



# Public Service Commission

## State of North Dakota

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March 3, 2011

Mr. D. Randall Crooke  
Environmental Manager  
Falkirk Mining Company  
P.O. Box 1087  
Underwood, ND 58576-1087

Dear Mr. Crooke:

The Reclamation Division has completed a technical review of the application for Revision No. 20 to Permit NAFK-9503 for the Falkirk Mine. The following items were noted in that review that must be addressed or corrected before the Reclamation Division recommends Commission approval:

### **Section 1.2.1 – Legal Description of Permit Area**

1. Please include the NAD 27 State Plane North coordinates for the Point of Beginning for both of the metes and bounds surveys in Section 1.2.1 and include the coordinates on the Metes and Bounds Map in Section 1.2.2. (MSK)

### **Section 1.2.5 – Certificate of Liability Insurance**

2. Please provide the current Certificate of Liability Insurance in Section 1.2.5 as required by NDAC 69-05.2-12-20. (MSK)

### **Section 1.3.5 – Other Licenses and Permits**

3. Please include updated information on the status of the conditional use permit for the area being added to the permit with Revision 20. NDAC 69-05.2-06-04 (SAS)

### **Section 1.3.6 – Relationship to Areas Designated Unsuitable**

4. Under the discussion about occupied dwellings, the following corrections should be made:
  - a) Item #21 states that the L. Leidholm farmstead is located outside the permit; however, with this revision it is now located within the permit area.

- b) Item #26 indicates an unoccupied dwelling in the SW $\frac{1}{4}$  of Section 16 / NE $\frac{1}{4}$  of Section 21, T145N, R83W but Section 3.2.2 only indicates farm buildings at this location. Please review and update as necessary. (SAS & DKM)
5. In the subsection describing which section lines will be closed, it appears that the section line in item #34 on page 8 should be T145N instead of T146N. Please make the necessary corrections. (SAS)
6. Please provide a commitment to add copies of the road authority's section line and road closure approval documents as well as approvals to conduct mining operations within 100' of the outside right-of-way to the permit once they are approved along with findings showing that the interests of the public and affected landowners are being protected. NDAC 69-05.2-04-01.3 (3) (GAW)
7. Road closures and operations within 100' of the outside rights-of-way for the area being added in Revision 20 are discussed in Section 1.3.6; however, it appears that there are some discrepancies for the areas where the Revision 20 area adjoins the previously approved Revision 11 area. Revision 11 indicates that mining operations will be conducted within 100' of the outside rights-of-way of the section line between the SW $\frac{1}{4}$  of Section 21 and NW $\frac{1}{4}$  of Section 28, T145N, R83W and the SE $\frac{1}{4}$  of Section 33 and the SW $\frac{1}{4}$  of Section 34, T145N, R83W. Revision 20 (and the public notice) does not indicate that those section lines will be closed; however, a review of the mine plan indicates that these areas will be mined through, therefore necessitating closure of these section lines/roads. Also it appears that mining operations may be within 100' of the outside right-of-way of the east-west section line between the SE $\frac{1}{4}$  of Section 4 and the NE $\frac{1}{4}$  of Section 9, T145N, R83W but approval to operate within 100' of the outside right-of-way was not requested. In addition, it appears that mining operations will be within 100' of the outside right-of-way (or actual closure may be required) of the county/township road between the NW $\frac{1}{4}$  and SW $\frac{1}{4}$  of Section 12, T144N, R84W. Please update Section 1.3.6 as necessary. Pursuant to NDAC 69-05.2-10-01(1)(d), newspaper notices of Falkirk's intent to close or conduct mining operations within 100' of the outside rights-of-way of the above mentioned roads will need to be published before Revision No. 20 is approved. (DKM)

#### **Section 1.4.2 – Surface Ownership Notification Letters**

8. According to pages 302-307, this letter was sent to Eleanor H. Sheldon and Kay Maureen Hegvik as co-owners of Tract 109. Sections 1.5.1 and 1.5.3 indicate only Kay Hegvik owns the land. Please explain or correct this discrepancy. (SAS)
9. The Landowners Post-Mining Preference Statement indicates the legal description for surface owner Michael Thyberg includes an area in Section 1, T144N, R83W which is not in the permit. It appears this should be T144N, R84W. Please review and make the necessary corrections. (SAS)

10. The letter for Tract 98 went to the George Swanson Life Estate but Dean Swanson is listed as the surface owner in Sections 1.5.1 and 1.5.3. Please explain or correct this discrepancy. (SAS)

### **Section 1.5.1 – Permit Area Surface and Coal Interests**

11. Please update the address for Mildred Leidholm (Tracts 82 and 89) to 213 14<sup>th</sup> St., Washburn, ND 58577. She provided this address after our notification letters were mailed. (SAS)
12. Please correct the zip codes listed in Tract 165 since these are the addresses we use to notify landowners. Currently there are six digits instead of five. (SAS)

### **Section 1.5.2 – Adjacent Surface and Coal Rights**

13. The listing for the coal ownerships in the S½SW¼ of Section 30, T146N, R83W indicates what appears to be three husband/wife combinations but the Ownership Map, Section 1.5.3, only lists a single name for each. Please review and correct as needed. (SAS)
14. There is no ownership listing for the S½SW¼ of Section 31, T145N, R83W. Please provide the necessary information as appropriate. (SAS)

### **Section 1.5.3 – Ownership Map**

15. The tract boundary line between Tracts 77 and 78 in Section 33 is missing. Please correct. (SAS)
16. Section 1.5.1 indicates there are two coal owners for Tract 120, but Section 1.5.1 lists only a single owner. Please review and correct as necessary. (SAS)

### **Section 2.1 – Cultural and Historic Resources**

17. The narrative in Section 2.1.1 indicates there are 84 cultural resource sites within the survey area and Section 2.1.3 (Summary of Cultural Sites Located within Riverdale 4<sup>th</sup> Addition) lists a total of 95 sites. Of these 95 sites it appears that 23 are located outside of the proposed addition area which would indicate that 72 (95 – 23) sites are located within the addition area. In addition, it appears a total of 70 sites (includes site 32ML1127 which is located in exclusion area) are depicted within the proposed addition area on Section 2.1.2, Cultural Resource Location Map. Please correct these discrepancies with regard to the number of sites within the permit. It is recommended that sites that are outside of the permit boundary, but within the study area and included in Section 2.1.3, be marked in some manner to indicate they are located outside of the permit area but within the study area. (DKM)

18. Please depict the location of Site 32ML1137 (located in the SW<sup>1</sup>/<sub>4</sub> of Section 12, T145N, R83W) on Section 2.1.2, Cultural Resource Location Map and include it in Section 2.1.3, Summary of Cultural Resource Sites Located within NAFK-9503. This site is located within the area being added to the permit and was deemed insignificant in the SHPO's June 2, 2008, letter. (DKM)
19. Please provide the final site determinations (SHPO correspondence) for the 29 sites that were tested for significance and update Section 2.1.3 accordingly (these 29 sites are currently listed as "unknown" status in Section 2.1.3). In addition, please provide any further correspondence from the SHPO regarding these sites (testing plan final report acceptance, final site determinations, mitigation approval, etc.) in Section 2.1.4. (DKM & BEB)

### **Section 2.2 – Description of Ground Water Hydrology**

20. Please provide information in the permit describing any computer modeling efforts employed by Falkirk in determining the ground water probable hydrologic consequences and the results of that modeling, if any. NDAC 69-05.2-08-04(7). (BEB)
21. Ground Water Hydrologic Setting, Section 2.2.1, provides information concerning permit area seeps and springs on pages 1 and 2 and we ask that a link be installed in the narrative of this section that directs the reader to the Surface Water Features and Monitoring Sites Map, Section 2.6.4, which depicts the locations of the seeps and springs. (BEB)
22. Please review the third paragraph on page 1 of the Probable Ground Water Hydrologic Consequences, Section 2.2.5. There appears to be several sentence structure errors associated with a couple of the sentences in this paragraph and a couple of sentences describing the effects of mining on alluvial materials associated with the Square Butte Aquifer system (presumably for the proposed Otter Creek Mine permit). Please review this paragraph and update as necessary. In addition to providing the required empirical data, Falkirk is also required to predict, with appropriate justification whether or not seep and spring flow will be impacted as a result of mining activities. NDCC 38-14.1-14(1)(o). (BEB)
23. Narrative in the PHC on page 3 of Section 2.2.5 describes removal of the Tavis Creek and Coal Lake Coulee beds and the probable consequences of removal of those ground water hydrologic resources. The statement is made in narrative for both of those units that "*The re-establishment or permanent loss of spring or seep flows in their pre-mining locations cannot be predicted*". Please expound on these statements by providing documented information, if available, drawing upon Falkirk Mine's several decades of mining and reclamation experience whether or not re-establishment of spring or seep flow can be realistically expected in the post-mining environment. If post-mining re-establishment of spring or seep flow has been documented at Falkirk Mine, please incorporate those site specific details and locations into the PHC narrative. If Falkirk cannot predict the impacts to springs that are used for livestock watering or other purposed, plans for replacing these water sources must be provided. (BEB)

24. On page 8 of Section 2.25, the discussion of three wells which will be destroyed by mining should be deleted since the complete listing is now in Section 2.2.14. (JRD)
25. Using Falkirk's drilling or well certification data, or County Ground Water Studies data, please extend a couple of the geologic cross-sections that are provided in the hydrology portion of the permit in Section 2.2.9 to provide a visual geo-hydrologic perspective of coal seam subcrop/outcrop elevations and locations with the glaciofluvial and alluvial sediments of the Missouri River Trench and the alluvial aquifers associated with it. If possible, please extend cross section A-A' further to the west/northwest and extend either cross-section B-B' or C-C' further to the southeast to provide the requested information. (BEB)
26. Review of information that is provided for new (2009) monitoring well installations in Section 2.2.23, Potentiometric Data, associated with the Riverdale 4<sup>th</sup> Addition indicates that 6-months worth of water level data was collected for the permit application and added to the permit. The last date of water level data provided in the permit for the new wells is March, 2010. Reclamation rules require the applicant to provide sufficient baseline hydrologic information within the permit area under seasonal flow conditions (generally acknowledged or interpreted as one year's worth of data). Please incorporate into the table of Section 2.2.23 recently acquired water level data for the new wells subsequent to March, 2010 and update Section 2.2.38, Time Series Hydrographs, to reflect the added data. (BEB)
27. Please add a footnote to the legend of the Hagel A Potentiometric Surface Map, Section 2.2.25a, that water level elevations labeled as 0.00 located next to the well identification number on the map denotes a dry well (as opposed to static water level elevation). (BEB)
28. The Tavis Creek Bed Potentiometric Surface Map, Section 2.2.25d, depicts the water level elevation of Ground Water Monitoring Well 342-1 as being 1,817.05 feet; however, the well is located directly between the 1,790' and 1,800' elevation contours. In addition, monitoring Well RP-311-1 depicts a water level elevation of 1,812' but the well is positioned between the 1,820' and 1,830' contours and a similar discrepancy is evident with Well RP-310-2 and perhaps others. Please correct the potentiometric contour discrepancies. (BEB)
29. There appears to be a typographical error associated with hydraulic properties regarding reclamation monitoring Well RP-310-1 in the Hydraulic Characteristics of Permit Aquifers spreadsheet, Section 2.2.30. Monitoring Well RP-310-1 is depicted as having a calculated transmissivity of .0001363 ft<sup>2</sup>/day on pages 5 and 6 of the spreadsheet; however, data provided in Section 2.2.29, Well Response Tests, indicates a transmissivity measurement for the well of .0317 ft<sup>2</sup>/day and it appears that this error may have carried over into the statistical summation of hydraulic properties for the spoils wells that is provided on page 6. Please correct the typographical error and re-calculate the statistics for the spoils wells based on the revised data. Also, the calculated "Minimum" value for spoils wells transmissivity is listed as 1.000003 which appears to be another typographical error and this value should be corrected with the other updates. (BEB)

30. In Section 2.2.15, Well and Spring Certification Field Data Forms, it appears that information provided for the Max Guenther Well #3 is probably correct; however, the well certification field form incorrectly lists the well as the Max Guenther #4 well. Please review and correct as needed. (BEB)
31. In order to readily distinguish certified and operational well locations within the permit to those located off-permit, please add the permit boundary to the Certified and Operational Well Location Maps, Sections 2.2.12 and 2.2.13, respectively. (BEB)

### **Section 2.3 – Description of Geology**

32. The General Geology Narrative, Section 2.3.1, describes the minable coal in the Riverdale Field as being in the Sentinel Butte Formation, but with the planned removal of Tavis Creek and Coal Lake Coulee lignites, the narrative should be revised to include minable coal resources in the Paleocene Bullion Creek Formation, as well. Please revise. (BEB)
33. Information in the second paragraph of the General Geology Narrative in Section 2.3.1 describes the permit location with respect to several physiographic features within the Northern Great Plains Physiographic Province of Fenneman. Since the work of Nevin Fenneman is specifically referenced in this paragraph, please add the appropriate reference information for Fenneman into the cited References of Section 2.3.3 in the permit. (BEB)
34. Site specific geology narrative in Section 2.3.2 describes the location of areas within the 4<sup>th</sup> Addition permit area in which significant thicknesses of Holocene Oahe Formation Eolian Silts (Loess) exist and those locations are provided in the narrative. One of the locations noted in the narrative is Section 18, T145N, R84W which is located west of the Missouri River and it is assumed the statement was intended to describe T145N, **R83W**, wherein thick deposits of loess have been mapped within the permit area. Please review and correct as necessary. (BEB)
35. Site specific geology narrative in Section 2.3.2 describes overburden thickness in the permit area as ranging upwards of 180 feet in thickness and this statement could be modified to account for overburden thicknesses above the Tavis Creek seam measuring upwards of 220 feet in the NW¼ of Section 21, T145N, R83W as depicted on the Overburden Thickness Isopach Map, Section 2.3.12. Please review and revise the narrative accordingly. (BEB)
36. Page 3 of the Overburden Characteristics Narrative in Section 2.3.5 provides a statistical summary table of the overburden analysis data. The table lists the maximum pH for the (Till) lithologic type, and separately for the (All Units) category as 77.00. Additionally, the midpoint pH for both categories is listed in the 40-41 range. Please correct these obvious errors and check the table for any other possible erroneous data or calculation errors. (BEB)

37. Please review the Overburden Analysis Statistical Summary under the (% Sand) parameter column for all of the listed lithologic types on page 3 of Section 2.3.5. All of the listed statistical summary values under the Sand column are 0.00. Please provide the corrected statistical summary data for this particular parameter column, and check the remaining parameters on the spreadsheet for accuracy. (BEB)
38. Links to Sections 2.3.7 and 2.3.8 that are provided in the Overburden Characteristics Narrative in Section 2.3.5 do not work, and the link to Section 2.3.9 that is provided on page 1 of Section 2.3 does not work. Please repair the links. (BEB)
39. Since all or most sections of the permit information reference the Tavis Creek coal seam or bed and all sources indicate that terminology to be correct, please change the name of the Structural Contour Map in Section 2.3.11c from the *Top of Tavis Bed* to the *Top of Tavis Creek Bed*. (BEB)
40. Please include the coal crop line designations (dashed pink line and solid green line) on the legend of the Overburden Thickness Isopach Map, Section 2.3.12. (BEB)
41. Geologic narrative and maps that are provided in the permit reference various coal seam subcrop locations (Hagel Beds, Tavis Creek, Coal Lake Coulee, etc.) throughout the Riverdale Field. It appears that several of the subcrops that are mapped and described might actually be outcrop locations, in particular when describing or depicting the Hagel A and B seams, although subcrop locations appear to be correctly mapped in areas where a coal seam located below grade has been truncated and replaced with glaciofluvial and/or alluvial deposits. We suspect the higher elevation coal seams exposed along the major surface water drainageways and the Missouri River breaks are likely outcrop locations. Although not required, consideration may be given to changing the terminology on the maps and map legends and in the narrative where appropriate in Section 2.3, or simply depict those crop locations in the legend as being outcrop/subcrop locations. (BEB)

#### **Section 2.3.8 – Overburden Sample Analysis**

42. Please enable the Adobe Reader bookmarks for the sample results of the following drill holes: RD03183C, RD07004C, RD07005C, RD07006C, RD07043C, RD07086C, RD07094C, RD07096C, RD07102C, RD07109C, RD07112C, RD07115C, RD07124C, and RD07125C. (WTG)
43. Although the bookmark for the sample results of drill hole RD07099C was removed in the completeness response, two pages of unnecessary data for the drill hole remain in the permit (pages 287 and 288). Please review and correct as necessary. (WTG)

#### **Section 2.4.1 – Fish and Wildlife Resources Report**

44. Please include a general description of the woodlands in the “Habitat Classification and Inventory” and “Habitat Characteristics” in the Methodology and Results subsections of Section 2.4.1. (GAW)

45. Please include a copy of the approved Fish and Wildlife Baseline Inventory Plan for the 4th Addition Area in Appendix I. (GAW)
46. Please include the Study Plan Maps that were associated with each of the four plans that were submitted and approved for acquiring Fish and Wildlife Baseline Inventory in the Permit area in Appendix I. This is needed to document the boundaries of the study areas, the survey routes and other details that were specific to the approved plans. (GAW)
47. Table 12 is an outdated listing of the Federal Threatened, Endangered and Candidate Species found in ND. It is not clear what this table is representing since threatened, endangered and candidate species lists are associated with each of the approved baseline inventory plans. Please clarify the relevance of this stand alone table and/or otherwise explain its purpose. If it is to be retained, please update the list. (GAW)
48. The new language regarding the Dakota Skipper in the Results and Discussion portion of Section 2.4.1 states that specific ground surveys were conducted to determine if Dakota Skipper were present based on suitable habitat and comments made by the USFWS. Please discuss if the proposed addition area contains habitat suitable for the Dakota Skipper and identify when and where specific ground surveys were conducted. Areas identified as potential Dakota Skipper habitat should be shown on a map. NDAC 69-05.2-09-17. (GAW)
49. Please include a discussion in the Results and Discussion portion of Section 2.4.1 that Sprague's Pipet was added as a candidate species to the endangered species act on September 10, 2010, and discuss if this species is present in the proposed addition area. To the extent feasible, discuss specifics regarding the habitat where the species was observed and if those areas are to be disturbed by mining activities. Discuss if this species was identified displaying flight behavior, indicating that the species was nesting in the area. [NDAC 69-05.2-09-17] (GAW)
50. Please include a discussion in the Results and Discussion portion of Section 2.4.1 indicating if the permit is within the primary whooping crane migration corridor and if there is any suitable roosting and feeding habitat for whooping cranes within the proposed permit area. NDAC 69-05.2-09-17 & NDAC 69-05.2-13-08. (GAW)
51. NDAC 69-05.2-08-15 requires that the applicant include fish and wildlife resource information for the permit and adjacent area. The Fish and Wildlife Inventory Plan that was approved in April 2007, included a buffer zone around the then anticipated permit boundary. Please revise the Wildlife Habitat and Study Area Location Map, Section 2.4.1a, to show the habitats within the previously approved study area or at a minimum include a ½ mile buffer around the proposed permit area, and revise the results and discussion section of the report to include a discussion if the adjacent area contains any high value to fish and wildlife habitats and if any species of concern were identified or have been known to exist on the study area. (GAW)

52. The ND Parks and Recreation Department commented on Revision 20 in a letter to the PSC dated December 30, 2010, (a copy of which has been attached to this letter) in which they pointed out that their database, ND Natural Heritage Inventory, indicates occurrences of plant or animal species or ecological communities of concern within or adjacent the proposed addition area. Please review the ND Parks and Recreation Department letter and update the Fish and Wildlife Report to address their comments. The ND Natural Heritage Inventory identifies two grassland ecological communities in the proposed addition area with a state rank of S2 meaning it is very rare and imperiled with the state. (GAW)
53. Please revise the Fish and Wildlife Report to mention if the ND GAP Analysis Project Final Report indicates if any rare plant or terrestrial vertebrate species or important plant communities are potentially in or immediately adjacent to the proposed permit area. NDAC 69-05.2-09-17(1) and 69-05.2-08-15(3)(c). (GAW)
54. Please revise the Wildlife Habitat and Study Area Location Map, Section 2.4.1a, to show the boundaries of the original permit area, the 2<sup>nd</sup> Addition Area, the 3<sup>rd</sup> Addition Area and the 4<sup>th</sup> Addition Area to the permit, and adjacent lands included in the study areas to the extent feasible. (GAW)

#### **Section 2.4.2 – Fish and Wildlife Management Plan**

55. Please discuss in the first paragraph of Fish and Wildlife Management Plan that woodlands are a pre-mining habitat that are present in the permit area. (GAW)
56. The second paragraph on page 5 of the Fish and Wildlife Management Plan states that no critical habitat for threatened or endangered species has been identified on or near the permit area prior to mining. Please revise this statement to clarify that the Missouri River is designated as critical habitat for the Great Plains population of Piping Plover and that it is only about 1 mile away from the southwest corner of the proposed permit boundary and within two miles of the proposed permit boundary in other areas. (GAW)
57. Please update the Fish and Wildlife Management Plan to discuss if the permit area contains any high value fish and wildlife habitat and how Falkirk will, to the extent possible, using the best technology currently available, avoid or minimize impacts to fish and wildlife species and important habitats. This should include rare animal and plant species and ecological communities identified by the ND Natural Heritage Inventory. This discussion should indicate if the permit area contains any intermittent or perennial streams. NDAC 69-05.2-13-08 (6) (f) & NDAC 69-05.2-09-17. (GAW)
58. Please update the Fish and Wildlife Management Plan to discuss how Falkirk employs practices for compliance with the Migratory Bird Treaty Act, which prohibits the taking and killing of migratory birds and their eggs and nests. This should include a discussion about how Falkirk avoids impacts to migratory birds during the breeding season by generally scheduling SPGM removal and construction activities during the late summer and fall time periods. NDAC 69-05.2-13-08. (GAW)

### **Section 2.4.3 – Wildlife Monitoring Plan**

59. A sentence in the fourth paragraph on page 1 indicates that an Annual Wildlife Report will be written and submitted to the PSC by February 15 of every year. NDAC 69-05.2-13-08 (1) requires the results of the monitoring plan be submitted by March 15 in even numbered years. Please review and correct if Falkirk does not intend to submit the results annually. (GAW)
60. The Wildlife Monitoring Plan includes narratives about pre-mine baseline study plots, page 3, and pre-mine wetlands and there is language on page 4 that indicate that studies will continue within the described plots. However, many of these pre-mine study plots and wetlands have been mined through. Please revise the plan to further clarify how these study plots and the 4<sup>th</sup> Addition study plots will be used in the annual monitoring plan. The language discussing the native grassland/wetland study plot is outdated in that the native grassland in the NE¼ of Section 36 is not the only native grassland in the permit area. Please review and edit to provide clarity. NDAC 69-05.2-05.02(1). (GAW)
61. Please update Table 1 to indicate that Sprague's Pipit has been listed as a candidate species to the Threatened and Endangered Species List, and update the monitoring plan to specifically state that annual surveys will be conducted on undisturbed and reclaimed lands to determine the presence of this species. (GAW)

### **Section 2.6.1 – Surface Water Hydrologic Conditions**

62. Narrative in the second paragraph on page 1 describes the permit area as being drained mostly by ephemeral streams and an intermittent stream. Subsequent narrative in the same section describes at least two intermittent streams within the permit area. Also based on the definition of "intermittent stream" under NDAC 69-05.2-01-02(60) it appears portions of streams identified as ephemeral may be intermittent due to spring discharges. Please review and revise the narrative accordingly. (BEB)
63. The third paragraph narrative describes Missouri River Watersheds C, D, E, and F as all draining into the Missouri River via a series of ephemeral streams. Please preface the narrative in this section by describing Falkirk's methodology for determining stream flow classification in areas where surface water monitoring stations have not been installed. (BEB)
64. Please update the third paragraph on page one to state that the permit area is now divided into seven major watersheds. Please also update the relative location of watersheds in the expanded permit area, e.g., the Coal Lake Coulee Watershed now encompasses the northeast portion, Watershed A the southeast portion, and Watershed B the south portion. (WTG & BEB)

65. Please review the range of subwatershed acreages for Missouri River Watershed E described on page 2 of Section 2.6.1, Surface Water Hydrologic Conditions. It appears that the smallest watershed is 83 acres, rather than 53 acres. Please review and correct as necessary. Please also correct the apparent misplaced wording in the second sentence of the same paragraph (“*with flat no well-defined channels*”) (WTG)

### **Section 2.6.3 – Surface Water Quality Data**

66. Please change the title name of Section 2.6.3 from “Surface Water Quality Data” to “Surface Water Quality and Flow Data” to more accurately describe the content of the section. (BEB)
67. Surface Water Monitoring Stations Flow Data in Section 2.6.3 that is provided for monitoring sites associated with the 4<sup>th</sup> Addition (Monitoring Sites 13-18) provides only limited data needed to assess seasonal variation of stream flow characteristics. It was noted that data transducers were deployed for the 2008, 2009, and 2010 monitoring years and appropriately scaled time-series graphs of flow data collected from the transducers during the months of operation for those years need to be incorporated into the permit. (Software available with Solinst level-loggers provides several methods of data recording and reporting.) The submittal of continuous hydrographs during periods of operation is being requested in determination of permit baseline information. NDAC 69-05.2-16-05(1). (BEB)
68. The first paragraph of Section 2.6.3 implies that all of the Permit NAFK-9503 monitoring sites are shown on Section 2.6.4, Surface Water Features and Monitoring Sites Map, but monitoring Sites 7 and 8 have been intentionally omitted. Please add a statement to the second paragraph to explain that these monitoring sites are depicted on Section 2.6.4, Surface Water Features and Monitoring Sites Map, in Permit NAFK-8705. (WTG)
69. Please make the following changes and corrections to the table of pre-mining surface water monitoring stations that begins on page 3 of Section 2.6.3, Surface Water Quality Data:
- a. Use your choice of notation to indicate that the locations of Station Numbers 7 and 8 are shown on Section 2.6.4, Surface Water Features and Monitoring Sites Map in Permit NAFK-8705;
  - b. Correct the township number to read **144N** for Station Number 19 because it appears that 145N is erroneous;
  - c. Correct the township number to read **144N** for Station Number 20 because it appears that 145N is erroneous;
  - d. Correct the township number to read **144N** for Station Number 23 because it appears that 145N is erroneous;
  - e. Correct the township number to read **144N** for Station Number 24 because it appears that 145N is erroneous;
  - f. Correct the section quarter/quarter to read **NE¼NE¼** for Station Number 25 because it appears that NW¼NE¼ is erroneous;
  - g. Correct the township number to read **144N** for Station Number 27 because it appears that 146N is erroneous;

- h. Correct the township numbers to read **145N, R83W** for Station Number 31 because it appears that 144N, R84W is erroneous;
  - i. Correct the section quarter/quarter to read **NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>** for Station Number 32 because it appears that NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> is erroneous;
  - j. Correct the section quarter/quarter to read **NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub>** for Station Number 33 because it appears that NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> is erroneous;
  - k. Correct the section quarter/quarter to read **SW<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub>** for Station Number 34 because it appears that SE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> is erroneous;
  - l. Correct the section quarter/quarter to read **SE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>** for Station Number 39 because it appears that SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> is erroneous;
  - m. Correct the section quarter/quarter to read **NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>** for Station Number 46 because it appears that NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> is erroneous;
  - n. Correct the section quarter/quarter to read **W<sup>1</sup>/<sub>2</sub>NW<sup>1</sup>/<sub>4</sub>** for Station Number 47 because it appears that W<sup>1</sup>/<sub>2</sub>NE<sup>1</sup>/<sub>4</sub> is erroneous and correct the township number to read **144N** for Station Number 47 because it appears that 145N is erroneous;
  - o. Correct the section quarter/quarter to read **NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>** for Station Number 61 because it appears that NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> is erroneous; and,
  - p. Correct the section quarter/quarter to read **NW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>** for Station Number 62 because it appears that NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> is erroneous. (WTG)
70. Please create the hyperlinks to the photographs and water quality sampling data for the table of pre-mining stockpond assessments in Section 2.6.3, Surface Water Quality Data. The Designation column for the table heading indicates that a hyperlink should exist for each stockpond listing. Alternatively, you can remove the “click to see photo” remark from the Designation column because the reader is referred directly to Section 2.6.3a Stockpond Water Quality Data elsewhere in the last paragraph of page 2 of Section 2.6.3, Surface Water Quality Data. (WTG)
71. Please add the complete record for stockpond DWR-SW-32-1(146-83) to the table of pre-mining stockpond assessments because it appears that it has been omitted. The photograph and water quality sampling data (one sample date) for the stockpond is included in Section 2.6.3a, Stockpond Water Quality Data. (WTG)

### **Section 2.6.3a – Stockpond Water Quality Data**

- 72. Please place the water quality sampling data in chronological order for DWR-NW-6-1 (145-83). The 7/27/08 data is out of order at the end. (WTG)
- 73. Please rearrange the photograph for DWR-SE-11-1 (144-84) so that it follows (rather than leads) the water quality sampling data for DWR-NW-11-1 (144-84). (WTG)
- 74. Please place the water quality sampling data in chronological order for DWR-NE-19-1 (145-83). The 7/27/08 data is out of order at the end. (WTG)

75. It does not appear that the water quality sampling data for the 4/18/08 sampling date of DWR-SE-31-1 (146-83) is included in Section 2.6.3a, Stockpond Water Quality Data, even though it is listed in the table of pre-mining stockpond assessments in Section 2.6.3, Surface Water Quality Data. Please review and correct as necessary. (WTG)

#### **Section 2.6.4 – Surface Water Features and Monitoring Map**

76. Please label all seven major watersheds on Section 2.6.4, Surface Water Features and Monitoring Sites Map (only four are currently labeled). (WTG & BEB)
77. As required by NDAC 69-05.2-08-07-1(b) and (c), please add the water features including the location of all ephemeral, intermittent, and perennial streams to Section 2.6.4, Surface Water Features and Monitoring Sites Map. Some of these water features (water/creek and swamp/marsh land) are shown elsewhere in the permit on Section 4.2.6a, Pre-Mining Contour Map. (WTG & BEB)
78. Please correct the township number labeling for Station Number 32 DWR-SW-29-1, Station Number 33 DWR-SW-29-2, Station Number 34 DWR-SE-31-1, and Station Number 36 DWR-SW-32-1 on Section 2.6.4, Surface Water Features and Monitoring Sites Map, to read (146-83) because it appears that (145-83) is erroneous. (WTG)

#### **Section 2.6.5 – Surface Water Probable Hydrologic Consequences**

79. The hyperlinks to other text documents in this section do not appear to function, but the links to maps appear to function. Please review and correct as necessary. (BEB & WTG)
80. Please reference a map that depicts the location of intermittent streams in the narrative on pages 1 and 2 of Section 2.6.5. (WTG)
81. Please define the criteria used to assign moderate or slight changes to subwatersheds at the designated control points in the first paragraph on page 10 of Section 2.6.5, Surface Water Probable Hydrologic Consequences. It appears that the only criteria used to assign moderate changes to seven subwatersheds was watershed area change of more than 25 percent, although peak discharge and runoff volume changes should also be considered in the evaluation. Using a similar percentage change criteria for peak discharge and runoff volume, there are additional subwatersheds that would have moderate changes, as shown in Tables 1 and 2 of Section 2.6.5c, Surface Water Probable Hydrologic Consequences Data. As required by NDAC 69-05.2-08-04(4), please address whether adverse impacts occur to the hydrologic balance, specifically what impact the moderate watershed changes will have on flooding and surface water availability, downstream of the control points. The watershed modeled for control point R12, for example, indicates a 20 percent increase in peak discharge and a 40 percent decrease in runoff volume (10 year/24 hour). It does not appear that adverse impacts to water availability would occur downstream of this location because the stream empties onto nearly level upland cropland where the runoff infiltrates into soils formed in eolian sand. It is unclear, however, what effect the increased peak discharge may have on a culvert located under a road and possible erosion in the sandy cropland. In another example, the watershed modeled for control point 32

indicates a 45 percent increase in peak discharge (a major change) and a 26 percent increase in runoff volume (10 year/24 hour). An adverse impact to the hydrologic balance may occur as the stream flows under a road that serves farm buildings before the stream empties onto nearly level cropland where the runoff infiltrates soils formed in medium-textured alluvium. Please address potential adverse impacts to the hydrologic balance including cropland erosion potential at all control points where watershed modeling indicates moderate to major changes to watershed area, peak discharge, or runoff volume. If the proposed PHC indicates significant changes to peak discharges or flow volumes for a watershed, Falkirk must explore options to minimize changes to the pre-mine hydrologic balance. (WTG)

82. Please add the corresponding control points in parenthesis to each paragraph describing subwatershed changes on pages 10 and 11 of Section 2.6.5. In the current format, the reader must refer back to the first paragraph on page 10 to find the control point number that identifies the watershed in Tables 1 and 2 of Section 2.6.5c, Surface Water Probable Hydrologic Consequences Data. (WTG)
83. Information regarding springs is provided in at least three major sections of the permit (Ground Water, Surface Water, and Wetlands), with each section providing different spring information. For example, the Water Supply Well and Spring Information Table of Section 2.2.14 provides information concerning probable impacts of mining on 4 springs; however, there are a total of 34 springs/spring zones that have been identified within the permit area on the Surface Water Features and Monitoring Sites Map, Section 2.6.4. In addition, there are a total of 30 springs that have been accounted for in the Pre-Mining Springs Plant Species Identification Forms of Section 5.1.1c; and water quality data has been provided for 22 springs in Section 5.1.1d, yet the Well and Spring Certification Field Data Forms in Section 2.2.15 provide spring certification data for only 3 springs permit-wide. Due to the large number of springs identified within the 4th Addition Area, Falkirk needs to provide a more comprehensive overview or centralized arrangement of all information regarding springs including narrative describing the selection criteria utilized in determining which springs were certified and which were not. Flow data, or even estimated flow data for all identified springs (including all undeveloped springs) for which water quality information has been provided in Section 5.1.1d needs to be provided in the permit. Also, the ground water PHC in Section 2.2.5 must discuss the impacts of mining on all springs, not just the developed springs as discussed on page 10 of Section 2.2.5. Please address the above noted discrepancies concerning the disparity of spring information between the various sections, provide the requested spring flow data, and attempt to consistently unify or incorporate all spring related data and information into as few sections of the permit as possible. NDAC 69-05.2-08-07(2). (BEB)

**Sections 2.6.5a & 2.6.5b – Pre & Post-Mining Watershed Map Probable Hydrologic Consequences**

84. Please label all seven major watersheds on Sections 2.6.5a and 2.6.5b, Pre-Mining Watershed Map Probable Hydrologic Consequences and Post-Mining Watershed Map Probable Hydrologic Consequences . (WTG & BEB)

85. It appears that the acreage labels are absent for some subwatersheds in Missouri River Watersheds B and D on Section 2.6.5a - Pre-Mining Watershed Map Probable Hydrologic Consequences. Please review and correct as necessary. (WTG)
86. Please consider using color or black to identify the terrain modification boundary on Section 2.6.5a, Pre-Mining Watershed Map Probable Hydrologic Consequences, and Section 2.6.5b, Post-Mining Watershed Map Probable Hydrologic Consequences. As currently displayed, the gray boundary is very difficult to identify against the gray topographic contour lines. It may be beneficial to modify the line type as well to make the boundary more prominent. (WTG)

### **Section 2.6.7 – Surface Water Monitoring Plan**

87. Missouri River Watershed B located within the southern portion of the permit area has been instrumented with 2 surface water monitoring stations (MS-10R and MS-11R) prior to Revision No. 20; and both are located on upstream low order tributary drainages to the major surface water drainage feature that is central to, and controlling the drainage characteristics of the entire watershed. While the two monitoring stations appear positioned to provide some baseline information for ephemeral flow and water quality of up-gradient tributary channels during limited times and duration of flow, a down-gradient monitoring station of the intermittent stream needs to be installed to record quantity and quality of discharges from the permit area associated with proposed mining activities in the 4<sup>th</sup> Addition Area. In order to comply with the requirements of NDAC 69-05.2-16-05(1)(a)(1), it appears that a surface water monitoring station and the resultant permit baseline information generated from the monitoring site needs to be established off-permit in the SE $\frac{1}{4}$ SE $\frac{1}{4}$  of Section 8, T144N, R83W or further downstream. Surface water monitoring at this location will provide combined down-gradient coverage for both monitoring stations MS-10R and MS-11R. Additional surface water monitoring coverage will be required even further downstream for the proposed 5<sup>th</sup> Addition to Riverdale in the future. For now, Falkirk needs to address the lack of surface water monitoring information of this major watershed drainage system. (BEB & WTG)
88. A total of 13 springs, 12 developed water resources and a couple of wetlands have been identified within the major watershed west of Missouri River Watershed B (assumed to be Missouri River Watershed D) encompassing approximately 2,500 acres within the 4<sup>th</sup> Addition Area. We have noted there are no surface water monitoring stations for the several drainageways within or adjacent to the proposed permit area associated with these features that terminate in the Missouri River floodplain in Sections 10, 11, 13, and 14, T144N, R84W. Additionally, one of the major upland drainages within the permit with separate reaches that span through Sections 31 and 32, T145N, R83W that confluence in the NW $\frac{1}{4}$  of Section 3, T144N, R84W and continuing to its termination in the Missouri River Floodplain in the S $\frac{1}{2}$  of Section 4, T144N, R84W has no surface water monitoring stations associated with this major permit drainageway either. In consideration of the amount of springs that have been identified within these drainageways and limited spring flow data available in the permit, it seems logical to conclude that some of the stream channels may support intermittent flow. To comply with the requirements of NDAC 69-05.2-16-05-1(a)(1) it appears that surface water monitoring stations are needed within or

along the stream channel in the NW¼ of Section 3, T144N, R84W for the major northeast-southwest trending drainage, and consideration given to at least portions of the other drainageway locations mentioned above. Justification is requested for not installing surface water monitoring stations at the above noted locations. Without proper justification, it appears Falkirk must install additional surface water data collection points and submit the required baseline data for those areas discussed. (BEB & WTG)

### **Section 2.7.1 – Pre-Mining Land Use and Vegetation Narrative**

89. A sentence in the first paragraph on page 1 lists the land uses and mentions that baseline vegetation data is presented in Appendix IV through VI. However, woodland is not mentioned as a land use and baseline sampling data is in Attachment VII. Please update this sentence accordingly. (GAW)
90. In the narrative on page 13 and at the beginning of Appendix V, please reference all of the maps that show the location of the proposed native grassland reference areas. (GAW)
91. Please discuss how low shrubs not associated with tall shrubs or trees were dealt with for the purposes of land use classification, i.e., clarify that low shrubs not associated with tall shrubs or trees were considered native grassland. (GAW)
92. Please discuss the nature and variability of the vegetation associated with linear seasonal wetland types in the Pre-Mining Land Use and Vegetation Narrative per NDAC 69-05.2-08-08 (1)(d). There is essentially no discussion of linear wetlands in the temporary, seasonal and semi-permanent wetland narratives. The seasonal wetland narrative on page 9 continues to state that nearly all of the sampled wetlands exhibit strongly fresh water salinity characteristics but Table 3, of Section 5.1.1 indicates that the linear wetlands tend to be brackish. (GAW)
93. Within Appendix I, Pre-Mining Land Management Information, on pages 24 through 39, there are only 4 tracts of land owned by Falkirk mentioned (pages 26 and 28). Please update this discussion to include all of the Falkirk-owned lands in the 4<sup>th</sup> Addition. NDAC 69-05.2-08-08. (SAS)
94. Within Appendix II, Table 1, in Section 2.7.3, the following discrepancies were noted:
  - a. Page 44 indicates the surface owners are Leslie and Ruby Landenberger, but Section 1.5.1 indicates this tract is owned by Falkirk.
  - b. Page 125 (Tract 109) lists both Eleanor Sheldon and Kay Hegvik as owners which differs from Section 1.5.1.
  - c. Page 132 (Tract 98) lists George W. Swanson, Life Estate, as surface owner which differs from Section 1.5.1.
  - d. Page 133 lists Stephen P. Swanson as the surface owner of Tract 99, but Section 1.5.1 also lists Mark Swanson and Pamela L. Hopkins as 50% owners of this tract. If that is the case, Tract 99 should be separated from the other three tracts that are owned solely by Stephen Swanson.
  - e. Data for Tract 175A that is owned by Falkirk is not included in this appendix. We are uncertain if it may have been included with Falkirk-owned tracts on page

94 but not listed. Please clarify to ensure that the acreage within this tract is accounted for. (SAS)

95. Please include Ecological Site Descriptions for all of the ecological sites found within the permit area. Table 2 of Appendix II indicates that Loamy Overflow, Clayey, Shallow to Gravel, Saline Lowland, Wet Meadow, Claypan, Subirrigated and Loamy Subirrigated ecological sites are present on native grasslands within the proposed addition area and productivity values for these sites are needed for compliance with NDAC 69-08-08(1)(c)(2). (GAW)
96. The title page for Appendix IV mentions "...Specified Drops..." which this reviewer assumes should be "...Specified Crops..." Please correct. (SAS)
97. The second sentence on second page of Appendix V (page 362) states that information for each ecological site found within the permit can be found in Section 2.7.1. The new language in the narrative discussing the native grasslands in Section 2.7.1 contains this same statement, but only some general language is included in Section 2.7.1. It appears that these sentences should reference Appendix V of Section 2.7.3 rather than Section 2.7.1. (GAW)
98. A sentence in the Similarity Index Methodology narrative on page 363 of Appendix V states that 3 plots within each stop were clipped by species and weighed. Please clarify if a single stop or a number of stops were made near the sampling points identified on the Pre-Mining Land Use and Associated Mapping Units Map, Section 2.7.2a, and indicate the size of the clipped plot. Although all of the Rangeland Similarity Index Forms indicate that all plots were clipped, discuss if any double sampling estimates were used in conjunction with clipping to determine estimates since this is allowed using NRCS protocol. (GAW)
99. The last two sentences on page 363 of Appendix V state that similarity index scores in one tract can be used across multiple tracts if similar conditions exist and that this was the case for this permit addition area. Please then clarify if any of the Similarity Index Sheets in Appendix V also represent areas other than where actual sampling was conducted. (GAW)
100. A sentence in the second paragraph on page 363 of Appendix V indicates that "qualitative assessments" of the native grasslands are included in the permit but it is not clear where this qualitative assessment information is located within the permit. Please review and clarify. (GAW)
101. Please include the Forage Production Clipping Worksheets, CPA-33, used to determine the rangeland similarity index values for the proposed native grassland reference areas. This is needed to document the number of samples taken, percent dry matter values used, plot or frame size, species growth curve adjustment factors and grazing adjustment factors used. (GAW)

102. In Appendix V include a narrative discussing the variability of the native grassland vegetation within the Riverdale 4th Addition Area. In other words, evaluate the results of the sampled ecological sites and discuss if the plant communities observed are similar to any of the plant communities illustrated as being common in the Ecological Site Descriptions. NDAC 69-05.2-08-08(1)(d). (GAW)
103. Please include a narrative in Appendix V that evaluates the species composition of the proposed native grassland reference areas and discuss if the plant communities are similar to the plant communities within the permit area and plant communities considered common to the ecological site. The estimated yield values of the reference areas should be compared to expected average annual yields for the ecological site with consideration given to the amount of precipitation during the years sampling was conducted. NDAC 69-05.2-08-08(2). (GAW)
104. Cover data for the NE¼ of Section 19 is included for Thin Sands and Sands ecological sites and is labeled as proposed native grassland reference areas, but the proposed reference area in Section 19 is located in the NW¼ of Section 19. Please review and correct as necessary. (GAW)
105. Similarity index information for a Loamy ecological site is included in Appendix V for Tract 91, but the sampling point is located on a transition zone between a Shallow Loamy and Clayey site. Please review and correct as necessary. (GAW)
106. Similarity index data for Tracts 97, Thin Loamy, and 118 – Loamy (Idle) are included in Appendix V but the samples were taken on areas listed as cropland – hayland. Please review and correct these errors. Areas not previously tilled should not be classified as cropland – hayland. (GAW)
107. Similarity index data for Tract 142, Sandy, is included in Appendix V but the area is classified as CRP cropland on the Pre-Mining Land Use Map. Please review and correct as necessary. (GAW)
108. The sample location for Tract 103 – Ly (North) similarity index is shown on the Pre-Mining Land Use and Associated Mapping Units Map, Section 2.7.2a, on a Thin Loamy site rather than a Loamy site. Please review and correct as necessary. (GAW)
109. Please identify on the Pre-Mining Land Use and Associated Mapping Units Map, Section 2.7.2, where Tracts 104 and 162 were sampled to obtain the similarity index values. (GAW)
110. Similarity index information for Tract 105 in Appendix V indicates that a Loamy site was sampled in the northern and southern portions of this tract; however, the Pre-Mining Land Use and Associated Mapping Units Map, Section 2.7.2a, shows that Clayey and Thin Loamy sites were sampled. Please review and correct as necessary. (GAW)

111. Similarity index sampling data is included for Tract 117 (Ly); however, this tract does not contain any native grassland. It may be possible that the tract numbers were changed and this data is for Tract 116 rather than 117. Please review and correct as necessary. (GAW)
112. Similarity index sampling data for two Loamy sites on Tract 151 are provided in Appendix V, but the sample points on the Pre-Mining Land Use and Associated Mapping Units Map, Section 2.7.2a, would indicate that the ecological sites are Clayey and Shallow Loamy rather than Loamy. Please review and correct as necessary. The Loamy site with 24% western wheatgrass is most likely a Clayey site. (GAW)
113. A similarity index for a Loamy site on Tract 152 (NE¼ of Section 1, T145N, R84W), is included in Appendix V, but that ecological site type is not listed on the Pre-Mining Land Use and Associated Mapping Units Map, Section 2.7.2a, where this sample was taken. Please review and clarify as appropriate. (GAW)
114. The Pre-Mining Land Use and Associated Mapping Units Map, Section 2.7.2a, indicates that a Thin Sands site was sampled in Tract 157, but all three similarity index forms for this tract are for Sandy sites. Please review and update as necessary. (GAW)
115. It appears that the Thin Loamy ecological site listed in Appendix V for Tract 175 is actually for Tract 175A rather than 175. Please review and correct if necessary. (GAW)
116. In the Revision 20 woodland narrative in Appendix 2.7.3, Appendix VII, please discuss how low shrubs not associated tall shrubs or trees were dealt with for the purpose of land use classification, i.e., clarify that low shrubs not associated with tall shrubs or trees were considered native grassland. (GAW)
117. The first sentence on page 2 of Appendix VII states that Falkirk will reclaim woodlands to meet or exceed pre-mine density and diversity standards, but Section 4.1.6 of the permit states that the standards will be developed from the planted mixtures. Please review and revise as necessary. (GAW)
118. Woodland sampling data is listed in Appendix VII for Tract 158, but woodland land use is not depicted in this tract on the Pre-Mining Land Uses and Associated Mapping Units Map, Section 2-7-2a. Please review and correct as necessary. (GAW)
119. Low shrub and tall shrub data is listed for Tract 148 in Appendix VII, but only one sample site is shown. Please depict the location of both sample sites on the Pre-Mining Land Uses and Associated Mapping Units Map, Section 2-7-2a. (GAW)
120. Two woodland sampling points are depicted in Tract 123 on the Pre-Mining Land Uses and Associated Mapping Units Map, Section 2-7-2, but data for all three woodland types is listed in the tables in Appendix VII. Please review and update as necessary. (GAW)

121. Woodland sample sites are depicted in Tracts T139, T172 and T175 but there is no woodland sampling data associated with these tracts in Appendix VII. Please review and update as necessary. (GAW)
122. Please include the size of each shelterbelt by surface owner as required by Section II-G-2 of the Standards for Evaluation of Revegetation Success and Recommended Procedures for Pre- and Post-Mining Vegetation Assessments. The shelterbelt line drawings and associated scale bar do not always accurately depict the size of the planting. For example, the tree and shelterbelt evaluation form of the shelterbelt located in the SE $\frac{1}{4}$  of Section 2, T144N, R84W, includes a drawing of the shelterbelt that indicates the shelterbelt is less than 1 acre in size; however, the shelterbelt appears to be about 6 acres in size based on aerial photography. The shelterbelt located in the SE $\frac{1}{4}$  of Section 12 is identified as being about 600 feet long on the drawing but the Land Use Map indicates that it is nearly 2,200 feet long. Likewise, the field windbreaks in the NE $\frac{1}{4}$  of Section 12, T145N, R84W are shown to be about 400 feet long, but they are actually about 1,800 feet in length. Please review the scale bars associated with the drawings of each planting and include the accurate size of each shelterbelt. NDAC 69-05.2-08-08-(1)(c)(1). (GAW)
123. The tree and shelterbelt evaluation form for the shelterbelt located in the NW $\frac{1}{4}$  and part of the SW $\frac{1}{4}$  of Section 2, T144N, R84W, states that Forrest W. and Alyce F. Ecklund are the surface owners. However, the Surface Ownership Map indicates that Stephen Swanson owns the NW $\frac{1}{4}$  of Section 2 (Tract 101). The Land Use Map indicates that these shelterbelts are located in the SW $\frac{1}{4}$  of Section 2. Please review and update the shelterbelt evaluation form to provide clarity. (GAW)
124. The tree and shelterbelt evaluation form for the shelterbelt located in the SW $\frac{1}{4}$  of Section 7, T144N, T83W indicates that Area 7 consists of 7-rows of dead and dying Chinese elm, but 2010 aerial photography indicates that these rows may have been removed. Please review and update if necessary. (GAW)
125. Please review the tree and shelterbelt evaluation form for the shelterbelt located in the NE $\frac{1}{4}$  of Section 5, T145N, R83W. It appears that this shelterbelt is partially located in the NW $\frac{1}{4}$  of Section 5 and the scale bar does not accurately portray the size of this planting. (GAW)
126. The tree and shelterbelt evaluation bookmark for the shelterbelt located in the north part of the SE $\frac{1}{4}$  of Section 23, T145N, R83W (Mann, Crum and Tollerud) is identified on the evaluation sheet as being in the north part of the SE $\frac{1}{4}$  of Section 32, T145N, R83W. It appears that the location on the bookmark is incorrect as the SE $\frac{1}{4}$  of Section 23, T145N, R83W is not within the 4<sup>th</sup> Addition Area. Please correct the bookmark as necessary. (GAW)
127. A shelterbelt evaluation form is included for a shelterbelt located in the SE $\frac{1}{4}$  of Section 32, T146N, R83W, but this shelterbelt appears to be outside of the permit boundary (associated with the farmstead that is not being permitted). Please clarify if any portion of this shelterbelt is in the proposed addition area. (GAW)

**Section 2.7.2 – Pre-Mining Land Use Maps**

128. Please depict and label the shelterbelt (Area 16) located on the section line between the SW $\frac{1}{4}$  of Section 7, T144N, R83W and the SE $\frac{1}{4}$  of Section 12, T144N, R84W on the map. (GAW)
129. The shelterbelt(s) depicted in the NE $\frac{1}{4}$  of Section 2, T144N, R84W on the map does not match the line drawings of the shelterbelts in Appendix VI, page 685. Please review and revise so the information is consistent and correct. (GAW)
130. Please clearly depict the shelterbelts located along the west edge of the NW $\frac{1}{4}$  and SW $\frac{1}{4}$  of Section 4, T145N, R83W on the map. (GAW)
131. Please clearly depict the shelterbelts located in the southwest corner of the SE $\frac{1}{4}$  of Section 16, T145N, R83W, on the map. (GAW)
132. Please depict and label the shelterbelts located in the NW $\frac{1}{4}$  of Section 20, T143N, R83W on the map. (GAW)
133. The section line trails and county roads are hard to distinguish. Please modify the legend to more clearly depict these features. (MSK)

**Section 2.7.2a – Pre-Mining Land Use and Associated Mapping Units**

134. Please depict and label the woodland mapping units or woodland types, i.e., trees, tall shrubs and low shrubs as required by NDAC 69-05.2-08-08(1)(a)(4). (GAW)
135. The map shows a woodland sampling site in the NE $\frac{1}{4}$  of Section 19, T145N, R83W (T139), but woody species density data is not included for this sample site in Appendix VII. Please review and include this sample site in the density tables in Appendix VII or explain why only cover data was collected. (GAW)
136. Please include the ecological sites in the legend of the Pre-Mining Land Use and Associated Mapping Units Map. (GAW)
137. The native grassland and woodland sampling data is organized by tract numbers but tract numbers are not listed on the map. Please include legal descriptions with the sampling data or depict the tract numbers on the map. NDAC 69-05.2-05.2. (GAW)
138. Two rangeland similarity index forms are included for Tract 88 in Appendix V, but only one sampling point can be found on this tract on the map. Conversely, two sample points are shown for Tract 90, but data for only the Loamy site is included. Please review and correct as necessary. The first similarity index for Tract 88 (TLy-idle) may actually be located in Tract 90. (GAW)

139. Please depict the sampling location for the native grassland in T172, NE¼ of Section 36, T146N, R84W on the native grassland rather than the cropland –hayland area and label the ecological sites on the map. (GAW)
140. Please revise the reference area location maps, Sections 2.7.2d-g, to show the reference area location (limited to a few acres in size) and identify the soil mapping unit of the specific area being proposed for use as a native grassland reference area. If the reference area is larger than a few acres in size, show the location where the site was sampled. The Revegetation Success Standards document limits the ecological site to a specific soil mapping unit. NDAC 69-05.2-08-08-(2)(b). (GAW)

### **Section 2.8.1 – Soils and Prime Farmland Narrative**

141. Page 5 near the bottom of the first paragraph mentions a “...Section 3.5 of the soil reports...” which cannot be located in Section 2.8.2. Is this citation correct? (SAS)
142. Please add the phrase “in red” following “highlighted” on page 1 to inform the reader that the described changes to the soil survey report for the 4th Addition are shown in red. (WTG)
143. The hyperlink to Section 2.8.2b, Prime Farmland Map, in the first paragraph of page 5 does not appear to function properly. Please review and correct as necessary. (WTG)
144. Please add Table 1C (Mixing Percentages Between Prime and Non-Prime Topsoil by Soil Series for each Landowner Within the Riverdale Fourth Addition of the NAFK-9503 Permit) starting on page 15, as indicated on page 8 of the narrative. (WTG)

### **Section 2.8.2 – Soil Survey Reports**

145. Please make the following corrections to Table 1 on page 1: (a) add “(W½SW¼)” after Section 7 in the T145N, R82W column to indicate that the W½SW¼ is within the permit boundary (this method of notation is used elsewhere in the table to indicate a parcel is within the permit boundary); (b) correct the description in red for Section 10 of the T144N, R84W column to read E½ rather than W½ because it does not appear that any of the W½ of Section 10 was mapped; and, (c) correct (NE4) in the description for Section 10 of the T144N, R84W column to read (NE¼). (WTG)
146. For clarity, please add a footnote on page 1 that refers the reader to page 1 of Section 2.8.1, Soils and Prime Farmland Narrative, for an explanation of the red highlights. (WTG)
147. Please insert “**Table 4a Soil Volumes Page 14**” in the List of Tables on page 3 in the Table of Contents. (WTG)
148. Following the sentence “*KDK Consulting was responsible for determining the areal extent of each map unit and calculating the volume of SPGM by parcel or other appropriate land unit.*” on page 8, please add the phrase “**as shown in Table 4a on page**

14". As currently presented, there does not appear to be a reference to Table 4a in the narrative. (WTG)

149. Please add an acreage total (16,924.1) following the last entry to Table 4a to indicate that the permit acres column total matches that of acreage added with Revision 20. (WTG)

#### **Section 2.8.2a – Soil Survey Maps**

150. Please update all three sheets of the Soil Survey Map to depict the entire Revision 20 NAFK-9503 boundary. In their current form, the maps only depict a partial boundary of the acreage added with Revision 20. Please also label the permit boundary at several locations because the legend is dedicated to soil survey information. (WTG)

151. The soil survey completed by Prairie Soil Consulting, LLC for some of the parcels outside of the Revision 20 permit boundary is depicted on the soil survey maps, but it is not depicted on other parcels. For example, the soil survey completed for Section 30, T145N, R83W is depicted, but the soil survey completed for the SW¼ of Section 30, T146, R83W is not depicted. At your discretion, please either depict all of the soil survey results completed by Prairie Soil Consulting, LLC, or limit its depiction to only the parcels within the permit boundary. The inconsistencies become apparent when comparing the parcels highlighted in red in Table 1 of the soil survey report to the soil survey depicted in Section 2.8.2a. (WTG)

#### **Section 2.8.2b – Prime Farmland Map**

152. About 13 acres of soil map unit FaB - Falkirk Loam 3 to 6 percent slopes in the W½NW¼ of Section 33 is not defined as prime farmland. The land use is cropland, however, adjacent acreage added with Revision 20 mapped as FaB in the S½ of Section 33 and the E½ of Section 32 is defined as prime farmland. Please review and correct the map and related sections of the permit as necessary. (WTG)

#### **Section 2.8.3 – Drill Hole Location, Overburden Characteristics and Projected Respread Depth Map**

153. Please consider using a more vivid color scheme to make it easier to identify the various mining areas; two of the yellow hues are particularly hard to distinguish. Please also consider using a fill pattern rather than slight color changes to identify areas where mining is complete. (WTG)

154. A 36 inch SPGM respread depth is proposed for the location of drill hole RD08153C in Section 1 of T144N, R84W, but it appears that 48 inches of SPGM respread depth is required at this location because SAR values of greater than 20 occur in more than 20 percent of the overburden thickness (14 of 54 feet). Please review and correct as necessary. (WTG)

155. A 36 inch SPGM respread depth is proposed for the location of drill hole RD03183C in Section 18 of T145N, R83W, but it appears that 48 inches of SPGM respread depth is required at this location because SAR values of greater than 20 occur in more than 20 percent of the overburden thickness (48 of 108 feet). Please review and correct as necessary. (WTG)

### **Section 3.1.1 – Operations Description**

156. Please add to the abandoned mines narrative on page 2 of Section 3.1.1 to state that Falkirk did not find any evidence of the existence of abandoned underground or surface mines, assuming that is the case. NDAC 69-05.2-08-02(1)(j) & (k) requires the submission of permit information regarding both abandoned underground and surface mines, and if none are present that should be stated for the record in the permit. (BEB)
157. The last paragraph of Section 3.1.1 states that the federal coal within the 4<sup>th</sup> Addition Area will not be mined until the second or third term of the permit. The second term of this permit is about to expire and the third term is about to start. Please update to indicate when the federal coal will be mined (it may be easier to indicate the approximate years that mining of federal coal will begin). (DKM)

### **Section 3.1.2 – Mining Method Narrative**

158. In the second paragraph where the sections are listed, please make the following corrections:
- q. Remove Section 6 for T145N, R84W.
  - r. Remove the second listing for T145N, R82W since it is the first area listed.
  - s. Change Sections 29, 30, 31, and 32 to T146N, R83W, rather than T146N, R84W. (SAS)

### **Section 3.1.5 – Pit Layout and Facilities Map**

159. The Pit Layout and Facilities Map, Section 3.1.5, shows a SPGM storage area affecting a portion of a wetland in the NE¼ of Section 2, T145N, R84W. Please revise the map to show that the SPGM storage pile will not be affecting this wetland in accordance with NDAC 69-05.2-13-08(6)(a). (GAW)
160. The Pit Layout and Facilities Map, Section 3.1.5, shows a terrain modification boundary around the areas where mining is planned in all areas except the area to be mined in Sections 31 and 36 of T146N, R83W and T146N, R84W, respectively. In addition, the terrain modification boundary seems excessively large around the small area to be mined in the NE¼ of Section 10, T144N, R84W. Please review and update as necessary. (GAW)
161. As currently depicted on the Pit Layout and Facilities Map, the initial 103 Pits in Sections 35 and 36, T145N, R83W and Section 4, T144N, R83W as being north-south pits; however, recent inspections have indicated that these pits are being angled to

accommodate more efficient operations. Please revise Section 3.1.5 to accurately depict the mine plan for this area. (MSK)

162. Please include the heat enclosure building in the NE¼ of Section 25 on the Pit Layout and Facilities Map. (MSK)
163. Please depict a 500 foot no-disturbance boundary around the occupied farmsteads within the permit area that have not been purchased by Falkirk (farmsteads #22-28 in Section 1.3.6) on Section 3.1.5, Pit Layout and Facilities Map. Also please depict the appropriate setback around the farmstead located just outside the permit area in the southeast corner of Section 32, T146N, R83W and any other farmsteads located within 500 feet of the permit area. There are several unoccupied farmsteads within the area being added to the permit and they are labeled as “unoccupied farm buildings on Section 3.2.2, Existing Structures Map. Falkirk needs to make a determination if any of these buildings are still in use and if so, a 500 foot setback needs to be depicted around these farm buildings on Section 3.1.5 or provide waivers from the surface owners (NDAC 69-05.2-09-01(5)). Also, any significant cultural resource sites that will not or have not yet been mitigated should be depicted on Section 3.1.5 with the appropriate buffer zone. (DKM, BEB, & GAW)

### **Section 3.1.6 – Extended Mine Plan Topographic Map of Mine Phases**

164. The Extended Mine Plan Map has wording in the SE¼ of Section 30 and SW¼ of Section 29, T146N, R83W that implies that the 4th Addition Area comprises 18,581.5 acres, which is incorrect. Please review and correct as necessary. (GAW & BEB)

### **Section 3.2.2 – Existing Structures Map**

165. NDAC 69-05.2-08-02(1)(e) requires that the location and current use of all buildings in and within one-half mile of the permit area be shown in detail on a map. Please revise the Existing Structures Map or include other detailed maps to provide information regarding the current use of all buildings as required. The current designation of “occupied” or “unoccupied” does not give any indication if the farm buildings may still be in use even though the dwelling may be unoccupied. The farmstead narratives in Section 1.3.6 of the permit do not provide sufficient information regarding the current use of the buildings. (GAW)
166. The Existing Structures Map indicates that there are buildings in the NE¼ of Section 2, SE¼ of Section 10, SW¼ of Section 11, and SE¼SW¼ of Section 12, T144N, R84W, and the NE¼ of Section 18 and N½ of Section 30, T145N, R83W but these features are not identified as abandoned or occupied farmsteads. In addition, NAIP aerial photography indicates that there are buildings located in the NE¼ of Section 18, T145N, R83W that are not shown on the Existing Structures Map. Please indicate whether these buildings are occupied or abandoned farmsteads. (GAW)

### **Section 3.3.2 – Blasting Map**

167. Several areas (farmsteads) are depicted as unsuitable for blasting; however, it is unknown if they are farmsteads that are occupied or unoccupied. If they are unoccupied, it is unknown if some of the buildings are still in use or if the farmstead is totally abandoned. Also there is an area labeled as farm buildings in Section 7, T145N, R83W, and it is not shown as Falkirk ownership or as unsuitable for blasting. Please update Section 3.3.2 to clarify the status of these buildings. (MSK)
168. Several occupied buildings do not have a distance shown to the nearest location of possible blasting. Please depict the distances for all occupied buildings. (MSK)

### **Section 3.4 – Operations – Air Pollution**

169. Please provide updated climatological data tables in Section 3.4.4 to provide current information. Narrative provided in the same section describes that the data was obtained in 1978 and some of the narrative will need to be revised/updated as well, with the addition of new information. For historical reference purposes, we ask that the original information tables remain in the permit. NDCC 38-14.1-14(1)(p). (BEB)

### **Section 3.5.1 – Transportation Narrative**

170. No plans or narrative are included for the stabilization of the culvert outfalls. Please discuss measures that will be used to stabilize culvert outfalls, since all culverts through the haul road will discharge at rates over 7 ft/s. (MSK)
171. Please clarify where the at-grade crossings will occur and denote their location on the Transportation Facilities Map, Section 3.5.2. (MSK)

### **Section 3.5.21 – Road Relocation and Closing Map**

172. Please identify the segment of county road in the S½ of Section 13, T145N, R84W, which runs through a pit that is scheduled to be mined in 2066-2068 as requiring closure or relocation/straightening at some point in time. (MSK)

### **Section 3.6.1d – Pond and Diversion Construction and Reclamation Schedule**

173. Please update the pond and diversion schedule to list the ponds for which detailed design plans have been already submitted. (MSK)

### **Section 3.6.20 – 3.6.25 Design of Sediment Ponds**

174. Please check the calculations on page 3 for each of the new pond designs included in Revision 20, specifically the Height of Embankment above existing upstream toe calculation. This should equal the spillway elevation (or top of embankment) minus the elevation of the top of the topsoil at its deepest part (for example, Impoundment P-R01-01 would be  $1757-1754 = 3'$ ). (MSK)

175. Since the outflow velocities out of the barrels are above 12 fps, please explain the measures that Falkirk will use to minimize erosion in these outfall areas. Also the slope at some of the outfalls is quite steep, thus some erosion protection measures will be needed in these areas. Please address. (MSK)
176. The Pond R36-04 design plans currently indicate an embankment height of over 20 feet which would characterize this pond as an MSHA impoundment. If this pond meets the MSHA criteria, then the requirements of NDAC 69-05.2-16-09(17) must be met. Alternatively, the pond can be redesigned so that it does not meet the MSHA requirements. (MSK)
177. Please correct the spillway elevation of Sediment Pond P-R36-03 as labeled in Cross Section B-B'. (MSK)

#### **Section 4.1.1 – Post-Mining Land Use Narrative**

178. Please discuss replacing each pre-mine developed water resource (stock ponds and springs), undeveloped water sources (creeks and undeveloped seeps) and wells that are serving as water sources. For example, it appears that the springs or seeps in Sections 7, 17, 18, 20, and SE¼ of Section 33, T145N, R83W and NW¼ of Section 6, T144N, R83W are functioning to supply water to allow the adjacent native grasslands to be grazed but no stock ponds or other water replacement features are shown on the Post-Mine Land Use Map. Likewise, it appears that the farmsteads in the NE¼ of Section 5 and SE¼ of Section 32, T145N, R83W are supplying water for the grassland located nearby but these farmsteads are going to be mined through and not replaced. In addition, water must be provided on tracts of tame pastureland and native grassland in those instances where pre-mine cropland, hayland or CRP is being converted to these land uses. Please review, update, and clarify as necessary. The appropriate discussions also need to be provided in the surface and ground water PHC's. NDAC 69-05.2-16-17 and NDAC 69-05.2-09-13 (1). (GAW)

#### **Section 4.1.2 – Post-Mining Land Use Map**

179. Please revise the Post-Mining Land Use Map to not show any land use changes on lands where Falkirk does not have the necessary leases to mine the coal. We realize that these lands can be permitted for surface disturbances, but given the requirement to minimize disturbances on lands where coal is not removed, we believe it is not appropriate to change the land use on tracts that are not going to be mined or have not been approved for mining. Concerns were identified with the proposed land use changes on the following tracts: not replacing the woodland planting in the S½ of Section 12, T145N, R84W, reclaiming cropland in the NE¼SW¼ of Section 32, T145N, R83W with slopes exceeding 9%, and not minimizing disturbances to woodlands located in the S½ of Section 32, T145N, R84W. (GAW)
180. The cropland/hayland located in the SE¼ of the NW¼ of Section 1, T145N, R84W has areas with 14% slopes. This is too steep for cropland/hayland. Please reduce the slopes to 9% or less or change the land use to permanent grassland. (GAW)

181. Please more clearly label the cropland land use in Sections 2 and 3, T144N, R84W on the Post-Mine Land Use Map. (GAW)
182. Please depict vegetative buffer zones around the wetlands that are going to be constructed in areas surrounded by cropland as indicated in Section 5.2.3, Wetlands Reclamation and Construction Operations. (GAW)

#### **Section 4.1.4 – Landowner’s Post-Mining Preference Statements**

183. Except for the date signed, the preference statements for Section 12, T144N, R84W on pages 86, 90 and 91 are signed by the same person, Kay Hegvik. It appears that only one of the statements is needed. Also, Eleanor Sheldon is listed on the form as a 50% owner but is not listed in either Section 1.5.1 or 1.5.3. Please explain or correct. (SAS)
184. Pages 87 and 106 are the same sheet signed by Brent Jahner. Since page 106 is included with the rest of the pages for Tract 89, it seems prudent to delete page 87. (SAS)
185. Several private surface ownership land preference statements are missing from the lands added in Revision 20. Please discuss Falkirk’s attempts to obtain preference statements from these owners. (SAS)
186. Michael Thyberg requests in his preference statement that the 24.11 acres of cropland and 0.4-acre waterway located in the SW¼ of Section 32, T145N, R83W be reclaimed with native grasses. However, Falkirk is reclaiming about 25 acres of cropland on this tract that contains unleased federal coal. If land use changes are going to be made on areas where the coal is not yet leased, please address the landowners preference statement requests. (GAW)
187. The surface owner of the NW¼ of Section 1, T145N, R84W requested that the volunteer trees on this tract not be replaced but the Post-Mine Land Use Map shows that Falkirk is planning to replace these trees on this tract. Please consider replacing this pre-mine acreage of trees on Falkirk owned property to comply with the surface owner’s request. (GAW)

#### **Section 4.1.5 – Revegetation Procedures and Establishment**

188. Please consider including Indian grass and little bluestem in the standard native grassland seed mixture with seeding rates rather than simply indicating that these species may be seeded depending on availability and topography. In addition, the Reclamation Division would encourage including forbs in the native grassland seed mixture. NDAC 69-05.2-13-05 requires the use of the best technology currently available and native forb species are more available than they have been in the past. The USFWS typically comments that a more diverse native seed mixture should be planted and that native forb species should be included. NDAC 69-05.2-09-11(6) and NDAC 69-05.2-22-01 & -02. (GAW)
189. Please include Woodlands as a bookmark. (GAW)

190. The second sentence in the third paragraph of the Woodland section states that Falkirk will use low and tall shrub planting mixtures to re-establish the acreages of low and tall shrub communities that are affected by mining activities. Please clarify if low and tall shrub plantings will also be used to replace affected deciduous woodland communities. The Reclamation Division recommends developing a single woodland planting mixture that includes trees, tall shrubs and low shrub species. The deciduous woodland community that includes trees, tall and low shrub species is the dominant woodland type on the Riverdale 4th Addition Area. (GAW)

#### **Section 4.2.1 – Reclamation Procedures narrative**

191. The hyperlink to Section 4.1.2 under “Land Use” on page 4 is broken. Please fix. (SAS)
192. Please revise the last paragraph on page 5 of Section 4.2.1, Reclamation Procedures Narrative, and the narrative in Section 4.2.6, Post-Mining Topography Map Generation to explain why Falkirk is showing significant topographic changes on areas where they have not yet secured the necessary coal leases (federal & state coal leases). In addition, Falkirk must provide a commitment to revise the post-mine topography before mining comes within ½ mile of these tracts in event that the necessary leases are not obtained for these tracts or that the tracts are not otherwise mined. NDAC 69-05.2-13-05. (GAW)
193. Please provide the Material Balance Calculations, and include a “Post-Mining Development Map” which shows the cuts & fills and how the Post-Mining Topography is achievable pursuant to NDAC 69-05.2-09-11(3). (MSK)

#### **Section 4.2.4 – Reclamation Costs (Worst Case)**

194. Under Assumptions for Associated Disturbance on page 4, item 11 states that gravel for reconstructed public roads is assumed to be \$16,000/mi. Based on conversations with the McLean County Road Superintendent, he states that \$31,500/mile is the cost that they are incurring for delivered gravel, please update accordingly. (MSK)
195. Under Assumptions for Associated Disturbance, item 12a states that \$40/ton is deducted due to salvage value. Please remove this language. The total removal cost would be 679 tons \* \$250/ton = \$169,750. (MSK)
196. Under Assumptions for Associated Disturbance, item 12c states that no demolition costs were included for the heat enclosure buildings in Section 22 or the building in Section 25; however, the Post-Mine Land Use Map denotes the NE¼ of Section 22 as NG (native grassland) and the NE¼ of Section 25 as CL (cropland). Both areas are depicted on the Worst Case Bond Map, Section 2.4.2b, as being an associated disturbance area. Please include a removal costs for both heat enclosure buildings and the shift change building/parking lot. (MSK)
197. Under Assumptions for Associated Disturbance, item 12d states that bridge removal/rebuilding of Hwy 200 is valued at 350,000. Please break down these costs similar to item 12a for the drive house removal. Include costs of removal, and construction of Hwy 200

(fill, base, roadway, topsoil/seeding, mobilization, temporary bypass, etc.). Please include additional costs under item 12 for the removal of the underpass under Highway 83, in Section 34, T146N, R82W and the removal of the bridge between Sections 5 & 6 in T145N, R82W. (MSK)

198. On pages 7 and 10 of Section 4.2.4, under the Miscellaneous Projects column for the D11 (page 7) or Truck/Shovel fleets (page 10), the material needed to fill and compact the substrate to successfully construct the roadways where the current bridges are located was not included in the costs. Please update accordingly. (MSK)
199. On page 6, only 3 ramps are shown into the 102 Pits. The Pit Layout and Facilities Map (submitted with Revision 27 to NAFK-8405) shows 4 or possibly 5 ramps into these pits. Also the depth of these ramps is stated as being 75-79 feet, which matches the overburden depths in the area; however, it neglects the pre-bench depth of 30+/- feet. Also, all ramp depths on this page are currently calculated to the bottom of the overburden (or top of the first seam), not to the depth of the bottom of the coal that is to be removed (which in some cases also includes interburden). Please revise accordingly. (MSK)
200. On page 11, the length of each pit is provided on the Mining Disturbance table. This length should correspond with the length shown in 4.2.4b. Please revise as needed. (MSK)
201. Several distances in the Worst Case Pit Cross-Sections are different from the values provided in the Reclamation Costs, on page 11 in the Mining Disturbance tables, specifically the push distances associated with the 101 Pit and the 195M Pit. The location of all cross-sections should also be depicted on the Worst Case Bond Map, Section 4.2.4b. Also if only one cross-section per pit is to be used in the calculation of the worst case bond, it must be located at the deepest and widest part of the pit. Several cross-sections at 1,000 foot intervals would also be acceptable in dragline pits while only one average cross-section is needed to verify the material in truck/shovel pits. Please revise as necessary. (MSK)
202. The "P&H Shovel Pit" in Section 13, which is to be mined in 2016, is not included in the worst case calculations and is not depicted on the map in Section 4.2.4b. (MSK)
203. In Section 4.2.4b, Worst Case Bond Map, the "Tavis/Hitachi" Pits in Section 1 will be mined in 2014 and 2015, particularly on the far east edge (currently labeled as the proposed waste disposal area), may be left open to increase the percentage of coal recovered without rehandling material. If that is the case, please note that "pit" would be open in the 4<sup>th</sup> quarter of 2016, and thus be shown in Figure 4.2.4b. (MSK)
204. Please include the updated version of the Worst Case excel file and AutoCAD files with the technical responses. (MSK)
205. Pond R-01-03 is not shown as an associated disturbance area on Section 4.2.4b, Worst Case Bond Map. Please update the map. (MSK)

#### **Section 4.2.6A – Pre-Mine Contour Map**

206. A pre-mine wetland is located in the SW¼ of Section 10, T145N, R83W; however, it is neglected on the Post-Mine Contour Map in Section 4.2.6B. Also, the wetland design was not included in Section 5.0. Please correct the appropriate maps, narratives, and tables as necessary. (MSK)

#### **Section 4.2.6B – Post-Mine Contour Map**

207. Several areas contain very long (more than ½ mile) slopes, without any secondary drainages depicted. This was specifically noted in Section 36, T146N, R84W. Please add secondary drainages to conform closer to the approximate original contour and to break up the long, erosive slopes. (MSK)

208. Several areas are projected to contain circular wetlands, which are to replace linear drainages. To conform closer to the pre-mine conditions, please replace these wetlands with beaded wetland features. An example is located in the NW¼ of Section 17, T145N, R83W or the non tillable, multi channeled, sinuous drainage which existed pre-mine that runs from the SE¼ of Section 20 thru the NE¼ of Section 18, T145N, R83W. (MSK)

209. Several areas on the Post-Mining Topography Map seem to be significantly steeper than pre-mine conditions. For example, the W½ of Section 1 and the NW¼ of Section 12, both appear to be over 6 feet higher than the pre-mine conditions, this increasing the slopes in the area as depicted in Section 4.2.7B. Please review and adjust as necessary. (MSK)

#### **Section 4.2.7B – Post-Mine Area Slope Map**

210. Due to the above deficiencies related to the post-mine topography, please make the corresponding adjustments to Section 4.2.7B, Post-Mine Area Slope Map. (MSK)

#### **Section 5.1 – Pre-Mining Wetlands**

211. Please include a copy of the wetland Drainage Permit for the Riverdale 4th Addition Area if it has been approved and edit the first paragraph of Section 5.1.1, accordingly. (GAW)

212. The number “thirty-one” should be changed to “forty-five” in the second sentence of the last paragraph of Section 5.1.1, Pre-Mining Wetlands Narrative. In addition, the second and third sentences of this paragraph incorrectly indicate that the water quality information for the wetlands and springs is in Sections 5.1.1b and 5.1.1c, but the water quality data is in Section 5.1.1d. Please make the necessary corrections. (GAW)

213. Please provide a narrative describing the variability of the vegetation of each wetland class within the Revision 20 area, and include a discussion of the relationship of vegetation, soils and surface and ground water hydrology and anthropomorphic uses observed. In other words, please evaluate the data and provide a discussion of the results of data collected. NDAC 69-05.2-08-08(1)(d). (GAW)

214. Please identify wetland LSW-NE-3-2 (144-84) on the Pre-Mining Wetland Location Map, Section 5.1.1a. This wetland is identified in Table 3, but it is not shown on the Pre-Mining Wetland Location Map. (GAW)
215. Please identify where the wetlands were sampled on the Pre-Mining Wetland Location Map, Section 5.1.1a, or provide GPS sample locations. The line drawings shown in Section 5.1.1b do not provide any information as to where sampling was conducted beyond the legal description. (GAW)
216. Wetland SW4-01-T145N-R83W is classified as a seasonal wetland, but aerial photography shows that this basin was farmed through in 2003, 2004, 2005, 2006, and 2009 and not farmed in 2010. Please review the classification of this wetland and update if deemed necessary. (GAW)
217. The National Wetlands Inventory (NWI) identifies a couple of small temporary wetlands in the SE¼ of Section 5, T145N, R83W that are not classified as wetlands on the Pre-Mining Wetland Location Map, Section 5.1-1a. Aerial photography indicates that these features may be temporary wetlands. Likewise, it appears the seasonal wetland SE5-02-T145N-R83W has expanded northward over the past few years. Please review and update if necessary. (GAW)
218. Wetland NE2-01-T145N-R84W is delineated as if it were two separate wetlands, presumably due to previous split surface ownership, but it is classified as a single feature. If other changes are being made to the Pre-Mining Wetland Location Map, Section 5.1-1a, please update this apparent error. (GAW)
219. In the last paragraph of Section 5.1.1, Pre-Mining Wetland Narrative, please indicate which map shows the location of the springs and seeps that were sampled. We recommend showing the location of the sampled spring and seeps on the Pre-Mining Wetland Location Map since the vegetation sampling data for the springs is located in Section 5.1, Pre-Mining Wetlands. (GAW)
220. Please reference a map that depicts the spring locations, such as Section 2.6.4, Surface Water Features and Monitoring Sites Map, and a tabular listing of all springs, such as Section 2.6.3, Surface Water Quality Data Pre-Mining Surface Water Monitoring Stations, in the last paragraph of page 3 informing the reader where to view the spring locations and where to find a complete list of springs. (WTG)
221. Please add a Station Number column to Table 4 that will allow the reader to quickly cross reference the spring sample name to the surface water Station Number listed in Section 2.6.3, Surface Water Quality Data Pre-Mining Surface Water Monitoring Stations. (WTG)
222. Please define footnote 1 for the Spring Sample column on Table 4. It appears that it may be defined by the phrase "*Other springs/seeps identified but not water sampled due to inadequate volumes*", but please define it for the reader by prefacing the phrase with <sup>1</sup>. (WTG)

223. Please reorganize the spring sampling data in Section 5.1.1d so that the analytical reports for all samples dates of spring SPR-NE-18-2(145-83) are together. As currently presented, the 7/26/2009 analytical report is combined with analytical reports for spring SPR-NW-18-2(145-83). (WTG)
224. Please reorganize the spring sampling data in Section 5.1.1d so that the analytical reports for all samples dates of spring SPR-NW-18-2(145-83) are in chronological order (after removing the report for SPR-NE-18-2(145-83)). As currently presented, the 8/1/2007 analytical report is out of chronological order. (WTG)
225. Section 5.1.1d contains sampling analytical reports for 10 springs that are located outside of the Revision 20 permit boundary on its western side. As required by NDAC 69-05.2-08-07-1, please depict the locations of these springs on Section 2.6.4, Surface Water Features and Monitoring Sites Map, as follows: SPR-NW-19-1(145-83), SPR-NW-19-2(145-83), SPR-SW-24-1(145-84), SPR-NE-24-1(145-84), SPR-SW-24-2(145-84), SPR-NE-25-1(145-84), SPR-NW-25-2(145-84), SPR-SW-25-2(145-84), SPR-NE-26-1(145-84), and, SPR-NE-36-1(144-84). Please note that the township number for the analytical report of SPR-NE-36-1(144-84) appears that it may be erroneous and should more likely be labeled as 145. (WTG)

### **Section 5.2.1 – Post-Mining Wetland Design Narrative**

226. In Section 5.2.1, Post-Mining Wetland Design Narrative, please discuss plans for replacing pre-mine linear or drainageway type wetlands with prairie pothole type basins. It appears that linear wetlands in Sections 7, 17, 18, 20, and 33, T145N, R83W are going to be replaced with pothole type basins. Discuss if the pre-mine wildlife habitat value of the linear wetlands will be enhanced by replacing these wetlands with pothole type basins. NDAC 69-05.2-09-17. (GAW)
227. Please consider placing created wetland W-NW17-01 within the native grassland that is going to be reclaimed on this tract. Some of the pre-mine wetlands within this tract were surrounded by native grassland and ideally this would be the case after mining. (GAW)
228. Please edit the last paragraph of Section 5.2.3, Wetlands Reclamation and Construction Operations, to clarify that perennial sowthistle and quackgrass are not state listed noxious weeds. (GAW)

### **General**

229. Please include updated AutoCAD drawings of the applicable figures. (MSK)

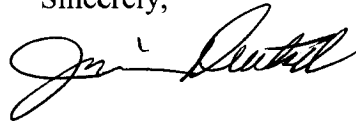
As previously mentioned in Deficiency #53, a copy of the ND Parks and Recreation letter is attached to this letter. Concerns raised in the letter must be addressed.

Mr. D. Randall Crooke  
March 3, 2011  
Page 34 of 34

As of today only a few days remain in the 120 day review period specified in NDAC 69-05.2-05-01(3). Due to the large number of deficiencies noted above and the changes that will be required to the application, the review period will be extended for an additional 120 days as allowed by NDAC 69-05.2-05-01(4)(b) upon the submittal of Falkirk's response to all noted deficiencies.

If you have any questions, please contact this office.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Deutsch", written in a cursive style.

James R. Deutsch  
Director  
Reclamation Division

Enclosure

cc: McLean County Auditor

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