



# Public Service Commission

## State of North Dakota

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May 29, 2018

Mr. Jason Frye  
Environmental Specialist  
Falkirk Mining Company  
P.O. Box 1087  
Underwood, ND 58576-1087

Dear Mr. Frye:

The Reclamation Division has conducted a technical review of the application for Revision No. 38 to Surface Coal Mining Permit NAFK-8405 submitted on January 5, 2018 by the Falkirk Mining Company. Revision No. 38 updates the existing permit for the addition of 1680.1 acres to the permit; updates the Underwood Ground Water Hydrology document; and updates Falkirk's Consolidated Bonding document. This technical review letter is correspondingly organized into separate categories for the revision application, ground water hydrology document and the Consolidated Bond. The following items must be addressed before the Commission can take further action on this application:

### **REVISION NO. 38**

#### **Section 1.1 – Introductory Information**

1. Please revise the Revision Summary narrative for Revision No. 38 to include a discussion about all of the changes being proposed with Revision No. 38, including, but not limited to, topographic and land use changes on lands already permitted, changes to the reclamation schedule and grading sequence map, and mining sequence and timing changes on lands in Section 2. The mine plan changes in Section 2 have resulted in a portion of the area being excluded from the area-wide regrade volumetric calculations. (GAW)

#### **Section 2.1 – Cultural Resources**

2. New cultural resources narrative on page 4 of Section 2.1.1 describes acreage incorporated into the permit with the 7<sup>th</sup> Addition and the location narrative requires some updating. The location description for areas added to the permit include the NE1/4 and portions of the NW1/4 of Section 5 and this should be revised to state the NE1/4 and portions of the NW1/4 of Section 8, not Section 5. Please review and update as necessary. (BEB)
3. The Summary of Cultural Sites spreadsheet in Section 2.1.3 lists 7<sup>th</sup> Addition Historic sites 32ML1311, 1312, 1318, and 1319 as being Prehistoric sites. All other information in the permit

describes these sites as being Historic, not Prehistoric. Please review and update as necessary. (BEB/RLK)

### **Section 2.3 – Geology**

4. Please compare the topographic transects of cross-sections B-B' that are provided in Sections 2.3.14 and 2.3.15. The cross-section reference map in Section 2.3.14 depicts the B-B' transect running from north to south, beginning in the middle of the Section 3 washout; however, the generalized cross-section reference map inset at the top of Section 2.3.15 shows the B-B' transect running from south to north, with B' ending in the Section 3 washout. Based on the actual geologic cross-section provided in Section 2.3.15 it appears the B-B' transect should be running from south to north. Please review and update the cross-section transect on the Drill Hole Location and Cross-Section Reference Map in Section 2.3.14. (BEB)
5. It does not appear that the geologist's drilling and coring logs are provided in Section 2.3.7a (Lithologic Logs) for drill holes FA15001C and FA15002C located in the W $\frac{1}{2}$ NE $\frac{1}{4}$  of Section 10. Please review the Section 2.3.7a contents and add the logs as necessary to determine the potential SPGM respread depth on Section 2.8.7 (Drill Hole Location, Overburden Characteristics, and Projected Respread Depths Map) for the W $\frac{1}{2}$ NE $\frac{1}{4}$  of Section 10 within the terrain modification boundary. (WTG)
6. It does not appear that overburden sample analyses are provided in Section 2.3.8 (Overburden Sample Analyses) for drill holes FA15001C and FA15002C located in the W $\frac{1}{2}$ NE $\frac{1}{4}$  of Section 10. Please review the Section 2.3.8 contents and add the sample analyses as necessary to determine the potential SPGM respread depth on Section 2.8.7 (Drill Hole Location, Overburden Characteristics, and Projected Respread Depths Map) for the W $\frac{1}{2}$ NE $\frac{1}{4}$  of Section 10 within the terrain modification boundary. (WTG)

### **Section 2.5 – Alluvial Valley Floors**

7. Please review new Revision No. 38 narrative near the bottom of the paragraph in Section 2.5. Several typographical errors should be corrected to portray the intended meaning of the provided sentences. (BEB)

### **Section 2.6 – Surface Water Information and Monitoring Plan**

8. Please revise the second sentence of the description for Monitoring Site MS-6E added to the Surface Water Quality Data narrative (Section 2.6.3) for clarity. Perhaps the sentence could be revised to identify the years of data collection with wording similar to that used in the description for Monitoring Site MS-4E. In addition, it may be helpful to indicate the site was added to obtain baseline water quality data for the 7<sup>th</sup> Addition to the permit area. (RLK)
9. A sentence added to the Surface Water Monitoring Plan narrative (Section 2.6.7) states "*Water quality data will also be used to compare disturbed areas from undisturbed areas and determine if there are any downstream effects on water quality form mining.*" Please consider revising this sentence for clarity. (RLK)

10. Please update the watershed modeling narrative that begins on page 5 of Section 2.6.5 to indicate if the modeling program used to estimate peak discharge rates and runoff volumes used for the watershed areas/control points added with Revision No. 38 for the 7<sup>th</sup> Addition is the same as that used for Revision Nos. 23 and 27, or describe any change in method as appropriate. (RLK)
11. Please consider including watershed control point UC-3 and LA-13 in the narrative describing moderate changes in pre versus post mine area, peak discharge and runoff volume beginning on page 8 of Section 2.6.5. The changes shown for UC-3 in Section 2.6.5c appear similar to the other watersheds contributing to the Underwood Coulee drainage system and the watershed contributes to public infrastructure. The slight to moderate increase in watershed area, peak discharge and runoff volume for LA-13 partially offset the decreases noted for LA-14 within the Lake Audubon drainage system. (RLK)
12. The post-mining drainage profiles and related information in Section 2.6.9 was updated for changes to the proposed post mining topography. The new post-mining drainage profiles (Section 2.6.9b) show relatively abrupt longitudinal slope changes near CL-4 Stations 62+00 and 78+00, CL-15 Station 17+00, and CL-17 Station 25+00 that were not present in the pre-mine profiles. The lack of such features in the pre-mine drainage profiles suggest that the features may not be stable for the range of runoff events experienced in these types of drainages. Please consider consulting with a stream channel professional prior to implementing the design to determine if there are other design parameters that can be used to avoid constructing a feature that may have an increased potential for erosion. (RLK)

### **Section 2.7 – Pre-Mining Land Use and Vegetation**

13. The tract narratives added to Appendices for Vegetation I-VI in Section 2.7.3 incorrectly state that field bindweed, *Convolvulus arvensis*, is a noxious weed. Please revise to clarify that this species is not considered a State listed noxious weed. (GAW)
14. Please label the native grassland ecological sites on the Pre-Mining Land Use and Associated Mapping Units map, Section 2.7.2a, as required by NDAC 69-05.2-08-08(1)(a)(3). (GAW)
15. Please do not change the revision date for the Pre-mining Land Management Information provided in Appendix I of Section 2.7.3 if no updates have been made to the specific owner/operator management practices. To avoid confusion regarding the timeframe for which the management information was actually obtained and written, please consider leaving Appendix I as it is and add a separate appendix for Revision No. 38, Seventh Addition or consider using an arrangement similar to Appendix II. (RLK)
16. Please provide the productivity index (PI) as the measure of relative cropland productivity information for the Seventh Addition rather than the relative soil productivity expressed as bushels/acre yield for select crops. The productivity indices appear to have been the basis for the crop yields given for the soil map units in the Revision No. 22 and No. 23 information. The conversion factor to a bushels/acre yield rating is no longer updated and provided with NRCS soil survey information. (RLK)

### **Section 2.8 - Soil Resources**

17. Please review the "Areas Surveyed" legal description for the C. J. Heidt soil survey in the legend for Section 2.8.2 (Soil Survey Map) and revise the description as necessary. The survey area described in the introduction of Section 2.8.4f (Soils Description - C. J. Heidt and Mike Ulmer) does not describe any portion of the soil survey as being in the SE $\frac{1}{4}$  of Section 8. (WTG)
18. Please remove the potential SPGM respread depth delineation and labels in the S $\frac{1}{2}$  of Section 3 that lie beyond the terrain modification boundary on Section 2.8.7 (Drill Hole Location, Overburden Characteristics, and Projected Respread Depths Map), and for which no mining pits are depicted on Section 3.1.5 (Pit Layout and Facilities Map). We also request that the 24 inch potential SPGM respread depth label in the S $\frac{1}{2}$  of Section 2 beyond the terrain modification boundary in land added to Permit NAFK-8405 with Revision No. 23 be relocated to the SW $\frac{1}{4}$  of Section 1 and revised if necessary to differentiate potential SPGM respread depths for the overburden/spoil stockpile that extends into the SW $\frac{1}{4}$  of Section 1. (WTG)
19. Please close the potential 36 inch SPGM respread depth polygon along the east-west quarter line of Section 8 for drill holes FA92002C and FA05003C located in the E $\frac{1}{2}$ SE $\frac{1}{4}$  of Section 8 on Section 2.8.7 (Drill Hole Location, Overburden Characteristics, and Projected Respread Depths Map). The polygon was previously closed by the Revision No. 23 permit boundary. (WTG)

### **Section 3.1 – Operations Plans – General**

20. Mine plans for the area in the S1/2 of Section 2 are depicted differently on Section 3.1.5 (Pit Layout and Facilities Map) and Section 3.1.6 (Extended Mine Plan and Topographic Map of Mine Phases) to remove the proposed 2030 and 2031 102 dragline pits in the SE $\frac{1}{4}$  of Section 2 that lie beyond the terrain modification boundary to be consistent with nearby mining plans in Sections 2 and 3. Please review and depict the mine plan consistently between the two maps. In addition, the terrain modification boundary in the S1/2 of Section 2 may need to be adjusted on Section 3.1.5 as well. (WTG)
21. Please update the Pit Layout and Facilities map, Section 3.1.5, to correct the label for wetland basin B-E15-03 located in the N1/2 of Section 15. (RLK)

### **Section 3.2 – Existing Structures – General**

22. The Existing Structures map, Section 3.2.2, shows 500 feet set-backs around occupied farmsteads in the northwest corner of Section 15 but the Surface and Coal Ownership Map, Section 1.5.3, shows that Falkirk owns this property, and the Pit Layout and Facilities Map in Section 3.1.5 does not include setbacks around these farmsteads. Please review and revise as necessary. (GAW)

### **Section 3.6 – Surface Water Management Plan**

23. Please update the Total Water Management Plan Map, Section 3.6.1a, to correct the label for wetland basin B-E15-03 located in the N1/2 of Section 15 to match the designation given to the feature in the design information provided in Section 3.6.62. (RLK)

**Section 4.1 – Post-Mining Land Use and Revegetation**

24. Narrative on page 9 of Section 4.1.1, Post-Mining Land Use Narrative, states that developed water resources (DWR) will be constructed in the SW1/4 of Section 10 and the SE1/4 of Section 2, but the Post-Mining Land Use Map in Section 4.1-2 identifies DWR's in the SE1/4 of Section 10 and SW1/4 of Section 2. Please review and revise to as necessary to provide clarity. (GAW)
25. A sentence near the bottom of page 13 of Section 4.1.1, Post-Mining Land Use Narrative, states that Falkirk will add a 0.2-acre DWR in the SW/4 of Section 10 but this feature is not depicted on the Post-Mining Land Use Map, Section 4.1-2. Please review and revise as necessary. (GAW)
26. Please revise the narrative discussion near the bottom of page 13 of Section 4.1.1, Post-Mining Land Use Narrative, to explain why Falkirk is proposing to increase the wetland acreage in Section 10 by 4.1 acres and explain how this proposed land use change meets the requirements of NDCC 38-14.1-24, which requires restoration of the pre-mining capabilities. (GAW)
27. Please revise Section 4.1.1, Post-Mining Land Use Narrative, to provide addition information for converting 80 acres of reclaimed cropland to farmstead (residential) land in Sections 23 and 24 with Revision No. 38. It is not clear why so many acres are needed for a farmstead and the permit should clarify if the pre-mining capabilities of this property were restored prior to alternative land use classification. Please also clarify if any shelterbelts will be planted on farmstead acreage that will need to meet shelterbelt revegetation performance standards. [NDAC 69-05.2-23-03] (GAW)
28. Please consider revising the Post-Mining Topography, to the extent feasible given the requirements of Approximate Original Contour (AOC), such that reclaimed seasonal and semi-permanent wetlands will have a discharge elevation. The Reclamation Division is aware of reclaimed wetlands expanding considerably during extended wet periods and believe it is prudent to create a landscape that will minimize the amount of cropland that might be affected and/or provide a reasonable alternative to alleviate such occurrences. (GAW)
29. Please revise the Post-Mine Land Uses Map, Section 4.1.2, to remove the "CL" labels from Wetlands W-NW11-02 and W-NW11-04 located in the NW1/4 of Section 11. (RLK)
30. Please update the Pre- and Post-Mining Land Use Acreage Comparison Table, Section 4.1.3, to include a column indicating the number of bond released acres similar to that provided in Permit NAFK-8705. (RLK)

**Section 4.2.6 – Post-Mining Topography Map Generation**

31. Please revise the Post-Mining Topography Map Generation, Section 4.2.6, to mention that mass balance of available spoil for regrading does not include the area to be mined beginning in 2030 located in the northern portion of the S1/2 of Section 2. Prior to Revision No. 38 this area was included in the mass balance calculations so narrative should be included explaining the reasons for this change. (GAW)

### UNDERWOOD GROUND WATER HYDROLOGY

32. It was noted that most, if not all of the maps in the Underwood Coal Field Hydrology document provide the permit boundary for NAFK-8405 only. Since this document is inclusive of Permits NAFK-8405, NAFK-8705, and NAFK-9601, all boundaries for those permit areas should also be provided on the maps. Additionally, it was noted that the only bond release tract depicted on the maps was for FBR 1 to NAFK-8405. If your intent is to incorporate all bond release tracts on the maps, which we concur with, then please depict and label all bond release tracts for the other described permit areas as well. (BEB)
33. Several updates are required for the narrative provided in Section 2.2.2, Water Bearing Formations and Hydrogeology. The first page describes the Current Monitoring Wells Location Map, Section 2.2.21, and references active wells as of June 2010 and this should be updated to state the year 2017. Narrative in the same paragraph enumerates the active and removed wells in the Underwood Coal Field and these numbers will need to be updated to provide current information through 2017 with updated information provided with Revision No. 38 in Section 2.2.6. (BEB)
34. Ground Water Recharge narrative on page 2 describes water level data and potentiometric surface maps using water elevations collected through 2010. Water level information and all potentiometric surface maps provided with Revision No. 38 were updated with June 2017 data. Additional narrative in a couple of places in the remainder of this section also needs to be updated to reflect the usage of 2017 data for updates to the document. Please revise the narrative as needed. (BEB)
35. Narrative under Potential Level Analysis on page 6 of the Probable Ground Water Hydrologic Consequences in Section 2.2.5 describes tables and hydrographs provided in the report updated with June 2010 data, and similar to the above-listed items should be revised to state that the information for those sections was updated with 2017 data. (BEB)
36. The Ground Water Monitoring Plan on page 2 of Section 2.2.6 under "*The following wells have been destroyed by mining activities*" and "*They have been removed from the monitoring and sampling schedules*" appears to require updating. This listing shows that monitoring well 121-1 has been destroyed, but the monitoring schedule on page 10 shows this well remains in active status. It appears likely the well that should be listed as removed from the monitoring plan schedule on page 2 is well 122-1. Well 122-1 is owned by the USFWS and is located on the bond release tract in the SE1/4 of Section 31, Permit NAFK-8705. Falkirk was given approval to terminate monitoring of well 122-1, in addition to wells R23A and R23B this past year. Please review and update as necessary. (BEB)
37. Similar to the above item, monitoring wells 141-1, 2 and 3 are listed as having been "installed". However, those wells were mined through in 2009 and should all be moved to the listing of wells that have been destroyed. Wells 141-1 and 141-2 are already in the destroyed listing but not well 141-3. (BEB)
38. The Ground Water Monitoring Plan on page 3 of Section 2.2.6 under "*The following wells have been installed*" and "*They have been added to the monitoring and sampling schedules*" appears to require some updates. The listing shows that monitoring wells 141-1, 141-2, 141-3, RP-147-1,

and RP-147-2 have all been added to the monitoring and sampling schedules; however, the above-described wells are noted in other sections of the permit as having been mined through and destroyed, which appears to be the case. Please review and update as necessary. (BEB)

39. Please consider changing the name of Section 2.2.8 back to what it had previously been, "Location of Monitoring Wells, Pit Progression, & Cross-Section Reference Map" because the name-change to "Cross-Section Monitoring Map" is not consistent with the information that is provided on the map. (BEB)
40. Please update the legends of Section 2.2.12, Location Map – Certified Wells and Section 2.2.13, Location Map – Operational Wells. The legends provide an icon for pit progression with a label describing "Falkirk Mined-Out Area as of December, 2010" and the labeling should be updated to 2016 commensurate with the updated pit progression shown on the maps. (BEB)
41. Please give consideration to placing information regarding the Game and Fish Department's post-mining water well on reclaimed land in Section 25 of Permit NAFK-9601 and the recently installed production well for Michael Berg in Permit NAFK-8405 into Sections 2.2.12, 2.2.13, 2.2.14, and 2.2.15. (BEB)
42. The "Bed Screened" listing on the Monitoring Well Information spreadsheet in Section 2.2.16 for ground water monitoring well 217-5 should be revised to describe the Tavis Creek Formation. Please review and update. (BEB)
43. The Well Driller's Reports provided in The Well Completion Reports of Section 2.2.18 for the 216, 217 and 218-series of new ground water monitoring wells lists the well identifications as 216A, 216B, 216C, etc. as opposed to their actual well identification numbers, which are 216-1, 216-2, 216-3, etc. Simply hand writing the correct well numbers on the original Well Driller's Reports is all that is being requested so that the information provided on the Well Driller's reports corresponds with the well numbering protocol provided in all other sections of the document for those wells. Please review and update. (BEB)
44. Potentiometric data provided in Section 2.2.23 for Coleharbor Formation ground water monitoring well 113-1 has some errors. There are four successive entries for the well that are dated 01/01/16 in which the well is identified as a Hagel A monitoring well, not Coleharbor. No water level data is provided because the comments column indicates the well was under water. Please review the spreadsheet and make the appropriate updates. (BEB)
45. Updates are required to the screened unit listings on pages 502 and 503 in Section 2.2.23, Potentiometric Data, for several newly installed ground water monitoring wells. Please check and update the screened unit listings for wells RP-105-1, RP-105-2, and RP-108-1. The listings provided for these wells place the wells in different screened units on different dates. (BEB)
46. Some of the "Bed Screened" information for new wells added to the Water Quality Data spreadsheet in Section 2.2.31 is erroneous. New ground water monitoring wells in the 216, 217 and 218-series (14 wells total on page 78) are all shown to be screened in the Hagel A bed. Separately, reclamation monitoring wells in the RP-105 and RP-108-series (5 wells total on page 82) also have miscellaneous screened unit errors. Please review all data on the table for accuracy regarding the recently installed monitoring wells. (BEB)

47. Erroneous screened unit information described in the previous ground water deficiency (Item No. 46) also occurs in Section 2.2.32d, 2017 Baseline Water Quality Data. The 216, 217, and 218-series of ground water monitoring wells all show the screened bed for these wells to be the Hagel A seam, and the screened unit designation for most of the RP-105 and RP-108 wells are incorrect. Please review and update. (BEB)

#### **RECLAMATION BOND / COST**

48. Two ponds are identified as pond P-S13-07 and P-S13-08 under Scraper Calculations in the Worst Case Bond Costs, Section 4.2.4. It appears these should be labeled as ponds P-E13-07 and P-E13-08. Please review and revise if appropriate. (BAJ)
49. Please add pond PW-E11-05 and the portion of pitwater pond PW-E16-04 outside of the mining disturbance area to the Worst Case Bond Costs. In addition, a brief narrative or a design should be included for the pitwater pond that explains how the earthwork calculations for the worst-case bond were calculated (length of embankment, typical cross-section, etc.). (BAJ)
50. Please add pond P-R09-01 and pond P-R09-02 to the Worst Case Bond Costs in Section 4.2.4, and add the ponds to the Worst Case Bond Map, Section 4.2.4b. (BAJ)
51. Please add pond P-RW01-03 to the Worst Case Bond Costs in Section 4.2.4. This pond is shown on the Worst Case Bond Map, Section 4.2.4b, but is not included in the cost calculations. (BAJ)
52. Please add ponds P-R07-01, P-R07-02, and P-R07-03 to the Worst Case Bond Map, Section 4.2.4b, and to the Worst Case Bond Costs, Section 4.2.4. (BAJ)
53. Please review the length of haulroads that are anticipated to be present at the time of the worst-case scenario. Item No. 7 of the Assumptions states that 223,700 feet of haulroads will be present. The Reclamation Division calculates that this should be updated to approximately 229,100 feet (Permit NAFK-8405 = 73,392 ft., Permit NAFK-8705 = 25,061 ft., Permit NAFK-9503 = 130,663 ft.). The lengths were calculated from Section 4.2.4b. Please review and update as necessary. (BAJ)
54. Revision No. 38 to Permit NAFK-8705 proposes changing the Section 26 ash disposal pit to a long-term mining cessation area. The Worst Case Bond should incorporate the contingency plan for the Section 26 Ash Pit in Permit NAFK-8705 that is currently under review with Revision No. 38 to that permit. The Worst Case Bond should include costs to re-disturb the proposed borrow area located to the southeast of the ash pit (strip and stockpile SPGM, remove the necessary amount of overburden to achieve the required contours, and then respread SPGM in the borrow area). Subsoil stockpile SS-140 in Section 32 should be included with the subsoil respread of the ash pit. (BAJ)
55. Please review SPGM Respread Hours Summary – associated disturbance 657E machine type for Section 34, T145N R83W. The summary shows 44.9 acres of topsoil respread for haulroads. Page 3 of Section 4.2.2 - Reclamation Schedule for Revision No. 29 to NAFK-9503 states that Variance Area T will only be rough graded and left without SPGM respread for the period between 2015 and 2022. Please add the necessary acres of SPGM respread for those portions of

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Variance Area T that are not respread with SPGM at the time of the worst-case condition (end of 2021). (BAJ)

56. Please review SPGM Respread Hours Summary – associated disturbance 657E machine type for Section 28, T145N R83W. The summary shows 22.7 acres of topsoil respread for haulroads. Page 4 of Section 4.2.2 Reclamation Schedule for Revision No. 29 to NAFK-9503 states final backfilling and regrading of Variance Area Y will not commence until the last pit is mined out. The Reclamation Division calculated approximately 45 acres for Variance Area Y that is outside of the mining disturbance area would require SPGM respread, and possibly a portion of Variance Area H. Please review and add the necessary acres of SPGM respread for the portions of the Variance Areas that will need resreading of SPGM at the time of the worst-case condition (end of 2021). (BAJ)

If you have any questions, please contact this office.

Sincerely,



Dean K. Moos  
Director  
Reclamation Division