"Healthy environment, healthy people"

Montana Department of
ENVIRONMENTAL QUALITY

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March 31, 2014

Mr. Eric Detmer
Spring Creek Coal, LLC
Spring Creek Coal Mine
67 Lakeshore Drive
Decker, MT 59025

Permit ID: C1979012
Revision Type: Major Revision
Permitting Action: Deficiency
Subject: TR1; First Round Acceptability Deficiency

Dear Eric:

The Department of Environmental Quality (DEQ) has completed its acceptability review regarding Spring Creek Coal, LLC's application for Major Revision TR1. The following deficiencies must be adequately addressed before DEQ can determine the application acceptable:

ARM 17.24.303: "Volume 1, 303 various" is listed on the Index Sheet as having updated text. Please provide Section 303 as it appears that it was mistakenly omitted from the submittal.

ARM 17.24.304 BASELINE DATA:

"Volume 1, 304-1 through 304-11" is listed on the Index Sheet as being revised, but is not included in the submittal.

Vol3_Plate_4B_Premine_MJR_20130930.pdf (and associated CAD file):
Several of the totals and means in the Basin Statistics table have changed. Please provide a justification for each change.

ARM 17.24.305 MAPS:

Vol3_Plate_4B_Premine_MJR_20130930.pdf (and associated CAD file):

Channel sinuosity Mean values are misplaced in the Total cell.

Vol3_Plate_5_MINEPLN_MJR_20130930.pdf (and associated CAD file):

The pdf is very low resolution in comparison with the currently permitted exhibit. Contour labels are not readable and it is difficult to discern several other features.

The hatch in Pit 6, Cuts E1- E8, is not shown on the legend. This hatch is also shown in Pit 3, Cuts 24-26, and on the east side of the Cuts in Pit 2. Please provide a description of this hatch in the legend of Plate 5 Life of Mine Mining Sequence Plan.

Vol3_Plate_6_RECPLN_MJR_20130930.pdf (and associated CAD file):

Drainage channels have been revised to stream channels. Please provide the justification for this change and address any inconsistencies with associated exhibits.

The revision list in the title block is missing MR's 188 & 194.

The pdf is very low resolution in comparison with the currently permitted exhibit. Contour labels are not readable and it is difficult to discern several other features.

Please provide a breakdown of estimated reclamation for each year over the next five years (through 2019).

Vol3_Plate_8_FIELD_MJR_20130930.pdf (and associated CAD file):

Some of the topsoil stockpile footprint hatches are not visible.

The pdf is very low resolution in comparison with the currently permitted exhibit. Contour labels are not readable and it is difficult to discern several other features.

Vol4_Plate_18_ROADCNTRLINE_MJR20130930.pdf:

Pre-stripping Access Ramps are not shown.

The pdf is very low resolution in comparison with the currently permitted exhibit. Contour labels are not readable and it is difficult to discern several other features.

ARM 17.24.313 RECLAMATION PLAN:

Please provide a breakdown of estimated reclamation for each year over the next five years (through 2019).

There are proposed borrow areas and stockpile areas that unnecessarily eliminate Special Habitat Features described in Permit Volume 1B & 1C, Addendum 313D (T8S, R40E, SEC31 and T9S, R40E, SEC6). Please redesign these areas to preserve as much special native habitat as possible.

Volume 1 Section 313:

Table 313-3 has a column labeled (%) As-built (2013). This column is comparing the number of as-built acres for a specific land use to the total number of as-built acres completed. This column originally compared the number of as-built acres for a specific land use compared to the total disturbed acres. Depending on the desired purpose of this column, you may not be tracking the values that you had intended.

Table 313-3 and Table 313-4 do not have matching acreages. Grazing Land acres in 313-3 are listed as 2,677.5 while Grazing Land acres in 313-4 are listed as 2,677.0. These two numbers do not match, but the Totals in the two tables do match. Please use whole numbers and confirm the appropriate acreages for these tables.

Volume 1 Addendum 313:

Table 1 has been removed from this document. The remaining seven tables still have the original table numbers associated with them. Please correct these Table names and any references to them in the Addendum.

Vol3 Plate 4B Sheet 3:
Drainage SF-A is missing from the table of drainage properties on this sheet.

Vol3 Plate 4B and Plate 4:
Drainages used to calculate drainage characteristics are not comparable for basins PC-A, ND-2 and SD-1. There is a significant mismatch in the drainages drawn outside of the disturbance boundary which leads to incorrect calculations.

Appendix I

Table I-4.3.3-1: Please include North Fork Spring Creek, South Fork Pearson Creek calculations for premine channels so that these can be compared to the postmine channels.

Attachment I-3 and Plate I-1: There are no photos along South Fork Pearson Creek. Please update these documents to include detailed photo documentation of the South Fork Pearson Creek drainage.

Attachment I-5: Please run the HEC model for the same events used in the postmine model (missing the 10-yr, 24-hr event).

Attachmen I-5: Please recheck and reconcile the flows used for the premine HEC-RAS modeling of Pearson Creek. It is assumed the peak flows calculated for various storm events with the SEDCAD model are used as inputs in the HEC-RAS model. The flow values used in the two models do not often agree for Pearson Creek and Spring Creek.

Appendix J

Pg. J-5: The statistic that 10.9% of the Spring Creek drainage area will be affected by the mine is low. DEQ computations put the percentage at over 20% for the Spring Creek drainage. Please recheck this calculation.

Pg. J-9: "By area-weighting, as discussed above, the Curve Number (CN) for each sub-watershed and also the entire watershed, a CN of 80 was established." This statement is unclear and appears to be incorrect. The entire watershed, including undisturbed areas, should not be averaged together to produce a CN. Rather, the disturbed areas only should be averaged together. Using the method employed for the Spring Creek and South Fork Spring Creek watershed, the undisturbed watersheds should retain their curve numbers in the postmine watershed. This is not the case in Table J-2 where all basins are shown with a CN of 80.

Table J-2: There is ambiguity in the narrative as to how the postmine curve numbers are calculated, and consequently the text and table do not appear to be showing the same method. Our interpretation of the

text is that a small subset of postmine CNs (77, 81, and 80 for north side of Spring Creek, south side of Spring Creek, and Pearson Creek respectively) within the disturbance boundary is used to recompute sub-basin CNs. This is done by area-weighted averaging. If this is the case, then many of the sub-basins completely within SCM's disturbance boundary should equal one of these three numbers (e.g. all basin completely within the disturbance boundary on the north side of Spring Creek should be assigned a curve number of 77). Instead, most of the basins barely change their curve number from premine and do not follow this assumption. Please clarify the text as to how the postmine disturbed area CNs are used to calculate the sub-basin CNs.

Plate J-3: It would be very helpful for the reader to be able to see the disturbance boundary on the map as this delineates the area where CN averaging was employed.

Premine and postmine SEDCAD basin delineations are not comparable for sub-basin PC-6 (SWS-3) in Pearson Creek. DEQ suggests that it would be useful if the basins used in the SEDCAD model (labeled as SWS-#) were the same basins shown on the PMT map (labeled as PC-#) so that the model and the geomorphic properties can both be compared for various basins.

An explanation as to how sub-basins were chosen for the premine and postmine SEDCAD models would be very helpful for understanding how the model was created. For instance, in the postmine model, how was PC-A divided into the sub-basins? PC-6 was chosen as a sub-basin but the unnamed drainage immediately to the west of it which appears to be an equally large basin with equally long drainage was not used as a sub-basin. The same comment applies to the basins on the PMT map.

Please re-check the premine and postmine HEC-RAS models. Cross-sections 34 and 35 for the Pearson Creek should be identical because they are upstream of disturbance and yet are not identical. The model results for these upstream sections also do not match.

Please recheck and reconcile the flows used for the postmine HEC-RAS modeling. It is assumed the peak flows calculated for various storm events with the SEDCAD model are used as inputs in the HEC-RAS model. The flow values used in the two models do not often agree.

As a reminder, any changes made to the SEDCAD model that result in a change of modeled flow due to deficiencies noted for Appendix J should be propagated into the HEC-RAS model.

The design for Pearson Creek should be more explicitly stated or shown in more detail. From DEQ's calculations using the geomorphic reclamation tables provided by Spring Creek, the floodplain widths would be as shown in the table below. However, the permit is ambiguous on how the geomorphic reclamation tables will be used and if it is appropriate for the designed channel. The HEC-RAS model was created with widths larger than those calculated from the table, and the measured width from the PMT map appears to be much wider still.

Pearson Creek SEDCAD Model and Calculated Floodplain Width

SEDCAD Node	Channel Slope (%)	Total Area (ac)	Bankfull Width (ft)	Calculated Belt Width (ft)	
1	2.3	939	7	40	53
2	1.3	1,264	7	58	87
5	1.1	1,793	8	65	97
6	0.9	3,973	10	124	166

In some places within the Pearson Creek drainage, near the upstream portion of the permit area, there does not appear to be enough room to construct the width of the floodplain as it's understood to be designed. Floodplains of adjacent meanders would be touching, if the intent is to build an entrenched floodplain. Again, the intent of the Pearson Creek design is somewhat ambiguous.

In areas where the floodplain has been constructed, such as South Fork Pearson Creek, the postmine HEC-RAS model should be updated with the as-built channel and floodplain dimensions, where appropriate. This update could be used in the PHC to demonstrate impacts from channel reclamation.

Appendix L

DEQ requests more specific and quantitative statements in all new and revised PHCs. The following comments mainly address areas of the PHC where more detail or additional support from data is needed. Some of the comments are suggestions as to how to make the text comprehensive or create a more in depth analysis of hydrologic consequences. Additionally, DEQ would like the PHC to be more of a stand-alone document. Additional figures should be included to illustrate statements regarding drawdown and water quality changes in time. While other sections of the permit may contain the details of modeling and analysis, the PHC would benefit from including summary figures or maps to illustrate conclusions from these other documents.

Water quality summaries in Tables 4.1.3-1 and 4.2.3-1 can be used to make very general statements about overall water quality through time at the mine. However, these tables combine data from before mining impacts, during mining, and after reclamation. The data would be more useful if the data was broken up into a time before mine impacts and after mine impacts or if they were shown on time-concentration plots to illustrate any changes or lack of changes through time.

Table 4.2.4-1 and Plate L-1: Please recheck the well list. First, make sure that the area searched incorporates the farthest 5-ft drawdown contours (the area may already incorporate this, but it is difficult to tell for certain from the map). Second, DEQ has found some users in the MBMG database that were not found by Spring Creek Mine. As an example, the well with GWIC ID 197445 in Twn 8S Rng 39E Sec 8 is not listed but within the study area.

Pg. L-28: "The lack of hydraulic continuity across the fault suggests that any drawdowns in the A/D seam in Pit 4 will not directly affect the Canyon coal seam." This statement does not seem to be supported by water levels in CN-1A and perhaps in CN-3. Please review this statement with current data and determine if it is still valid. Also, explain the drawdown seen in the nearby Canyon wells.

Pg. L-35: Please update the section on Spring Creek supply wells to include the newly completed TR-2 well.

Pg. L-42: "By developing a PMT that closely resembles the premine topography, SCM is ensuring that the postmine drainage system performs in a manner that meets the needs of the postmine land uses". Please elaborate on this statement by stating what the postmine land uses are and specific ways how the PMT aids in the land uses.

Pg. L-44, Section 5.1.2.2: The section on potential short-term impacts focuses in Pearson Creek. Although somewhat addressed in the previous section on Observed Impacts, please also include potential short-term impacts to the other main drainages that are being disturbed by Spring Creek Mine. One question of particular interest is how hydrologic control structures on the Spring Creek Mine may impact reclamation at the Decker Mine (address impacts to downstream users and channel formation).

Pg. L-44, Section 5.1.2.3: Please provide more quantitative descriptions on the changes to surface water. For instance, the statements made in this section should be supported by referencing results from runoff models using the premine and postmine topography.

Pg. L-44, Section 5.1.2.3: Please elaborate on the implications of geomorphic changes to the Pearson Creek drainage. Comment on how changing the drainage from a steep, geologically controlled terrain to a terrain with shallower slopes on unconsolidated material may affect hydrology and geomorphic habit. Include also the implications, if any, for vegetative diversity in the main drainage bottoms and side drainages.

Pg. L-45, Section 5.1.3.1: Please include a statement regarding how many MPDES discharges have occurred from Spring Creek mine and if those discharges have met MPDES standards.

Pg. L-45: "Postmine vegetation will meet established cover and production criteria... This will assure that postmining surface water quality will be similar to premining surface water quality". It is unclear in this paragraph how vegetation requirements are linked to water quality and if the same premine communities are being introduced into reclamation. Please elaborate as to how vegetation affects water quality.

Pg. L-46: Cite and show a quantitative comparison of slopes, curve numbers, net runoff, etc. to support the statement regarding the reduction in runoff rates.

Pg. L-46: Please reference the section of the permit that makes the commitments for the creation of the pools. Also, please clarify if these pools are intended to be ephemeral or perennial water sources. Determine the likelihood that these pools may concentrate salts from surface water.

Pg. L-46: The statements from Van Voast and Thompson should be confirmed or updated using current knowledge of spoils in the Spring Creek Mine area. This change is the same as requested for statements on page L-58.

Pg. L-47: Please include a reference or references to the studies that have shown that return flows to the river from agricultural irrigation can have a greater effect on water quality than mining activities.

Pg. L-48: "...reclaimed topography will only produce 84 percent of the sediment yield..." Provide a more detailed analysis by breaking down the results be watershed or major sub-watershed. An interesting and potentially important analysis would be to see if sediment yields more closely approximate premine yields as reclamation practices have changed over the years to better approximate premine topography.

Pg. L-49: Explain in the PHC why 50 years was chosen as to show postmine groundwater drawdown and long-term impacts.

Pg. L-55: Four spoils wells are cited to show recovery. Please update this section to include and discuss data from all spoils wells and include recent data. This section could benefit from a figure showing water levels in some spoil wells.

Pg. L-55: Instead of referencing hydrographs in the AHRs, please include any hydrographs necessary to demonstrate the statements regarding water levels in this section in the PHC.

Pg. L-55: "The time required for full recovery ... [is] ... approximately 100 years for some local areas and up to 1,000 years for the entire region". This statement could be better specified by addressing specific areas of the mine. From the groundwater model, the Pit 4 area will recover slower than other areas. A figure showing modeled recovery for selected wells around the mine would be appropriate to show the differences in exponential recovery.

Pg. L-56: Please verify the statements regarding CBM development not affecting Canyon wells. For instance, well CN-4 appears to have been affected (if it is due to another source, please explain).

Pg. L-56, Section 5.2.2: Water quality from wells in the Pearson Creek amendment area (AD-14 and OB-9) have very poor water quality with TDS over 7,000 mg/L. From experience with spoils in other parts of the mine, postmine TDS in this area could be anticipated to be well over 10,000 mg/L. The PHC should specifically address this concern and the impacts of the potential change in water quality on downgradient users and aquifers.

Pg. L-58: Data trends from 1988 to 2005 are discussed. Please update this discussion with data through 2013.

Pg. L-58: "Future monitoring of well 504AQW will confirm trends..." From the current data record, there appears to be enough data to make a statement about the movement of spoil water to well 504AQW. Please update this paragraph with the most recent data and include graphs as necessary.

Pg. L-58: "Based on mass balance calculations performed by Van Voast and Thompson (1982) from overburden quality information available from testing of paste extracts from 20 cores obtained from SCM overburden, the implied increase in dissolved solids content in groundwater in mine backfill is estimated at 1,940 mg/L." These measurements were done on a very limited area of SCM. Please address water quality over the entire mine area and how it may vary, including the Pit 4 area and the Pearson Creek amendment area. Suggestions for updating include: 1) comparing predicted increases to observed (to-date) spoil water quality; 2) using overburden samples from additional areas of the mine to estimate postmine TDS increases in these areas; 3) creating / using an alternate scientific method for estimating spoils water quality that does not rely on paste extracts.

Pg. L-59: With the new wells, the source of the arsenic should be better known, and statements regarding the possible source should include updated arsenic (and any impact mining has had on the arsenic levels).

Pg. L-61: There are many statements about wells being a sufficient distance from mining that high TDS water will not reach the wells. These statements should be further elaborated on as to why such distances are believed to be protective (speed of movement of groundwater, sources of cleaner-diluting water, empirical evidence of dilution from monitoring wells, etc).

Pg. L-63: The statement that unmined A/D coal northwest of the Carbone Fault could provide alternate water sources leaves a question as to the replacement water for the rest of the mine area and areas south of the mine. Also, drawdown in the A/D may preclude the use of the unmined A/D for water replacement. Please clarify what the alternate water source is for other areas potentially affected by drawdown.

Pg. L-63: "small stock ponds will also be lost due to mining". Please show these on a map or reference a map. Indicate if these small stock ponds will be replaced during reclamation.

Pg. L-64: Section 7.0: Please briefly indicate how residual impacts to water quality and quantity will be addressed by the mine, if needed.

Appendix K Exhibit 1

The hydrologic control plan does not show how water will be managed within the proposed mining area in Pearson Creek, and the map only shows the currently approved hydrologic control for the drainage. Pond #50 is proposed to be used for hydrologic control, but the pond will be removed by mining, and mining is also proposed downstream of the pond. Please update the map to show how water will be managed in the drainage including any new upstream of downstream ponds that are proposed.

Please indicate if the dam on Pearson Creek will be replaced postmine.

Volume 3 Plate 4A:

Footnote 1 in the legend refers to Table 313-1 in Permit Volume 1. This reference is incorrect. Please change this footnote to refer to Table 313-3 in Permit Volume 1.

<u>ARM 17.24.313, 17.24.634:</u>

Pearson Creek Drainage (AppJ_Vol1_Plate_J-4_Postmine_HECRas_Section_Locations_MJR_20130930.pdf, AppJ_Vol1_Plate_J-4_Postmine_HECRas_Section_Locations_MJR_20130930.pdf, AppJ_Vol1_MJR_2013 0930.pdf, Vol3_Plate_4_PMT_MJR_20130930.pdf , et. al.):

The conceptual design for the main channels (Pearson Creek and South Fork Pearson Creek) of this drainage calls for the construction of a 100 foot wide floodplain with naturally establishing pilot channels formed within. The pilot channels are indicated by meandering blue lines in plan view on the applicable drawings. It is unclear how the pilot channels will naturally establish in the meandering form exactly as shown.

The channel lengths between HEC-RAS cross sections in this submittal are based on the lengths and slopes of the meandering blue lines instead of the actual floodplain channel lengths (which would be considerably shorter and steeper). This misrepresents the actual channel geometry and therefore distorts the results of the HEC-RAS analysis.

Please provide detailed designs for Pearson Creek and South Fork Pearson Creek pursuant to permit commitments described in Appendix J.

Please update SEDCAD and HEC-RAS models accordingly. Please also incorporate any adjustments that may occur during the HEC-RAS trial and error process in the associated documents.

ARM 17.24.501: The up gradient tie between native and reclamation of Pearson Creek should be modified: reduce a significant portion of the small sinuous features with larger, valley and flood plain sinuosity. Second, there is potential for blasting and dragline creation of bedrock controlled steep features on the west endwall in PIT 2. These features could be constructed during mining and have sides with multiple aspects that align with the drainage divides.

General Comments:

The addition of a new MPDES outfall is mentioned (and illustrated) in the Nov 7, 2012, deficiency response document, but not documented in any of the updated permit materials. The pond and associated outfall are not named, nor are they denoted on the Hydrologic Control Plan map.

Please provide acceptable, detailed answers to these deficiencies.

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

Sincerely,

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