, any page with new changes will be updated with the submittal month and year in the footer. Pages in the permit without changes will maintain previous dates.

Comment MuK 97 – Round 3

Response accepted.

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