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Permit ID: C1984003B
Revision Type: Permit
Permitting Action: Deficiency
Subject: C1984003B; Round 2 Acceptability Deficiency

Dear Dicki:

The Department of Environmental Quality (DEQ) has completed its acceptability review regarding Western Energy Company's (WECO) application for SMP C1984003B. Additional in-depth deficiencies have been added with WECO's responses to the previous deficiency response. The following deficiencies must be adequately addressed before DEQ can determine the application acceptable:

ARM 17.24.302(1): Permit layers are not tagged in most maps. Many required permit layers are not tagged in any map (example, mineral ownership). This renders the function in the e-Permit to search by map layers useless. Please tag all relevant layers in all maps which contain them.

The format of some pdf exhibits is not acceptable and must be changed. For example, the Reclamation Plan map (Exhibit J) is too large of a file to view with the computer (refresh time is too long) or plot. Other maps with similar problems must also be changed. To "flatten" the image see the following link: <https://helpx.adobe.com/acrobat/kb/printing-complex-pdfs-acrobat.html>

WECO must add accuracy and clarity to the mine plan by making the following corrections:

There are discrepancies between Table 303-3, the narrative on page 1 of 308(1)(a) and what appears feasible on Exhibit A; for example, the narrative on page 1 of 308(1)(a) states that BXS 65-1 is a box cut, but Table 303 depicts BXS 65-1 being mined in 2019 and BXS 69 and 65 in year 4 as box cuts. In addition, the dates set forth in Table 303-3 do not make sense for example: BXS 65-1 (year 19), BSX 66-1 (year 12) and BXS 89-1 (year 11). These discrepancies must be addressed. It may be helpful to add years 1 - 6 annotation to the mine passes on Exhibit A.

Add an explanation to Table 303-3 that identifies the "first year" number as the whole number, the second-year correlating to the "- 1" mine pass numbers on Exhibit A and the third year correlating to a "- 2" numbers and so on as they appear on Exhibit A.

Table 303-3 references mine passes not found on Exhibit A. Corrections to mine passes BXS 104-1,

106-1, 108-1, and 110-1 must be made on either the exhibit or the table. Additionally, in Table 303-3 mine pass numbers cannot be abbreviated: numbers identifying mine passes must match exactly with what is depicted on Exhibit A.

The disturbance areas associated with stockpiles must be reviewed and changes made to Exhibit A where needed. For example, Table 308-1 on page 2 denotes 2.2 million yards of material will be stored in Spoil Stockpile SS-6 area which is only 13 acres in size. The stockpile would need to be over 100' tall (with vertical sides) to fit in the 13-acre disturbance area. It is not feasible for haul trucks to build such a stockpile; thus, a larger disturbance area is needed, or the amount of stored material adjusted.

There is a sequencing problem between the main haul road to the BXS pits and the mining of passes BX 6 through 19. The haul road must be constructed two years before mining is finished in pass BX 6. The inaccurate sequencing must be corrected or another haul route must be found. DEQ is not in support of the proposed haul route if an alternate route can be found which, pursuant to ARM 17.24.638(2)(a), disturbs "the smallest practicable area".

Page 642-1 proposes leaving permanent impoundments. Pond PO-21C does not have a location or any general information associated with it. This must be clarified.

The "Typical Culvert Cross Sections" on pages 605-4 and 605-5 are not legible and must be re-done so all information presented on the figures is clear.

The inconsistency between the narrative discussions for pond sizing to a 10-year, 24-hour event [pages 315-1, 639-1, and Appendix J (PHC) page 6] and the 100-year, 24-hour event used for the general pond designs requires additional explanation. Alternatively, all general designs could be changed to the 10-yr, 24-hr event. This issue should be discussed with DEQ.

The 1st paragraph on page 639-1 explains that details for sediment ponds and traps are found in Appendix J "located in Reclamation, Plans for Ponds and Embankments". The reference should be changed to Appendix J, Reclamation, Plan for the Protection of the Hydrologic Balance. WECO should correct the reference and add a reference to, "Pond Specific Design and As-built Attachments located in Mining, Plans for Ponds and Embankments."

Page 313-1 of AM5 narrative addresses ARM 17.24.313(1)(f)(i): detailed drainage designs. Exhibits V1 thru V14 appear to be included in the application to address this regulation and as such must be referenced on page 313-1.

The reference to a 1998 minor revision (MR 98-03-03) on page 321-2, for the use of up to 40% bottom ash in the road base, is not an acceptable format for addressing ARM 17.24.321(1)(e) and 601(7). In addition, any mention of ash in 505, 510, and 308(1)(c) does not include its' use as road base but only sanding and culvert bedding. WECO must remove narrative allowing use of any bottom ash in the road base or include a demonstration of compliance to the road performance standards in the permit. Please note and correct references to 313(1) in 505 and 510 because 313(1) is a dead end without any substantive information. If WECO is going to discontinue the use of bottom ash, appropriate narrative should detail how bottom ash was used in the permit area, where it was used, and during what time frame. There should also be a commitment to not using bottom ash after a specific date.

Information on page 302-2 must be reviewed and updated. In addition, the acre numbers

represented in the table are acres "to be permitted" and not total acres permitted.

ARM 17.24.303(1)(o): The attached table for Legal Right to Enter does not appear to match the permit information for Rosebud Area B and seems to be for a different permit. Please resolve this issue.

ARM 17.24.303(1)(s): The currently approved acres in Table 303-1 does not match what DEQ has in the database for Rosebud Mine Area B, which is 6,045. Please provide a reason for the discrepancy. Permit acreage should include MR65 (82 acres), MR67 (42 acres) and bond release SL15 (- 195 acres).

ARM 17.24.303(1)(y): "17.24.303(1)(y) and (z).pdf" refers to maps included with WECO's annual reports for the information requested by this rule. A map containing this information could not be located in recent annual reports. Please include a specific reference to the annual report year and map name which contains this information, or include a map containing this information in the permit application.

ARM 17.24.304(1)(e): DEQ checked the baseline information contained in "Appendix B – Baseline Hydrology Data.pdf" by comparing the information presented in Attachment B with Attachments C and E. DEQ also compared Attachment E with Attachment F to the extent of confirming that each sampling event was reported in each attachment. DEQ did not verify that the results of individual analyses in Attachments E and F match. DEQ also cross checked with the information in "02 Appendix F - Area B-Extension South Benthic Macro Report 2015_ERM.pdf" and "04 Appendix F - Area BXS Macro Survey_2016_10-13.pdf" on the Baseline - > Wildlife Survey page where appropriate. This review identified the following inconsistencies:

Field parameters from 2016 ERM macroinvertebrate sampling event are not entered for surface water sites.

All SW, SP, and PO sites, 1/27/17 field sheet indicates all sites inaccessible, no entries in field data table.

SW-301, 4/8/14, lab sample "SW-301" not listed in field data table.

SW-301, 12/11/14, field sheet notes top autosampler bottle empty, not in field data table.

SW-301, 4/17/15, no field sheet.

SW-301, 5/3/16, field data table omits decimal point from psi measurement.

SW-301, 6/2/16, field sheet says "over" at bottom but reverse side not included, psi/depth readings not included in comments in field data table.

SW-301, 2/23/17, "flowing, immeasurable (mix of ice and water)" added to field sheets for BS and TS samples, this is not consistent with the RT and TB sample field sheets or with the field data table.

SW-301, 3/27/17, incorrect sample ID "SW-301-20170324-BB" in lab data table and lab sheet, correct sample ID "SW-301-20170327-BB" on field sheet, field data table, and COC.

SW-301, 4/5/17, psi/depth from field sheet not reported in field data table.

SW-301, 5/31/17, no field sheet.

SW-302, 8/28/13, no field data associated with lab sample "SW-302 Bottom."

SW-302, 10/9/13, Bottom bottle EC in field data table (7140) does not match field EC for routine sample or field sheet (7170).

SW-302, 10/23/14, no EC, field sheet noted as illegible...appears to be 8.46 mS.

SW-302, 4/17/15, no field sheet.

SW-302, 1/20/16, field sheet time 9:45, data table 21:45, field sheet comments say "rainy/snowy" not in field data table.

SW-302, 6/2/16, first psi and depth values from field sheet not reported in field data table comments.

SW-302, 9/27/16, psi/depth from field sheet not entered in field data table comments.

SW-302, 4/5/17, psi/depth from field sheet not reported in field data table.

SW-302, 5/31/17, no field sheet.

SP-300, SP-302, & SP-303, 9/25/13, no field data associated with lab samples "SP-300", "SP-302", & "SP-303".

SP-300, 5/22/14, no lab sheet or data in lab data table for sample "SP-300".

SP-300, 10/7/15, field blank listed on field sheet, and in lab sheets, but not in field data table.

SP-301, 5/22/14, lab sample "SP-301" not listed in field data table.

SP-302, 3/20/14, no field sheet.

SP-302, 2/14/17, event routine sample is dated 2/24/17 in field data table.

SP-304, 4/14/16, flow <1 in field data table entered in water depth column.

SP-304, 5/17/16, flow <1 in field data table entered in water depth column.

SP-306, 9/21/16, field sheet says "Weir: not available, too marshy & wide" not in field data table comments.

SP-309, 9/22/15, DO from ERM 2015 Table 2 entered as pH, correct pH value is 8.43.

SP-309, 7/13/16 event is dated 7/16/16 in field data table.

SP-310, 7/6/16 event is dated 7/13/16 in field data table.

PO-300, PO-301, PO-302, & PO-303, 9/25/13, no field data associated with lab samples "PC-300", "PC-301", "PC-302", & "PC-303".

PO-300, 8/28/14, pH in field data table (9.89) does not match field sheet (9.86).

PO-300, 2/17/15, no data for sample "Field Duplicate" (Lab ID: S1502227-014) collected on this date in lab data table, comparison of lab results indicates this is the PO-300 duplicate.

PO-300, 3/24/15, Temp in field data table (12.2) does not match field sheet (11.2).

PO-301, 5/23/17, water depth in field data table appears inaccurate.

PO-303, Field Blank, 2/18/15, lab sheets indicate this field blank for SW suite but no entry for this field blank in field data tables, only SW sample collected this date was PO-303.

PO-303, 5/17/16, status should be "wet".

PO-304, 5/7/15 event is dated 5/4/15 in field data table.

All GW sites, 9/24/14 & 10/17/14, no field sheets for SWL events.

All GW Sites, 12/23/16, field data table comments say date approximate, SW field sheet indicate IML was on site 12/27/16.

WA-228, 12/3/14, field blank AGFB4Q14 listed on field sheet but not assigned to this location in field data table.

WA-228, 3/12/15, SWL on field sheet is 5.78, field data table is 5.87.

WA-228, 2/22/17, field sheet shows well pumped at 1.5 gpm for 21 minutes (31.5gal), field data table lists volume purged as 40.5 gal.

WA-229, 5/15/17, field sheet shows EC of 4340, field data table is 1340.

WA-235, 10/13/16, "WA-236" in field data table comments, not on field sheet, meaning unknown.

WA-235, 2/22/17, field sheet shows well pumped at 1 gpm for 9 minutes (9 gal), field data table lists volume purged as 3 gal.

WA-241, 2/23/17, field data table lists sample ID "WA-241" but field sheet states "insufficient water to sample" and no lab sheet for this sample found.

WA-242, 11/1/16, "WD-203" in field data table comments, not on field sheet, meaning unknown.

WA-242, 3/29/17, initials recorded as "2017" in field data table.

WD-203, 12/16/13, field sheet shows well purged dry, not in field data table comments.

WD-203, 10/13/16, "WD-204" in field data table comments, not on field sheet, meaning unknown.

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WD-204, 3/21/14, field sheet shows well pumped at 9 gpm for 18 minutes (162 gal), field data table lists purge volume of 72 gal.

WD-204, 3/13/15, field sheet shows initial pumping rate of 8 gpm decreasing to 5 gpm after 17 minutes then 5 minutes of pumping at 5 gpm, even if a constant rate of 5 gpm is assumed, this results in 110 gal purged, field data table shows 81 gal.

WD-204, 2/22/17, field sheet shows well pumped at 8 gpm for 18 minutes (144 gal), field data table lists volume purged as 324 gal.

WD-205, 12/16/13, field sheet shows well pumped at 6 gpm for 14 minutes (84 gal), field data table lists purge volume of 144 gal.

WD-205, FB1Q14, 3/21/14, no entry in field data tables for this field blank, sample time follows WD-205 sample time.

WD-205, 12/14/14, on sampling field sheet SWL = 65.33, field data table has 65.99, second field data table entry for SWL only shows correct SWL.

WD-205, 3/13/15, field blank FBG-1Q-15 time corresponds to WD-205 sampling times for routine and duplicate, field data table lists no location for this blank.

WD-205, 9/2/15, field sheet shows well purged dry, not in field data table comments.

WD-215, 9/15/16, field sheet states well was purged dry, not in field data table comments.

WD-215, 10/13/16, "WD-216" in field data table comments, not on field sheet, meaning unknown.

WD-217, 2/23/17, sample ID WD-217 listed in field data table and lab data table no lab sheet found.

WM-203, 5/12/14, field sheet shows well pumped at 6 gpm for 16 minutes (96 gal), field data table lists purge volume of 36 gal.

WM-204, 12/16/13, field sheet comment states well should be pumped at 4 gpm, field data table says 9 gpm.

WM-212, 9/15/16, "Sample ID" listed as WM-215 in field data table and lab data table, WM-212 on lab sheet.

WO-188, 12/17/13, field sheet shows well pumped at 4 gpm for 42 minutes (168 gal), field data table lists purge volume of 56 gal.

WO-188, 2/22/17, Routine and Field Duplicate, field sheet shows well pumped at 8 gpm for 21 minutes (168 gal), field data table lists volume purged as 56 gal.

WO-188, 2/22/17, Field Duplicate, no time listed in field data table, lab sheet shows 12:25.

WO-188, 2/22/17, Field Blank, no time listed in field data table, lab sheet shows 12:30.

WO-190, 12/16/13, field sheet shows well pumped at 4 gpm for 14 minutes (56 gal), field data table lists purge volume of 28 gal.

WO-190, 11/4/15, field data table lists sample ID as WO-199.

WO-190, 3/16/16, field sheet shows SWL of 77.33, field data table 77.83.

WO-196, 2/22/17, SWL on field sheet 163.49, field data table 163.44.

WO-196, 5/16/17, field sheet shows well pumped at 5 gpm for 25 minutes (125 gal), field data table lists volume purged as 75 gal.

WR-240, 3/21/14, final field EC reading likely wrong, earlier field EC readings are consistent with typical values for this well, should use 2700 in field data table and make note in comments.

WR-241, 3/13/15, field sheet shows well pumped at 9 gpm for 11 minutes (99 gal), field data table lists purge volume of 108 gal.

WR-246, 8/12/16, field sheet shows SWL 144.58, no entry in field data table.

WR-246, 5/11/17, field sheet and field data table dated 5/11/17, lab sheet, lab data table, and COC show sample collection date of 5/15/17.

WR-249, 9/22/16, field sheet does not record volume purged, number of bails entered in purge volume column in field data table, this should be entered in comments, well purged dry, not noted in field data table comments, Sample ID WR-249 listed in field data table and lab data table, no lab sheet found.

WR-249, 2/22/17, "Sample ID" listed as WR-2349 in field data table, WR-249 on lab sheet and lab data table.

Please correct the above noted inconsistencies in the baseline data reporting.

Additionally, field sheets for SWL only measurements are not really a field sheet, but rather a spreadsheet of field data. A copy of the paper field sheet should be included unless data is collected directly in electronic format.

ARM 17.24.304(1)(f): See 17.24.304(1)(e).

ARM 17.24.304(1)(f)(iii): "14.24.304(1)(f) Hydrologic Information.pdf" section 304(1)(f)(iii) refers to Appendix J Section 3.3, and Section 3.3 of "Appendix J - Protection of the Hydrologic Balance.pdf" on the Reclamation -> Plan for the Protection of the Hydrologic Balance page refers to Appendix O Section 4.3.5 and Appendix B. "01 Appendix B - Baseline Hydrology Data.pdf" contains no description of alternative water supplies, however this description is contained in "APPENDIX O - Probable Hydrologic Consequences.pdf" Section 4.3.5.

Please remove the reference to Appendix B from Section 3.3 of "Appendix J - Protection of the Hydrologic Balance.pdf" on the Reclamation -> Plan for the Protection of the Hydrologic Balance page.

ARM 17.24.304(1)(i)(ii)(D): The language associated with this permit material is merely the ARM spelled out. This portion of the permit requires a narrative that addresses which existing land uses are present and those land use classifications under local law, if any. This may be covered in other permit material, but is not referenced for this rule. Please update this permit material to meet the requirements of the ARM.

ARM 17.24.305(1)(z): The location and extent of subsurface water and the names and locations of surface water bodies, including springs, constructed or natural drains, and irrigation ditches, with the proposed mine plan and adjacent areas are depicted on maps in Appendix O (PHC). However, the maps in Appendix O (PHC) do not contain the required certification per ARM 17.24.305(2)(a) and (b). Exhibit H contains some, but not all, of the information required by this rule. Please provide the maps in Appendix O (PHC) with the required certification.

ARM 17.24.305(2)(c): Topography line, haul road and ramp annotation must be made clear and legible on all pdf map exhibits. This annotation is especially critical on Exhibits A, B and U.

ARM 17.24.313(1): Please provide the material or a link to the material that is being referenced as “see below” or remove “313(1)” all together.

ARM 17.24.313(1)(c): DEQ acknowledges Western Energy's commitment to submit a revised bond after the PMT plan is acceptable.

ARM 17.24.313(1)(d)(i): A plan for backfilling and grading must include diagrams, as necessary, to depict the final location of all overburden and parting materials. In accordance with this regulation, the permit must include a range diagram for the opening of the northwestern part of the BXS pits and the BX 6 through BX 19 mine passes. In addition, the permit must either, include narrative commitments to include additional range diagrams prior to opening the other box cut areas or additional range diagrams must be added at his time.

ARM 17.24.313(1)(d)(iv): The performance standards referenced in this rule include grading to the approximate original contour (AOC) of the land that existed prior to mining. WECO must include references to Exhibits B, T1, T2 and N (with the exhibit title) as supporting information to the performance standard of AOC. It would also be appropriate to add similar narrative, mentioning all four exhibits, to ARM 17.24.501(4).

Exhibits T1 and T2 will need to be revised once the PMT is acceptable. T1 stops at 24% slopes and should include all slopes and all disturbed area. The exhibits also need axis labels and must identify what area the figures are based (just affected area or the entire permit area).

Pursuant to 313(1)(d)(iv), the topography depicted on Exhibit B must meet the performance standard of grading affected areas to the approximate original contour of the land prior to mining. Regarding this, WECO must address the following two concerns:

The original topography had many more second and third or higher order tributaries than depicted on the proposed PMT map. While narrative in 501(4) attempts to address this issue, ARM 17.24.313(1)(d)(iv) requires “a map showing the postmining topography that the applicant proposes to meet at the time of final bond release.” Additional tributaries must be added to more closely approximate the pre-mine drainage density condition. DEQ suggests the addition of a line designating approximate locations and lengths for these tributaries without contour line

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alterations. Consultation with the DEQ is recommended because we are not looking for restoration of all lines depicted on pre-mine map, but what meets the definition of approximate original topography.

Drainage Rich 7 must be more incised than depicted to approximate the original topography.

There are several large areas where grading would be delayed because ramp locations do not correlate with the PMT plan. Pursuant to ARM 17.24.601(1), roads (which includes ramps) must "not delay or prevent recontouring and revegetation on immediately adjacent spoils". The location of Ramps SW3-A, SW5, and SW6 must be changed to better match the topography or the PMT must be changed.

Ramps SW5, SW3-A and SW3 are 8,000 feet to over 11,000 feet in length and cross the drainage divide between Armells Creek and Rosebud Creek. The permit contains a commitment to bring all but the last ~3,000 feet of ramps up to reclamation grade. A portion of these ramps may need to be left well below the grade of reclamation until mining is complete. This is allowed under the performance standards of ARM 17.24.601(1) after WECO documents and justifies, and DEQ approves, the need to delay recontouring of "immediately adjacent spoils". The narrative discussion of ramps must document the areas that will not "immediately" be brought up to grade and specify why. Specific reasons would include a discussion about the drainage divide, specific elevations, something about grades and any other supporting information.

ARM 17.24.313(1)(f)(i): The detailed drainage designs in "Area B AM5 EXHIBIT V1 thru V14 Drainage Design.pdf" meet the requirements of this rule, but are based on a previous version of the postmine topography. Please update these exhibits when all deficiencies regarding the postmine topography have been resolved.

ARM 17.24.313(1)(f)(ii): WECO made several changes to the postmine drainages to increase diversity in response to the previous comment. Please consider the following additional comments on postmine drainages:

Drainage Rich 64 is significantly shortened in the PMT by making a near-right angle turn at the edge of the pit to join the main channel of Richard Coulee, also at a near right angle. Please extend this drainage further into reclamation to join the main channel of Richard Coulee near drainages Rich 67 or Rich 66.

Drainage Rich 7 in Section 28 follows a straight valley for nearly one mile (between Rich 16 and Rich 22). Please revise the PMT in this area to allow for more sinuosity of this valley.

In "Appendix J – Protection of the Hydrologic Balance.pdf" on the Reclamation -> Plan for the Protection of the Hydrologic Balance page, changes were made to Exhibit J-1 resulting in the following deficiencies:

Exhibits J-1 sheets 1-3 are missing, these exhibits were the premine channel cross sections for East Fork Armells Creek.

Exhibit J-1 Sheets 4-7 are labeled Exhibits V-4 to V-7, and are plotted in the CAD screen display colors which make it very hard to see some items.

On Exhibit J-1 Sheet 4 (labeled Exhibit V-4), the topography is inaccurate and does not match the CAD file.

Please correct these issues with Exhibit J-1.

ARM 17.24.313(1)(g)(i): The first paragraph under 17.24.313(1)(g)(i) references Exhibit P and says it is located in the Map Summary section. DEQ was not able to find Exhibit P in either the .dwg files or the .pdf map summary lists.

In the third sentence of the last paragraph of 17.24.313(1)(g)(I) a reference is in place for ARM 17.24.313(5)(a). This is not an actual rule. Please correct the reference.

ARM 17.24.313(1)(g)(iii)(A): There needs to be a table or other representation of the salvageable soil volumes available for reclamation. The soil survey represents soil types and acreages; however, there is not a salvage volume represented. There is no new table in soil volumes I or II, or representation under this rule.

Please add the salvageable soil volumes to the soil tracking volume I, the soil survey map soil types table, a table under this rule header, or reference to where this information is located.

ARM 17.24.313(1)(h)(iv): Kentucky bluegrass is an introduced species that has been included in the Lowland seed mixture that was not addressed in the permit material for ARM 17.24.313(1)(h)(iv). Please include Kentucky bluegrass, and any other introduced species from approved seed mixes, in the permit narrative associated with this rule.

ARM 17.24.313(1)(h)(viii): This deficiency has not been addressed. This language still directs to ARM 17.24.313(1)(h)(iv) instead of ARM 17.24.313(1)(h)(v) as it is explained in the deficiency response letter. Please update this permit material with the appropriate language.

ARM 17.24.313(1)(h)(x): This item has not been addressed. ARM 17.24.726(3) was updated in 2014 to read that "Areas [...] must meet or exceed the performance standards in (1) and (2) in any two years after year six of the phase III bond period of responsibility." This does not match with what is currently listed under this rule and must be properly addressed.

ARM 17.24.314(3): Groundwater Models:

Because the groundwater models' primary function is to support the PHC, groundwater model attachments should be uploaded on the Reclamation -> Plan for the Protection of the Hydrologic Balance page under "Probable Hydrologic Consequences Attachments."

A complete review of the groundwater models could not be conducted because the MODFLOW files for the following simulations could not be located:

RB-Mine-2016-existing permit 2093.gwv
RB-Mine-2016-existing permit and AM5 2093.gwv
RB-Mine-2016-Steady-State-Final_01-05-2017.gwv

With this submittal WECO included separate copies of the above listed GWV files, but still did not include the MODFLOW files associated with these simulations.

Additionally, in this submittal all MODFLOW input and output files were omitted from "Electronic Deliverables - Appendix I.zip" Please include the MODFLOW files for all model simulations.

The steady state model initial heads are based on a head save file which was also not included: "D:\Projects\2016-326-Rosebud-Mine-Model\SS-2017-final-heads-Copy.hds"

Comments based only on review of the model reports are included below:

Appendix I-A - Rosebud Mine Model Report.pdf

Table GM-1 lists a well called WO-184 tested at AM5, however according to DEQ's records WO-184 is not located in this area. Please correct this table.

In Table GM-3, several wells are presented in italics, but no explanation of the significance of this difference is described.

On Figure GM-14 page 1 in Layer 3 the blue area representing Lee and Richard Coulee Alluvium is labeled T = 1,500, however in the steady state GWV file provided, T = 7,500 in this zone.

On Figure GM-14 page 2 in Layer 5 the light blue area is labeled T = 60, however in the steady state GWV file provided, T = 68 in this zone.

There appears to be a positive skew in the Layer 5 residuals for higher observed values (see Figure GM-12, page 2). Additionally, positive residuals are clustered in the AM5 area in Layer 1 (see Figure GM-13, page 1). Please evaluate if any reasonable changes can be made to provide a more random distribution of residuals.

The following deficiencies were identified in "Appendix O - Probable Hydrologic Consequences.pdf":

Citations to rules and statute in Section 1.3 are incorrect. This fifth bullet on Probable Hydrologic Consequences should refer to ARM 17.14.314(3) and 82-4-222, MCA (MSUMRA, not SMCRA governs coal mining in Montana). ARM 17.24.304(e) and (f) cover hydrologic baseline data.

In Section 3.2.4.2.4, on page 25, the third paragraph states "Streams are classified according to flow conditions as perennial, intermittent or ephemeral. Designated beneficial uses and water quality standards are applicable depending on the classification." Stream classifications are defined by ARM 17.30.611(1)(c) and are not dependent on flow conditions. Please change the terms "classified" and "classification" in this paragraph to "characterized" and "characterization."

Section 3.2.4.2.9, on page 33, is titled "Summary of EFAC Flow Classification." Please change "Classification" to "Characterization."

Section 3.2.4.2.10, on page 36, is titled "EFAC Classification Transition." Please change this to "EFAC Flow Regime Transition."

In Section 3.2.4.4.1, on page 41, the first sentence refers to Figure 38 for locations of monitoring wells, however the monitoring wells are displayed on figure 37. Please correct this reference.

Section 3.2.9 and Section 3.3.8 should be updated when DEQ finalizes the AVF determination for Richard Coulee.

There are two Sections 3.3.2.1 and 3.3.2.2 in the document. Please correct these section numbers to eliminate duplication.

Section 3.3.4.5 does not discuss all of the potential impacts of mining on some wetlands:

Wetland G300 will be physically disturbed by haul road construction (buried by fill). Wetland G012 is located within the disturbance boundary and will likely be disturbed. Please expand the discussion of probable impacts to wetlands to be more descriptive and include all probable impacts of mining, similar to discussions included for wetlands in the Area F PHC. Additionally, WECO should develop a wetlands mitigation plan like that developed for Area F.

In Section 3.3.5, on page 93, the fifth paragraph states the source of groundwater to the Lee Coulee Reservoir will continue to be undisturbed overburden sandstones after mining. However, the PHC provides no additional evidence supporting this conclusion. While it is true that the strata immediately adjacent the Lee Coulee Reservoir will not be disturbed, AM5 adds a considerable amount of spoil replacing the overburden sandstones upgradient from the reservoir which could influence water quality in the reservoir. Excavations for AM5 mining and Pond Lee-1 both substantially disturb the overburden within approximately 1/2 mile of the reservoir. Please provide more detail on the source area for water in the Lee Coulee Reservoir and a quantitative analysis of how mining and related disturbance will affect water quality in the reservoir.

Section 4.2.3.5, on pages 120 through 123, contains several references to the October 2012 edition of Circular DEQ-7. Such references are also contained in tables 22, 28, 33, 41, 45, and 46. Circular DEQ-7 was updated in May 2017, please reference the current edition and change the citation in Section 6.0.

In Section 4.2.3.5, on page 122, in the paragraph on arsenic it is unclear where the discussion of WI-153 ends and the discussion of WS-203 begins. Please clarify.

Section 4.3.3.1 discusses the Big Sky and "S" wells in the SW ¼ of Section 13 as separate entities. Data from these wells are also displayed separately in Attachment K and Attachment N. It is DEQ's understanding that BRC1313, BIN1317, and BMC1314 are the same wells as S-24, S-23, and S-22, respectively. If this is the case, please treat these wells as single wells with multiple designations, rather than as separate wells. Please note that MBMG has also collected water quantity and quality data from these wells which may not be included in the Rosebud and Big Sky Mines' databases.

Section 4.4.2, on page 136, discusses impacts of mining on alluvial groundwater generally, but neither this section or Section 4.4.3 include any discussion of the effects of replacing alluvium with spoil on groundwater flow. Typically, spoil would be expected to have a lower permeability than alluvium. Please discuss the probable impacts on groundwater flow of replacing the alluvium in Lee and Richard Coulees with spoil.

Section 4.4.5, on page 140, discusses prediction of spoil water quality for AM5 based on the average overburden TDS. However, overburden TDS within the AM5 area is variable based on location. TDS concentrations in overburden are much lower in the Lee Coulee mine area versus the Richard Coulee mine area. It would be more accurate to derive two separate estimates of spoil water quality for these areas.

In Section 4.4.5, on pages 141 through 143, the discussion of migration of spoil water, while now providing numerical estimates still does not demonstrate the probable outcome of AM5 mining. The geochemical processes postulated by Clark, 1995, were not well supported by the limited field data reported in his study. In fact, the field data collected at the nearby Big Sky Mine showed no changes in TDS as spoil water flowed into the unmined McKay coal. The estimate that postmine TDS at the permit boundary would fall halfway between the predicted spoil TDS and premine overburden/Rosebud coal TDS is not based on any reasonable scientific assumptions or analysis. Please provide an analysis which estimates the postmining changes in TDS at the permit boundary in both the Rosebud coal and the Richard Coulee alluvium as a result of mining in the Richard Coulee mine area.

In Table 21 the row "Count" for the Upper Fossil Site is listed under the Peep Site statistics. Please correct this table.

In Table 25 the first row of page 1 (BGDSG, 4/27/98) is repeated on all subsequent pages. Please correct this table.

In Table 41 the first six rows from page 1 (S-24 through WA-218) are repeated on all subsequent pages. Please correct this table.

In Table 48, the final column is titled "Final Rate per." It appears a word is missing, please clarify.

DEQ will evaluate the conclusions of Anticipated Impact and Rationale columns in Table 36 and Table 51, and Comments and Potentially Impacted columns in Table 50 when all other deficiencies which may affect these conclusions are resolved.

Figure 45 contains a legacy reference to Figure 13. Please correct this reference to Figure 46.

Figure 59 has two locations and labels for each AM5 monitored pond. Please remove duplicates.

In Figure 60 the label for Fossil Fork is in the wrong location. Please correct this figure.

In Attachment H, Table H-1, the top and bottom of the text for notes 7 is cut off. Additionally notes 10 through 12 are cited in the wrong location in the table. Please correct this table.

In Attachment J, Figure 5A, the graph for WO-180 is blank. Please correct this graph.

In Attachment K, Figure 5, there is no leader line for the WM-213 graph. Please correct this figure.

ARM 17.24.314(5): DEQ will evaluate if there are cumulative impacts of the Rosebud and Big Sky mines on the Rosebud Creek drainage. To support this evaluation please provide an estimate of the postmine equilibrium spoil water quality and the postmine steady state groundwater flux out of spoil in the Rosebud Creek drainage for Area B, Area E, Area D, and Pit 6. WECO may also provide the same estimates for Big Sky Mine Area A and Area B.

ARM 17.24.315(1): Pursuant to ARM 17.24.315(1), general plans must be submitted for each water impoundment. A general plan must be submitted if WECO is planning for flood control impoundments (ARM 17.24.642) upslope of the mining in Richard Coulee: Rich 56, 57, 58, 59 ~ 700 acres and Rich 64, 69, 70, 71 ~ 600 acres.

ARM 17.24.315(1)(a)(v): Narrative for this rule or Appendix J must include "a schedule setting forth the dates that any detailed design plans for structures ... will be submitted to the department." If all ponds are fully incised and no embankment or discharge control structures are required, then this should be added to the narrative waiving the requirement for a schedule setting forth submittal dates.

ARM 17.24.321(1): The haul road located mostly in mine pass BSX 92 requires relocation before year 7 when this pass is mined and construction of a new haul road begins. At a minimum, the timing of the next haul road must be discussed and a corridor in which the haul road will be located must be depicted on Exhibit A. DEQ would assume the second road would be established in the locality of reclaimed Richard Coulee.

ARM 17.24.321(1)(a): No information regarding this rule was provided for the haul road which runs through Section 13, 24, and 25 leading to the mine area in the Fossil Fork tributary of Lee Coulee. This road will be used to transport coal from a separate mine area for more than six months, thus is a haul road, not a ramp road. See ARM 17.24.301(108). Please provide a design for this haul road similar to the haul road leading to the Richard Coulee mine area.

Road cross sections, Figure 8a through 8e on pages 321-4 through 321-8 in the current permit, are required to address this regulation and must be added to AM5.

ARM 17.24.325(2)(b)(all): DEQ has not yet made written findings concerning this rule. Further evaluation of the subsequent rules will be completed after DEQ's determination is complete.

ARM 17.24.501(3)(b): Please include at the bottom of 501(3)(b); The method and design specifications for placing and compacting such materials must be approved by DEQ.

ARM 17.24.501(4)(c): WECO made several changes to the PMT to improve slope diversity in response to the previous comment. Please consider the following additional comments on slope diversity:

In the northeast quarter of Section 28 the PMT shows a long linear slope both east and west of drainage Rich 65. The premine topography in this area has a concave slope profile, with a steeper upper section and gentler lower section. Please modify the PMT in this area to more closely resemble the premine topography.

Highwall reduction in the center of Section 29 and in the southeast quarter of Section 20 eliminate some premine steep slope areas. Please consider modifying the PMT to minimize the disturbance in these highwall reduction areas and preserve premine steep slopes.

In Section 29, the PMT adds an upper reach to drainage Rich 7 to the northwest of Rich 24, shifting the drainage divide north towards the Richard Coulee main channel. Please consider reducing the length, and increasing the slope of this reach to place the drainage divide nearer to its premine position. Increasing the elevation of the graded spoils in this area would minimize the need for the adjacent highwall reduction and more closely approximate the premine ridge feature in this area.

In Section 20, the design of PMT drainage Rich 52 results in over 80 feet of excavation in the highwall reduction area adjacent to the pit. Please consider replacing PMT drainage Rich 52 with two or three shorter steeper tributaries, more similar to premine drainages Rich 49, Rich 50, and

Rich 52. This change would minimize highwall reduction disturbance and preserve the steep slopes in the area. The alignment of the main channel of Richard Coulee could also be shifted slightly south to reduce the need for highwall reduction in this area.

ARM 17.24.634(1)(all): Deficiencies in drainage basin reclamation have been identified in 17.24.313(e)&(f) and 17.24.501(4).

ARM 17.24.634(2): See ARM 17.24.634(1).

ARM 17.24.711(1): The MCA Rule has been repealed. Please correct the permit language to appropriate citation.

ARM 17.24.801(all): Appendix Q has now been included. Subsequent material is contingent on DEQ's determination pursuant to ARM 17.24.325(2)(b).

ARM 17.24.802(all): Appendix Q has now been included. Subsequent material is contingent on DEQ's determination pursuant to ARM 17.24.325(2)(b).

ARM 17.24.804(all): Appendix Q has now been included. Subsequent material is contingent on DEQ's determination pursuant to ARM 17.24.325(2)(b).

ARM 17.24.805(1): Appendix Q has now been included. Subsequent material is contingent on DEQ's determination pursuant to ARM 17.24.325(2)(b).

ARM 17.24.806(all): Appendix Q has now been included. Subsequent material is contingent on DEQ's determination pursuant to ARM 17.24.325(2)(b).

Upon receipt of satisfactory responses to these deficiencies, DEQ will determine the application to be acceptable.

Please feel free to contact Robert D. Smith at 406-444-7444 with questions regarding this letter.

Sincerely,



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Cc: Jeff Fleischman, Office of Surface Mining
Lauren Mitchell, Office of Surface Mining

FC: 620.112 (AM5)