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Department of Environmental Quality
Coal Program
1218 E 6th Ave
PO Box 200901
Helena, MT 59620

Permit ID: C1979012
Revision Type: Amendment
Permitting Action: Deficiency Response
Subject: APPAM5; Arrowhead Amendment-**Round 2 Acceptability Deficiency Response**

Dear Chris:

Spring Creek (SCM) is hereby submitting responses to the Round 2 Acceptability Deficiencies of the Arrowhead Amendment (AHA) application. The attachment to this letter lists each deficiency with SCM's response. For convenience of referencing, SCM has numbered the deficiencies from the deficiency letter dated July 14, 2017.

One change not listed in the deficiencies attached is the [_305_nonPE_MapAffidavit](#) for Plate 7 Cultural, Plate 23 Veg Baseline, and Plate 24 Soil Baseline. Rick Casteel has requested that this affidavit also be signed and stamped by a PE, this new affidavit now replaces the affidavit previously used.

If you have any questions or comments, please contact me at (406) 757-4236 or via email at gabriel.johnson@cldpk.com.

Sincerely,

A handwritten signature in blue ink that reads "Gabe Johnson".

Gabe Johnson
Environment Engineer
Cloud Peak Energy, Spring Creek Mine

1. ARM 17.24.304(1)(f)(i):

- a. In APXIV5_SW_GW_Hydro Base_20170131_APPAM5 (3).PDF, Section 2.1.2, page 20, the statement, "...groundwater of practical development depth (considered herein as less than 1,000 feet) is found predominately and only consistently..." should be "predominantly", or better yet "primarily".

ATC

Revised the text of the first sentence as requested by this comment.

- b. In Section 2.3.1, page 23, "PZ-YZ-3" should be "PZ-YC-3".

ATC

Corrected text error "PZ-YZ-3" to be "PZ-YC-3".

- c. In Section 2.3.1, page 24, regarding DCAL-1, "Only about 0.6 feet of saturation remained as of mid-August 2015, and the well is likely to go dry before the end of 2015." There is another year of data available, and water levels are indeed below the bottom of the screen in August 2016. This can be updated.

ATC

Added text to the bottom of the section updating the description of water levels found in Well DCAL-1 in late 2015 and in August and October 2016.

- d. In Section 2.3.1, page 25, it is not clear if OB-11 is screened in or below the Smith coal. It is implied by the water level being 18 feet below the Smith that it is screened below, but the other wells discussed explicitly state where they are screened.

ATC

Added two sentences to the third paragraph of Section 2.3.2 explaining the positioning of the well OB-11 screen and gravel pack zones relative to the Smith coal interval.

- e. Section 2.4.2, page 29 "Having highly vesicular and porous textures, scoria deposits..." "Vesicular", according to Bates & Jackson, specifically refers to cavities in aphanitic and glassy igneous rocks. It is also commonly applied to the "paralava" portions of clinker, but these conditions are fairly uncommon. In any case, vesicular texture does not promote water capacity, as vesicles are not connected. "Fractured" is a better term in this context.

ATC

Pursuant to this comment, the word "vesicular" was replaced with the word "fractured".

- f. In Section 2.5.1 and on Table 5-6, would it be possible to show T values in $\text{ft}^3/\text{day}/\text{ft}$ (ft^2/day) rather than $\text{gal}/\text{day}/\text{ft}$? This would be much more consistent, since K values are given in ft/day .

ATC

Section 2.51 and 2.52: Converted all transmissivity units of gallons per day per foot (gpd/ft) into square feet per day (ft^2/day).

Table I Vol. 5-6: Converted all transmissivity units of gallons per day per foot (gpd/ft) into square feet per day (ft^2/day). Added explanation in table notes that ft^2/day is equivalent to $\text{ft}^3/\text{day}/\text{ft}$.

- g. In Section 2.6.1 and thereafter, specific conductance is by definition at 25°C, so adding "at 25°C" to it is redundant. ATC

Section 2.61: Per comment NO CHANGES were made. The text referenced by this comment attempts to remain consistent with the language of ARM 17.30.1006, which in defining specific conductance limits for each class of groundwater, specifically states "at 25° C".
UNSOLICITED CHANGE: Made minor text change to the first paragraph to indicate that the spring monitoring program being reported with the baseline study was changed in third quarter 2017 to include the "CX Ranch Spring" (water right WR 42B 112098 00 source). Changed the word "Administration" to "Administrative" in the final sentence of the third paragraph.

- h. Section 2.7.2, page 45. Galyardt and Murray do not show the Carney as equivalent to the Wall. ATC

Removed the reference to Wall coal in the second paragraph.

2. ARM 17.24.304(1)(f)(i)(C):

- a. The listing of known wells and springs provided in Attachment I Vol. 5-8 does not include the Montana Bureau of Mines and Geology, Groundwater Information Center (GWIC) database as a source. GWIC often contains records of wells and springs for which no DNRC water rights have been obtained, thus it is likely that the listing in Attachment I Vol. 5-8 is incomplete. Please use GWIC as an additional source for readily discoverable wells and springs.

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- b. Exhibit I Vol. 5-4 depicts a spring associated water right WR 42B 112098 00. This spring water right is not listed in Attachment I Vol. 5-8 nor is its condition discussed in Appendix I, Vol. 5 - Pre-mine Hydrology for Arrowhead Amendment. This spring is of note because of its location in a Dry Creek tributary downstream of a sediment pond and outfall. From Exhibit I Vol. 5-4, it is not clear whether this is the same spring as CX Ranch Spring, which is reported as dry by the MBMG but also identified in the alluvial valley floor study. Include this water right in Attachment I Vol. 5-8 and clarify the condition of this spring and its relation, if any, to the CX Ranch Spring. If unrelated, CX Ranch Spring would also require further information, as it is not in Attachment I Vol. 5-8 either. ATC

Attachment Iv5-8: Added water right 42B 112098 00. No other changes were made in the water rights listings or notes for Montana or Wyoming.

Attachment Iv5-1: Added one page to the end of the document to provide notes made July 21, 2017 while examining the "CX Ranch Spring", which is the source of water right WR 42B 112098 00.

Exhibit Iv5-4: Moved the location shown for water right WR 42B 112098 00 to be the same as the site of the "CX Ranch Spring" noted by the MBMG in OFR 493-B.

Text Section 1.2.2: Added text describing the "CX Ranch Spring" which supplies water right WR 42B 112098 00.

c. Lastly, given this spring location in relation to sediment control structures, monitoring at this location is required (See ARM 17.24.314(2)(d)). ATC

MQAP Table 2-2: Added water right 42B 112098 00 ("CX Ranch Spring") to the hydrologic monitoring plan.

Exhibit 1v5-1: Added "CX Ranch Spring" (source for water right 42B 112098 00) to the hydrologic monitoring plan.

3. ARM 17.24.304(1)(f)(iii):

The updated Section 2.7.2 in Appendix I, Vol.5 - Pre-mine Hydrology for Arrowhead Amendment addresses this deficiency. However, language in the Alternative Water Supplies section in 17.24.304 Baseline Information: Environmental Resources (17.24.304.e-f_Hydrologic) still needs to be updated. This section is lacking a reference that alternative water supplies do exist for the Arrowhead Amendment, as discussed in Appendix I, Vol. 5, Section 2.7.2. ATC

17.24.304(1)(f)(iii) "Alternative Water Supplies Groundwater": Added a paragraph to the bottom of the section summarizing available alternative groundwater supplies and referencing Section 2.7.2 of Appendix I Vol. 5.

17.24.304(1)(f)(iii) "Alternative Water Supplies Surface Water": Added a paragraph to the bottom of the section summarizing available alternative surface water supplies and referencing Section 2.7.2 of Appendix I Vol. 5.

4. ARM 17.24.304(1)(g):

In the topological, geological, stratigraphic, and mineral descriptions (Appendix N), Section 2.3. Galyardt and Murray do not show the Carney as equivalent to the Wall. ATC

Appendix N, Section 2.1: Replaced reference to Wall coal with Carney coal.

Appendix N, Section 2.3: Edited text of fourth paragraph to clarify that the Carney coal and Wall coal are different seams as described by the authors Galyardt and Murray.

UNSOLICITED CHANGE-Appendix N, various text sections: Updated the date in the footers of all pages. Corrected the error on several pages where the footer identified the document as "Appendix J" instead of "Appendix N".

5. ARM 17.24.305(1)(a):

The proposed disturbance boundary appears to encompass areas outside of what would be absolutely necessary to disturb with road construction and operational activities. Please describe if any limits to disturbance will be imposed within the proposed disturbance boundary. GABE

The SCM permit currently includes commitments in Section 312 to minimize disturbance and adverse impacts on fish, wildlife, and related environmental values during mining and reclamation practices. Additionally, Sections 314 and 631 discuss measures to be taken to minimize disturbance to the hydrologic balance. In order to achieve these objectives, SCM must limit the disturbance footprint to the extent possible. The life of mine permit boundary shown is conservative; however similar to

construction of the railroad loop, the majority of that area will be disturbed only for road construction and will be expeditiously reclaimed as facility level reclamation.

6. ARM 17.24.305(2)(a):

The map affidavits need to be consistent with the maps submitted including their location within the E-permit. The locations of several maps are referenced incorrectly in the affidavits. Please ensure that all maps that were submitted with AM5 are listed correctly on the Map Affidavits.

LAURA

The affidavits have been examined and corrected as needed.

7. ARM 17.24.308(1)(f):

The dwg file for the noxious weed map has not been updated with the amendment boundary. The ortho boundary has not yet been attached. Please update the CAD files for the noxious weed map.

GABE

The image file has been mailed (8/4/2017) on a thumb drive to the MDEQ because the 2.3 gigabyte image file is too large for submittal through the MDEQ file transfer service.

8. ARM 17.24.313(1)

- a. Methods indicated in the reclamation plan use Geosynthetic fabric as a separator of the road base and remaining alluvial materials at creek crossings. A supporting layer of geogrid material would be incorporated for areas of softer alluvium. These products address degradation of alluvial material remaining in place through separation via the fabric and stability with the geogrid.
- Compressive forces are not addressed with these materials. Some amount of compressive force will impact the alluvial layers that remain in place following soil salvage. This impact was discussed with the Hydrology and Engineering disciplines.
- We expect the alluvial layer to sustain some sort of compression from the activity involved with construction and reclamation of the road. Compressive properties of the alluvium are reported to be high in the clay based near surface strata and low in the gravel based deep strata. This indicates the road project will compact clay of the upper portion of the alluvium to some extent. Literature on compaction suggests soils are affected in the top 20 inches or less. Following road removal ripping will be implemented to relieve the compacted layers before soil redistribution. The ripping will help relieve compaction. Another step that can be used to reduce compaction is to avoid construction when the subsurface material is wet. Alluvial areas should not sustain road construction during wet periods.
- Please add discussion of compaction in relation to geotextile use.

OWEN

References to Appendix L, Attachment H; Appendix K, Section 1.3.1; and Section 3.5.1 of Appendix J, have been added to 17.24.313 (1)(g)(iii).

b. Second, add a commitment to conduct road construction during periods of low soil moisture. OWEN

[See response to 8.a.](#)

9. ARM 17.24.313(1)(h)(x):

Deficiencies relating to ARM 17.24.724 need to be addressed to satisfy this rule. GABE

[The appendices to 313 Addendum B Technical Vegetation Standards were mistakenly missing from the submittal as noted under the deficiency for 17.24.724\(3\). The appendices have now been added to the 313_AddmB_TechStds_20170818_APPAM5.pdf document. There are no changes proposed to the Pastureland, Grazingland, or Wildlife Habitat technical standards. Technical standards associated with AM5 are addressed in the text and table footnotes in Addendum B of Section 313.](#)

10. ARM 17.24.314(2)(d):

Hydrologic Control Plan (During Mining) includes storm water sediment pond #76 and outfall. This storm water structure is located up- gradient of spring water right 42B 112098 00 in a tributary of Dry Creek. The condition of this spring is unclear (See ARM 17.24.304(1)(f)(i)(C)) and is not included in the proposed Arrowhead MQAP (MQAP Table 2-2). Regardless, this spring location should be included in the Arrowhead MQAP, as an up-gradient, unlined sediment pond and discharge could modify the water quality and quantity of this spring. ATC

[This comment is addressed under the responses to Comment No. 2.c.](#)

11. ARM 17.24.317(1):

The proposed Youngs Creek diversion has no narrative explaining how it will be compliant with ARM 17.24.751. As this will be diverting an active channel with fish species present, please address fish passage for this diversion.

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12. ARM 17.24.321(1) and (1)(a):

a. Please change rule citation on Plate 18A to ARM 17.24.321. RICK, LAURA

[Plate 18A, Sheet 1 of 3 represents an as-built and as such has an affidavit that refers to 17.24.321](#)

[Plate 18A, Sheets 2 and 3 \(of 3\) are design drawings for the Arrowhead road, which is not built yet and as-such the map affidavit references 17.24.601-605 for prudent engineering designs.](#)

[All drawings are required by 17.24.305\(1\)\(e\) as reflected in each title block.](#)

b. Please add road gradients to Plate 18A.

RICK

Road gradients have been added to Plate 18A, Sheets 1, 2, and 3
It should be noted that Sheets 2 and 3 reflects the Arrowhead road that has not been built yet, so these are design grades.

c. Please include technical information to support the proposed design of the articulated concrete block (i.e. dimensions, anchoring, etc.).

OWEN

Added additional detail and note to Plate 18C, Sheet 2 of 2, and corrected an incorrect reference to Appendix K, Exhibit 1, Sheet 2 to 3 detail figures

d. The haul road sections for AM5 and the current permit are not consistent. Please revise as necessary and include a typical berm on the AM5 and showing height, position and how it will relate to fill and cut slopes. Please include all applicable dimensioning including depth of scoria.

OWEN
RICK

Plate 18C sheet 1 of 2: Detail "120' WIDE TYP. HAUL ROAD STREAM CROSSING" has been revised to show the basics of the section (with ditches and berms).
The detail "TYP. 120' WIDE HAUL ROAD SECTION" shows ditch, berm and scoria particulars (depth, width, thickness and slopes) with dimensions.
Plate 18C sheet 2 of 2: Typical detail of the articulated blocks to be used at culvert inlets and outfalls has been added.

13. ARM 17.24.324(1)(a)(ii):

Appendix A3 has been located in baseline information. The root types are explained in this Appendix; however, the tables in the Prime Farmlands special application remain as in previous comments. Change the footnote in the Prime Farmlands special application pages 324-3&4 to match the soil baseline information.

GABE
WESTECH

The root types footnote in the tables of the Prime Farmlands special application section have been updated.

14. ARM 17.24.324(1)(b):

See deficiency under 313(1). The Geotextile concept needs additional information.

OWEN

References to Appendix L, Attachment H; Appendix K, Section 1.3.1; and Appendix J, Section 3.5.1 have been added to 17.24.324 (1)(b).

15. ARM 17.24.324(1)(h):

Three reference area locations are now shown on Plate 23, Sheet 2. They are all upgradient of the haul road as requested during the previous deficiency. The legend for this map states there are four reference areas when there are only three. Please update the legend to accurately reflect what is on the map.

LAURA

The legend on Plate 23, Sheet 2 has been corrected to reflect only three reference areas. While uploading the new file, Plate 23, Sheet 2 DRAWING FILE was inadvertently deleted. It has been re-uploaded with no changes.

16. ARM 17.24.605(2):

Please address planned erosion prevention methods at proposed haul road drainage crossings before, during and after vegetation establishment. Will erosion control fabric, or similar measures be utilized?

OWEN

A statement that the structure designs for stream crossings will include erosion protection measures and examples have been listed of the types of erosion protection that may be included in the design.

17. ARM 17.24.633(1):

The permit states that sediment ponds will be maintained until revegetation requirements have been met. Per Western Alkaline standards at 40 CFR 434 Subpart H, all drainages associated with MPDES outfalls can be permitted under an approved Sediment Control Plan. Therefore, ponds may be removed prior to meeting all vegetation requirements.

ERIC

Text clarifying the ability to remove ponds per the Western Alkaline standards has been added to this section.

18. ARM 17.24.633(5)(a):

The statement, "There have been no unplanned discharges from the sediment control ponds except as a result of storms in excess of 10-year, 24-hour events," is no longer applicable and should be removed. Discharges occurred in 2014 as the result of spillway leaks following a snowmelt event.

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19. ARM 17.24.724(3):

Technical standards regarding ARM 17.24.724 were generated and are included in the application under Addendum 313B. The Appendices are called out on the Table of Contents, but were not included in the submittal. Please submit the Appendices to Addendum 313B.

LAURA

The loading of the PDF appendices was missed on the last round of responses. They are now a part of Addendum 313B.

20. ARM 17.24.801(1),(2) and (3):

There are four additional drainages that have not been addressed in the permit material submitted for ARM 17.24.801. Please include Squirrel Creek, Dry Creek, Youngs Creek, and Little Youngs Creek when addressing alluvial valley floors.

ATC

17.24.801(1) is now addressed for the four drainages that the Arrowhead Road will cross.

Additionally Appendix O4 provides an AVF Overview map and all alluvial valley floor investigations for the Arrowhead Amendment area.
17.24.801(2) now describes how the construction of the stream crossings will minimize impact to the AVF functionality and the steps that will be taken to reestablish the essential hydrologic functions. 17.24.801(3) explains why the agricultural utility and productivity impact are only temporary. A discussion is provided on irrigation ditches, culverts and headgates for the reconstruction of flood irrigated lands.

21. ARM 17.24.802(1) and (2):

The four drainages intersected by AM5, Squirrel Creek, Dry Creek, Youngs Creek, and Little Youngs Creek, must also be addressed in 802(1) and (2) permit material. ATC

17.24.802(1) provides discussion on the undeveloped nature of Squirrel Creek and negligible size of impacted acreages in the Youngs Creek and Little Youngs Creek AVFs, thereby supporting the Department's finding that the AVF reaches to be impacted in each of the three creeks are insignificant to agriculture.

17.24.802(2) refers to the design of the construction, operation and reclamation of the AHA haulroad being specifically engineered to not significantly impact the quality or quantity of surface water and groundwater flows that supply AVFs crossed over by the haulroad.

22. ARM 17.24.804(1)

The four drainages intersected by AM5, Squirrel Creek, Dry Creek, Youngs Creek, and Little Youngs Creek, must also be addressed in 804(1) permit material. ATC

In consultation with the Department, surface water and groundwater monitoring sites were selected for the AHA and hydrologic monitoring plans were developed specifically for baseline AVF investigations. The AM5 MQAP contains the long term hydrologic monitoring plan for the four drainages intersected by AM5.

23. ARM 17.24.805(1):

The four drainages intersected by AM5, Squirrel Creek, Dry Creek, Youngs Creek, and Little Youngs Creek, must also be addressed in 805(1) permit material. ATC

The following statement is contained in 17.24.802(1) and 17.24.805(1) of the permit: "the Department found that the AVF reaches to be crossed by the AHA haulroad on Squirrel Creek, Youngs Creek and Little Youngs Creek are insignificant to the respective farms' incomes due to the undeveloped nature of Squirrel Creek and negligible size of impacted acreages in the Youngs Creek and Little Youngs Creek valleys. The Department also determined that Dry Creek, an ephemeral stream, does not possess all characteristics requisite of an AVF set forth under ARM 17.24.325"

24. ARM 17.24.806(1):

The four drainages intersected by AM5, Squirrel Creek, Dry Creek, Youngs Creek, and Little Youngs Creek, must also be addressed in 806(1) permit material.

ATC

The following statement is contained in 17.24.806(1) of the permit: "As described in Section 17.24.801(1), alluvial aquifer strata within and adjacent to the area AVFs will not be removed by AHA's operations, and groundwater flow in the alluvial aquifers will not be interrupted or diminished. Valley floor stream flows will not be impounded but will instead be permanently diverted around the AHA haulroad (see Section 17.24.801(2) or conveyed via culverts beneath the haulroad where it crosses the AVFs. Geochemically suitable strata materials will be used for constructing haulroad crossings over the AVFs, and runoff from the haulroad will be managed by implementing industrial stormwater runoff control measures before being released into native drainages. These facts considered, the AHA haulroad and its associated facilities are highly unlikely to cause potential increases in the concentration of total dissolved solids of waters supplying the alluvial valley floors."