Exhibit B

BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA

IN THE MATTER OF: APPEAL AMENDMENT AM4, WESTERN ENERGY COMPANY, ROSEBUD STRIP MINE AREA B, PERMIT NO. C1984003B	**CASE NO. BER 2016-03 SM** **BOARD ORDER**

CONTENTS

INTRODUCTION

This case has three parties: "(1) the Department of Environmental Quality (DEQ or "the Department"); (2) the Petitioners, Montana Environmental Information Center ("MEIC") and Sierra Club (collectively, "Conservation Groups" or "Petitioners"); and (3) the Respondent-Intervenors Western Energy Company ("Western Energy" or WECO), Natural Resource Partners, L.P., International Union of Operating Engineers, Local 400, and Northern Cheyenne Coal Miners Association (collectively, "Intervenors").

This case concerns Conservation Groups' appeal of DEQ's decision to approve an amendment (the "AM4 Amendment") to Western Energy's mining permit for Area B of its Rosebud Coal Mine. The case examines DEQ's implementation of the Montana Strip and Underground Mining Reclamation Act ("MSUMRA"), Mont. Code Ann. § 82-4-201, *et seq*. The question is whether the Department properly assessed the probable "cumulative hydrologic impacts" of all anticipated mining in the area on the "hydrologic balance" and sufficiently determined, in writing and upon record evidence, that the AM4 Amendment is designed to prevent "material damage" to the "hydrologic balance" outside the permit area. Mont. Code Ann. § 82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c); *In re Signal Peak Energy (Bull Mountain Mine No. 1)*, BER-2-13-07-SM, Findings of Fact, Conclusions of Law and Order, at 56 (Jan. 14, 2016) (herein, *Signal Peak*).

PROCEDURAL HISTORY

Conservation Groups filed a Notice of Appeal and Request for Hearing on January 4, 2016, identifying seven issues of alleged error in DEQ's permitting decision. Intervenors moved to intervene on January 25, 2016; their motion was granted on January 28, 2016. Conservation Groups moved for summary judgment on June 15, 2016. On December 9, 2016, the Montana Board of Environmental Review (BER) denied the motion for summary judgment and referred the matter for a hearing before a hearing examiner. BER, Transcript of Proceedings (Dec. 9, 2016), 12:19-13:24.

The hearing examiner, Sarah Clerget, assumed jurisdiction over this case in September 2017 and issued a new Scheduling Order (January 12, 2018) setting the case for a hearing. The parties filed five extensive motions in limine, on which oral arguments were held. On March 15, 2018, the hearing examiner ruled on those motions holding that "Conservation Groups will be limited to those issues contained in the administrative record, including those issue[s] raised in their August 3, 2015 objections and also preserved in the January 4, 2016 Notice of Appeal." Or. Mots. in Limine, at 7, 9 (Mar. 15, 2018) (Ex. A hereto). The Order excluded from consideration the following issues for failure by Conservation Groups to preserve:

a. Arguments related to the definition of "anticipated mining" and potential interactions between the AM4 Permit and Area F (Hrg. Tr. Vol. 1[1], 134:5-25, 137:7-13, 158:2-5);

b. Arguments related to DEQ's alleged failure to make a material damage determination regarding alleged dewatering of East Fork Armells Creek (EFAC) regarding the entire interaction of the AM4 Permit with all previous mining (Hrg. Tr. Vol. 1, 227:20-228:9);

c. Arguments related to alleged impacts of the AM4 Permit on Rosebud Creek (Hrg. Tr. Vol. 1, 43:15-44:25);

d. Arguments related to the alleged impacts from blasting (Hrg. Tr. Vol. 1, 56:15-17, 60:24-61:5);

e. Arguments regarding the impact of dissolved oxygen levels in EFAC on aquatic life (Hrg. Tr. Vol. 1, 302:22-303:12);

f. Arguments regarding the impact of chloride levels in EFAC on aquatic life (Hrg. Tr. Vol. 2, 32:18-33:25).

Or. Mots. In Limine, at 9 (Mar. 15, 2018) (Ex. A hereto). The hearing examiner determined at a hearing that Conservation Groups' challenge to the AM4 Permit is limited to the following issues preserved in Conservation Groups' Public Comments and Notice of Appeal and Request for Hearing:

g. The material damage determination regarding increased TDS levels in EFAC.

h. The material damage determination regarding increased nitrogen levels in EFAC.

i. The material damage determination regarding aquatic life use of EFAC.

[1] "Hrg. Tr." refers to the transcript of the evidentiary hearing held before the undersigned in March of 2018 (as opposed to the transcript of proceedings held before the BER in December of 2016). "Vol." refers to the volume of the transcript, which corresponds to the day of the hearing, e.g. Vol. 1 is the first volume of the hearing transcript proceedings held on March 19, 2018.

Id., at 9. A four-day contested case hearing was held March 19 through 22, 2018. At the hearing, the parties were represented by: Mark Lucas for DEQ; Shiloh Hernandez, Derf Johnson, Walton Morris, and Roger Sullivan for Conservation Groups; and John Martin, William W. Mercer, Victoria A. Marquis, Samuel Yemington, and Jeremy Cottrell for Intervenors.

At the hearing, the parties presented testimony from the following witnesses: Alex Bonogofsky, Steve Gilvert, Dr. William Gardner (designated an expert in hydrology and statistics), Sean Sullivan (designated an expert in aquatic ecology and taxonomy), Chris Yde, Dr. Emily Hinz (designated an expert in hydrology), Martin Van Oort (designated an expert in hydrology), Eric Urban (designated an expert in water quality assessment), Wade Steere, William Schafer (designated an expert in hydrology, statistics, and soil science), Dr. Michael Nicklin (designated an expert in hydrology, groundwater, and groundwater modeling), Penny Hunter (designated an expert in aquatic toxicology and biological monitoring), and David Stagliano (designated an expert in aquatic ecology and prairie stream ecology).

At the close of Conservation Groups' case-in-chief, Intervenors moved for the functional equivalent of a directed verdict pursuant to Rule 52, Mont.R.Civ.P. DEQ joined that motion. The hearing examiner reserved judgement on the motion at the hearing.

At a post-hearing status conference on March 29, 2018, the parties were ordered to submit proposed findings of fact and conclusions of law (FOFCOL) and then to respond to each other's proposed FOFCOLs. After several extensions, the proposed FOFCOLs and responses were fully submitted to the hearing examiner on September 28, 2018.

LEGAL BACKGROUND

DEQ reviews an application for a strip-mining permit or major permit revision under the Montana Strip and Underground Mine Reclamation Act ("MSUMRA") to determine if the application affirmatively demonstrates that the proposed operation is designed to prevent material damage to the hydrologic balance outside the permit area. To approve the application, DEQ must confirm, in writing, that the applicant has made the requisite showing and the information available to DEQ at the time does not show otherwise. Mont. Code. Ann. § 82-4-227(3)(a); Admin. R. Mont. 17.24.405(6)(c). With respect to water specifically, the law is:

> The department may not approve an application... unless the application affirmatively demonstrates and the department's written findings confirm, on the basis of information set forth in the application or information otherwise available that is compiled by the department, that:
> ...
> c) the hydrologic consequences and cumulative hydrologic impacts will not result in material damage to the hydrologic balance outside the permit area....

Admin. R. Mont. 17.24.405(6). The following definitions apply:

> "Material Damage" means, "with respect to protection of the hydrologic balance, degradation or reduction by coal mining and reclamation operations of the quality and quantity of water outside the permit area in a manner or to an extent that land uses or beneficial uses of water are adversely affected, water quality standards are violated, or water rights are impacted. Violation of a water quality standard, whether or not an existing water use is affected, is material damage." Mont. Code. Ann. § 82-4-203(31); Admin. R. Mont. 17.24.301(68).
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> "Hydrologic Balance" means "the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit, such as a drainage basin, aquifer, soil zone, lake, or reservoir, and encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in ground water and surface water storage." Mont. Code. Ann. § 82-4-203(24); Admin. R. Mont. 17.24.301(55).
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> "Cumulative Hydrologic Impact Area" means, "the area, including, but not limited to, the permit and mine plan area within which impacts to the hydrologic balance resulting from the proposed operation may interact with the impacts of all previous, existing and anticipated mining on surface and ground water systems." Admin. R. Mont. 17.24.301(32).
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> "Cumulative Hydrologic Impacts" means, "the expected total qualitative and quantitative, direct and indirect effects of mining and reclamation operations on the hydrologic balance." Admin. R. Mont. 17.24.301(31).

To determine whether the proposed permit amendment has been designed to prevent "material damage" to the "hydrologic balance" outside the permit area, DEQ assesses the "cumulative hydrologic impacts" of the proposed operation and all anticipated mining upon surface and groundwater systems in the "cumulative

impact area." Mont. Code Ann. § 82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c); Admin. R. Mont. 17.24.301(31), (32), (55), (68). A "material damage" determination must therefore assess whether the probable cumulative impacts from the proposed mining permit at issue will cause a violation of water quality standards outside the permit area. *See Signal Peak*, at 87 (citing Mont. Code Ann. § 82-4-203(31)); *see also* Admin. R. Mont. 17.24.301(68). This assessment is reflected in DEQ's Cumulative Hydrologic Impact Assessment ("CHIA"), which is attached to the permit amendment.

FINDINGS OF FACT

Having reviewed the proposed facts from the hearing examiner, the Board makes the following factual findings:

A. General Background on The Rosebud Mine

1. Western Energy operates the Rosebud Mine, which is a 25,752-acre coal strip-mine located in Colstrip, Montana, approximately 123 miles east of Billings and 36 miles south of Forsyth. DEQ Ex. 1A at 3-1, 3-2.

2. Northern Pacific Railway originally started strip-mining coal in Colstrip in the 1920s to fuel locomotives. *Id.* at 3-1. The mine shut-down in 1958 when the railroads modernized and switched the locomotives to diesel. *Id.*

3. Montana Power Company purchased the rights of the mine and the town in 1958. It formed a wholly-owned subsidiary, Western Energy Company, to

manage and develop the Colstrip properties, and in 1968 Western Energy began mining. In 2001, Westmoreland purchased the Rosebud Coal Mine, making Western Energy Company a subsidiary of Westmoreland Mining, LLC. *Id.* at 3-1.

4. The Rosebud Mine currently has a total permit area of approximately 25,752 acres in five individual permit areas: titled/labeled Areas A through Area E, which have been generally in existence since the late 1970s to early-to-mid 1980s. *Id.* at 3-2; *see also* DEQ Ex. 1A at Figure 5-1; Hrg. Tr. Vol. 2, at 167:13-15.

5. Maps of the Rosebud Mine and the areas involved in this case appear at Figures 1-1, 3-1, 4-1, 4-4, 5-1 of the CHIA. DEQ Ex. 1A at 13-1, 13-2, 13-3, 13-6, 13-7.

6. Currently Area B currently includes 6,182 acres of mineable land. DEQ Ex. 1 at 2, ¶ 6.

7. The AM4 Amendment proposes the following changes to the current Area B Permit: a 49 acre increase in the area permitted; a 146 acre increase in the proposed amount of surface disturbance limit; 8.6% increase in the minable coal reserve (approximately 12.1 million tons); 306 more acres of coal removal or 8.3% increase in the amount of coal aquifer disturbed; re-calculation of the performance bond to account for current practices and future conditions (increase from $48,403,696 to $73,650,000); and, changes to the post-mine topography (PMT). DEQ Ex. 1; DEQ Ex. 1A at Figures 3-1 and 9-9; Hrg. Tr. Vol. 2, at 174:8-25, Vol.

3, at 190:13-17. The total proposed permit area for the Area B Permit with the AM4 Amendment will be 6,231 acres. DEQ Ex. 1 at 2.

B. Standing

8. Alexis Bonogofsky is a member of Montana Environmental Information Center (MEIC) and Sierra Club. Hrg. Tr. Vol. 1, at 36:14-24.

9. Steve Gilbert is a resident of Helena, Montana, and a member of MEIC and Sierra Club. Hrg. Tr. Vol. 1, at 100:7-13, 101:5-17.

10. Ms. Bonogofsky and Mr. Gilbert use, recreate in, and visit the area affected by the Rosebud Mine, including the lands surrounding the mine, they are concerned that additional mining will impact their interests in the area, and believe that their concerns would be addressed in part by the cessation of additional mining. Hrg. Tr. Vol. 1, at 37:3-38:9, 46:4-16, 53:21-54:14, 61:25-62:19, 76:12-14, 101:23-102:10, 107:16-111:25, 126:22-128:19.

11. Ms. Bonogofsky hunts and takes photographs in the Colstrip area. Hrg. Tr. Vol. 1, at 37:5-25, 70:9-18, 71:14-20.

12. Ms. Bonogofsky visits ranches that "circle the industrial complex of the – Colstrip, the power plant, and the mine." Hrg. Tr. Vol. 1, at 77:4-12.

13. Ms. Bonogofsky professed a general concern about the impact of additional mining on water because she "know[s] a lot of ranchers" and they "talk

about [water] a lot, about the salinity in the water." Hrg. Tr. Vol. 1, at 54:8-25, 55:1-3.

14. Mr. Gilbert has familiarity with the EFAC watershed because he "would visit the area to hunt upland birds." Hrg. Tr. Vol. 1, at 108:11-15.

15. Mr. Gilbert presented conflicting testimony, as he admitted that he had not hunted in EFAC since 2007 (Hrg. Tr. Vol. 1, at 125:3-15) but also testified that he had "probably" birded in the EFAC watershed last summer or "probably" during turkey season in 2017 (Hrg. Tr. Vol. 1, at 126:22-25, 127:1-3).

16. Mr. Gilbert stated that the recreational value of "hunting upland birds" is impaired if there are impacts to wildlife "including upland birds" and that additional mining impacts his "perspective as a hunter." Hrg. Tr. Vol. 1, at 109:13-15.

17. Mr. Gilbert testified that adverse impacts to EFAC "has an effect" on his experience in the area "from an aesthetic perspective" and that his aesthetic sense was harmed because he could see an "industrial zone" that he described as the "power plant, mines, city [of Colstrip] itself." Hrg. Tr. Vol. 1, at 108:8-20, 131:5-7.

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C. Permitting Process

18. Western Energy's application for an amendment to its permit for Area B of its Rosebud Mine (AM4 Permit) was received by DEQ on June 15, 2009. DEQ Ex. 1, at 2, ¶ 7; Western Ex. RR.

19. DEQ determined that Western Energy's application was complete and that an environmental impact statement was not required on August 7, 2009. DEQ Ex. 1, at 2, ¶ 7; Western Ex. SS.

20. The AM4 Amendment application materials submitted by WECO to DEQ included WECO's Comprehensive Evaluation of Probable Hydrologic Consequences (DEQ Ex. 6) and Addendum to the Comprehensive Evaluation of Probable Hydrologic Consequences (DEQ Ex. 6A). DEQ Ex. 1A, at 2-7; DEQ Ex. 1, at ¶ 5.

21. A timeline of the application and public notice process appears at DEQ Ex 1 at 2-5.

22. Public notice of the application was provided on August 27, September 3, September 10, and September 17, 2009. DEQ Ex. 1, at 2, ¶ 7.

23. From 2009-2015 DEQ and Western Energy completed eight rounds of Acceptability Deficiency notices and responses. DEQ Ex. 1, at 2-4, ¶ 7; Western Exs. TT through III.

24. The seventh deficiency letter requested that Western Energy conduct an aquatic life survey of EFAC. MEIC Ex. 47[2].

25. DEQ issued an Acceptability Determination on July 8, 2015, more than six years after WECO's application was first submitted. DEQ Ex. 5.

26. Public notice of the Acceptability Determination was provided on July 8, 2015. DEQ Ex. 1 at 4.

27. The comment period closed on August 3, 2015, on which date the Western Environmental Law Center (WELC) submitted a timely comment letter (a.k.a. "objections"), with exhibits thereto. DEQ Ex. 1 at 4; Exs. 4, 4a thru 4l.

28. On December 4, 2015, DEQ issued the AM4 Amendment. Stipulated Facts; *See* DEQ Ex. 1, *passim*; DEQ Ex. 3; Hrg. Tr. Vol. 1 32:1-35:1, Hrg. Tr. Vol. 2, at 164:20-23.

29. DEQ's "Written Findings," released with the permit approval, include a section titled "Responses to Public Comments" in which DEQ specifically responded to each of the issues raised in the Public Comments, including WELC's comment letter. DEQ Ex. 1, at 8-14.

30. In its December 4, 2015 Written Findings and Cumulative Hydrologic Impact Assessment (CHIA), DEQ assessed the cumulative hydrologic impacts of all anticipated coal mining on the hydrologic balance within the cumulative impact

[2] For brevity's sake, Conservation Groups' exhibits are collectively cited herein as MEIC.

area associated with AM4 mining and determined, *inter alia*, that the AM4 Amendment would not result in material damage to the hydrologic balance outside the permit area. DEQ Ex. 1, at ¶ 12.

31. DEQ's Written Findings and AM4 Amendment Approval were based in part on information provided by WECO in its amendment application, as well as the AM4 CHIA, and in part on other information available to DEQ. DEQ Ex. 1 at ¶ 5; DEQ Ex. 1A.

32. DEQ's December 4, 2015 approval triggered a 30-day appeal period. ARM 17.24.425(1). Conservation Groups timely filed an appeal on January 4, 2016 (January 3 was a Sunday). Notice of Appeal (Jan. 4, 2016).

33. The public comments, including those by WELC, raised a number of challenges to DEQ's approval of the AM4 Amendment, some of which were preserved in Conservation Groups' Notice of Appeal. *Compare* DEQ Ex. 4 *with* Notice of Appeal.

D. Hydrologic Impacts of Strip-Mining Generally

34. Strip-mining for coal at the Rosebud Mine includes the removal and salvage (stockpiling) of soil and excavation of subsurface overburden layers (which are afterwards called "spoil") in order to reach and remove the Rosebud coal seam. DEQ Ex. 1A, at 3-2; Figure 9-21; Hrg. Tr. Vol. 2, at 177:6-15, 178:1-9.

35. The Rosebud coal seam is an aquifer, which is partially removed by mining operations and eventually replaced with backfilled spoils. DEQ Ex. 1A, at 3-1 to 3-2; 8-11.

36. Once the coal has been removed from the excavation, spoil materials are used to refill the excavation. DEQ Ex. 1A, at 3-2; Hrg. Tr. Vol. 2, at 177:6-15.

37. The backfilled spoil is regraded to an approved post-mine topography and salvaged topsoil or other approved suitable material is spread on the surface, after which seeding and planting of approved vegetation takes place. DEQ Ex. 1A, at 3-2.

38. The hydrologic system, including both groundwater and surface water, will experience both short- and long-term impacts from the strip-mining of coal which include diminishment of surface water flow due to sediment ponds placed below the mine disturbance, drawdown of groundwater levels or declines in pressure head, and changes in water quality in both surface water and groundwater. DEQ Ex.1A, at 9-2; *see also* Hrg. Tr. Vol. 2, at 183:24-184:5.

39. Strip-mining's effects to groundwater quantity include a phenomenon known as "drawdown," which involves reductions in water levels in water-bearing subsurface strata adjacent to the excavation as water flows into the void created by the excavation and removal of the Rosebud coal aquifer. DEQ Ex. 1A, at 9-27 and 9-38; Hrg. Tr. Vol. 2, at 183:24-184:13.

40. The AM4 Amendment will increase the drawdown or reduction in water levels in adjacent water-bearing subsurface strata in the immediate vicinity of the additional AM4 mine cuts, as shown in Figure 3-1 of the CHIA. DEQ Ex. 1A, at 9-80 to 9-81, Figure 9-84; Hrg. Tr. Vol. 2, at 188:7-10.

41. Once the spoil has been backfilled to replace the removed Rosebud coal aquifer, the spoil gradually re-saturates from recharging lateral flows of groundwater from the existing coal seam, and from infiltration of precipitation or surface water runoff in through the spoil. DEQ Ex. 1A, at 9-55 to 9-56, and 9-81; Hrg. Tr. Vol. 2, at 180:1-20.

42. Strip-mining also affects groundwater quality by causing increases in concentrations of dissolved solids in the spoil relative to what was present in the coal or overburden prior to mining. DEQ Ex. 1A, at 9-56; Hrg. Tr. Vol. 2, at 184:18-25.

43. Such increases in concentrations of dissolved solids occur because the spoils include broken up rocks which contain more reactive surfaces than the intact strata that existed prior to mining, which increase the exchange of ions with water. Hrg. Tr. Vol. 2, at 184:18-25.

44. Once the water levels have recovered in the spoil to approximate the pre-mine condition, some of that increased total dissolved solids (TDS) in the spoil can move downgradient towards either bedrock units outside of the mine or

towards the alluvial aquifer associated with EFAC. DEQ Ex. 1A, at 9-27; Hrg. Tr. Vol. 2, at 185:5-10.

E. East Fork Armells Creek (EFAC)

45. EFAC is a sub-basin to the Armells Creek watershed, which transects the majority of the mining from the Rosebud Mine, including most of Area B and all of the AM4 Amendment area. Hrg. Tr. Vol. 2, at 200:1-14; DEQ Ex. 1A, Figure 5-1.

46. Drainage from the AM4 Permit area discharges to EFAC. With the exception of a small area—from which water discharges are not expected to occur—the area subject to the AM4 Permit is located within the Upper EFAC drainage area. DEQ Ex. 1A at 5-1.

47. EFAC (that is, the creek itself) is outside the permit areas of the Rosebud Mine. Ex. DEQ 1A, at 9-20; *see also id.* Figs. 4-4, 5-1, 6-1.

48. EFAC is designated as a C-3 surface water. DEQ Ex. 1A, at 2-3; Hrg. Tr. Vol. 2, at 200:23-24; Admin. R. Mont. 17.30.611(1)(c).

49. The relevant water quality standard requires C-3 waters to be maintained to support "bathing, swimming, and recreation, and growth and propagation of non-salmonoid fishes and associated aquatic life, waterfowl, and furbearers." DEQ Ex. 1A, at 2-3 (quoting Admin. R. Mont. 17.30.629(1)).

50. EFAC is an ephemeral stream with a few intermittent sections that flows through the area of the Rosebud Mine, between Area A and Area B in the east (downstream) part of the mine area, and then between Area B and Area C to the west (upstream). DEQ Ex. 1A at 4-4, 8-8.

51. That portion of EFAC existing upstream of the Rosebud Mine and continuing to the highway bridge downstream of the AM4 Permit is referred to as Upper EFAC. Hrg. Tr. Vol. 2, at 229:3-13, 230:13-18.

52. Upper EFAC is a C-3 ephemeral water. DEQ Ex. 9, at 1; DEQ Ex. 10, at 1. DEQ Ex. 1A, at 9-6; Hrg. Vol. 1, at 226:7-23; Hrg. Tr. Vol. 2, at 183:17-23, 186:23-187:17, 200:15-20.

53. An ephemeral stream flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and has a channel bottom that is always above the local water table. DEQ Ex. 1A at 2-3, (citing Mont. Code Ann. § 82-4-203(18); Admin. R. Mont. 17.24.301(39), and Admin. R. Mont. 17.30.602(10))

54. An intermittent stream is a stream or reach of a stream that is below the local water table for at least some part of the water year, and obtains its flow from both surface runoff and ground water discharge. DEQ Ex. 1A, at 2-3, (citing Mont. Code Ann. § 82-4-203(29), Admin. R. Mont. 17.24.301(61), and Admin. R. Mont. 17.30.602(61)).

55. While livestock grazing and channel use by livestock occurs in areas upstream of mined areas, coal mining activity (open pits, reclaimed lands, sediment ponds, mining facilities, and associated infrastructure) dominates the potential anthropogenic pollutant sources in upper [EFAC]. DEQ Ex. 1A, at 9-6.

56. That portion of EFAC existing downstream of the highway bridge and continuing through the town of Colstrip until its conflux with the West Fork Armells Creek is referred to as Lower EFAC. Hrg. Tr. Vol. 2, at 229:3-13, 230:13-18.

57. Lower EFAC, from Colstrip to its confluence with the Yellowstone River, has large reaches with perennial to intermittent flow. DEQ Ex.1A, at 9-6.

58. Lower EFAC water quality is "much worse" than Upper EFAC water quality. Hrg. Tr. Vol. 2, at 230:13-19.

59. Because EFAC is predominantly ephemeral, many of its designated uses only exist on a seasonal basis when water is flowing. Hrg. Tr. Vol. 2, at 201:22-24.

60. The CHIA includes a series of photographs of EFAC where it flows through the Rosebud Mine which fairly and accurately depict the predominantly ephemeral conditions of EFAC at those locations and illustrate the nature of the creek. DEQ Ex. 1A, Appendix A A-5 to A-12, Figure A1; Hrg. Tr. Vol. 2, at 202:25-203:9.

61. The upper sections of EFAC which flow through the Rosebud Mine show well-vegetated conditions with a narrow and defined stream channel without any flowing water. DEQ Ex. 1A, Appendix A, Photo point # 3, A-5; Hrg. Tr. Vol. 2, at 203:18-21.

62. Photo Nos. 17 and 18 depict EFAC where it flows between permit Areas B and C of the Rosebud Mine in May and July, respectively, and likewise show well-vegetated conditions with no flowing water and a broader stream channel. Hrg. Tr. Vol. 2, at 204:16-21; DEQ Ex. 1A, Appendix A, Photo points # 17 and # 18, A-11.

63. Photo No. 4 depicts conditions which are indicative of most of EFAC where it flows through Area B of Rosebud Mine, and shows a wide and very poorly defined stream channel which does not regularly see flow. Hrg. Tr. Vol. 2, at 204:22 to 205:7; DEQ Ex.1A, Appendix A, Photo point # 4, A-5.

64. Most of the EFAC bed upstream of Rosebud Mine Area A is dry, while short stretches of intermittent flow have been identified downstream. Ponded sections, facilitated by the presence of four small dams built to retain water for livestock, contribute to intermittent flow conditions. DEQ Ex. 1A, at 8-8; Hrg. Tr. Vol. 2, at 203:24-204:1-9.

65. Ponding occurs in the intermittent sections of EFAC because of in-stream dams and road crossings, as shown in Photo No. 6. Hrg. Tr. Vol. 2, at 205:8-21; DEQ Ex. 1A, Appendix A, Photo point # 6, A-6 to A-7.

66. A number of photographs of EFAC appear in Appendix A of the CHIA. DEQ Ex. 1A, Appendix A.

67. Photo No. 9 shows a portion of EFAC with water flowing as a direct result of an in-stream stock dam. Hrg. Tr. Vol. 2, at 203:22-204:1; DEQ Ex. 1A, Appendix A, Photo point # 9, A-9.

68. Photo No. 9 was taken in the springtime, which is the time of the year with the most water flowing through EFAC. Hrg. Tr. Vol. 2, at 203:24-204:9.

69. Photo No. 10 depicts this intermittent ponded flow area where EFAC flows through Area A and B of the Rosebud Mine. Hrg. Tr. Vol. 2, at 205:21-25; DEQ Ex. 1A, Appendix A, Photo point # 10, A-9.

70. Photo No. 10 on was taken in April 25, 2014, during a time of extreme high-water levels in the stream. Hrg. Tr. Vol. 2, at 206:1-8.

71. Increased concentrations of TDS, nitrogen and various other constituents sampled in Lower EFAC are not attributable to past mining. Hrg; Tr; Vol. 2, at 230:19-25.

72. Lower EFAC is influenced by groundwater inflow and surface water runoff from a variety of anthropogenic sources, including cattle grazing,

agriculture, fertilizer from residential lawns, fertilizer from a commercial golf course, and discharges from a municipal water treatment plant. DEQ Ex.1, at 9, ¶ 4; DEQ Ex. 1A, at 9-6, 9-7, 9-79; Hrg. Tr. Vol. 2, at 207:11-25, 230:13-25.

F. Groundwater in Vicinity of Rosebud Mine

73. Groundwater in the EFAC alluvium is classified predominantly as Class II and Class III groundwater. DEQ Ex. 1A, at 8-8; Hrg. Tr. Vol. 2, at 213:5-7.

74. Groundwater monitoring wells in the vicinity of the Rosebud Mine frequently and naturally vacillate between Class II and Class III waters, and the variability occurs over space and time. Hrg. Tr. Vol. 3, at 100:18-25, 101:20-22.

75. The EFAC alluvium in the vicinity of the Rosebud Mine has a wide range of naturally occurring specific conductance varying from approximately 1,800 microsiemens per centimeter to over 4,000 microsiemens per centimeter. Hrg. Tr. Vol. 3, at 97:21-24.

76. The baseline concentration of TDS in the EFAC alluvium is 2,299 milligrams per liter, which is equivalent to a specific conductance of 2,650 microsiemens per liter. Hrg. Tr. Vol. 3, at 102:17-22; DEQ Ex. 1A, at 9-33.

77. Groundwater with a specific conductance (or electrical conductivity) of 2,650 microsiemens per liter is classified as a Class III water. Hrg. Tr. Vol. 3, at 97:19-98:3, 102:6-103:5.

78. Groundwater in the alluvium between Areas A and B, where the impacts from the AM4 Permit Amendment will occur, is classified as Class III groundwater. DEQ Ex. 1A, at 9-31.

G. EFAC Impairment

79. DEQ's Water Quality Planning Bureau, which includes the Water Protection Bureau, assesses Montana waters pursuant to Section 303(d) of the federal Clean Water Act every two years and produces a list of impaired waters which is included in a biennial integrated report to EPA. Hrg. Tr. Vol. 3, at 115:20-118:1, 162:2-7; DEQ Ex. 9, at 1; Hrg. Tr. Vol. 2, at 152:7-11, 224:1-6.

80. DEQ's Coal Section does not make impairment determinations. The Coal Section considers impairment determinations, but has no responsibilities connected to them or their inclusion in the Section 303(d) impaired waters list managed by DEQ's Water Quality Planning Bureau. Hrg. Tr. Vol. 2, at 152:7-12, 224:1-6.

81. Since 2006, EFAC has been listed on DEQ's 303(d) list as impaired for the function of aquatic life use support. Hrg. Tr. Vol. 3, at 123:11-22, 161:17-25, 177:5-21.

82. DEQ utilizes "Attainment Records" (a.k.a. "assessment records") to document and summarize all the information for a specific assessment unit (or stream reach), and to make impairment decisions for Clean Water Act 303(d)-

listing purposes as to whether or not the uses have been affected and whether or not the stream is in compliance with water quality standards. Hrg. Tr. Vol. 3, at 139:12-19.

83. DEQ's "assessment records" assess which pollutants are affecting a waterbody, describe a level of confidence (high, medium, or low) as to whether the use is impaired, and determine whether the source of any such pollutant(s) have been confirmed or remain unconfirmed. Hrg. Tr. Vol. 3, at 140:13-20.

84. The ephemeral nature of an ephemeral stream also affects the nutrient criteria which apply to such a stream. DEQ's nutrient criteria are identified in DEQ's Circular 12-A. Those criteria describe their applicability to wadable streams. "Wadable streams" is defined in that Circular and is specific to intermittent and perennial (and not ephemeral) waters. Hrg. Tr. Vol. 3, at 154:8-15.

85. DEQ's Water Quality Planning Bureau has not completed a remedial plan—called a Total Maximum Daily Load (TMDL)—to correct the water quality violations identified in East Fork Armells Creek. DEQ Ex. 10 at 20 ("[A] TMDL is required to address the factors causing the impairment or threat."); *see also* Hrg. Tr. Vol. 3 at 126:15-18 ("[W]e would leave that to the next program—that would be the TMDL program—if there was impairment to do more of a thorough source identification and follow the next steps of the Clean Water Act process.").

86. Because no TMDL has been prepared, DEQ's Water Quality Planning Bureau has not calculated and assigned pollution limitations—called waste load allocations and load allocations—calculated to bring East Fork Armells Creek back into compliance with water quality standards. Hrg. Tr. Vol. 3 at 131:3-11 ("And from there, if not in compliance, that water body would then go to the TMDL. 'TMDL' is an acronym for 'total maximum daily load.' It's really a restoration plan, bring a stream back into compliance with the standards. That's incorporated into any permitting process, whether—if it's a permitted source, it would have a waste load allocation through the TMDL; non-permitted source would have a load allocation. And by 'permitted,' I mean MPDES [Montana Pollution Discharge Elimination System] permitted.").

i. Upper EFAC Impairment

87. In 2006, DEQ's Water Quality Planning Bureau assessed the upper portion of EFAC, from its headwaters to Colstrip, to determine if the creek was meeting applicable water quality standards. DEQ Ex. 9, at 1.

88. The resulting "Water Quality Standards Attainment Record" (a.k.a. "assessment record") concluded that the creek was "Not Supporting" its designated use of supporting "Aquatic Life." DEQ Ex. 9, at 11. This determination was based on "Information from local residents," "Non-fixed station

physical/chemical" data, "Ecological/habitat surveys," "Visual observation," and "Other Agencies/Organizations provided monitoring data." *Id.*

89. DEQ's assessment record for Upper EFAC characterizes it as "[n]ot [s]upporting" aquatic life and identifies "[a]lteration in stream-side or littoral vegetation covers" as the cause, with surface mining identified as a possible, but unconfirmed source of the alteration. DEQ Ex. 9, at 11-12; Hrg. Tr. Vol. 3, at 141:1-9, 142:17-143:24.

90. The basis for identifying mining as a possible source of the impairment in Upper EFAC was anecdotal information from before 2006 (when the document was authored). Hrg. Tr. Vol. 3, at 145:19-146:3, 155:19-23; DEQ Ex. 9.

91. At the time DEQ issued the CHIA in December 2015, DEQ (including the Coal Section and the Water Quality Planning Bureau) was aware that the information contained in the 2014 Assessment Record which attributed the impairment of aquatic life use in EFAC to alteration of streamside vegetative cover caused by surface coal mining was incorrect. Hrg. Tr. Vol. 3, at 147:15-149:12, 123:11-124:19.

92. Mining adjacent to EFAC, which began in 1992, never got closer than three hundred feet to the stream channel. DEQ Ex. 1A at 9-9.

93. The Rosebud Mine never mined through the upper EFAC stream channel. Hrg. Tr. Vol. 3, at 145:19-146:3, 148:14-149:3; DEQ Ex. 1A, at 9-9.

94. The Rosebud Mine is not responsible for alterations in streamside vegetation, and DEQ's Attainment Record does not demonstrate otherwise. Hrg. Tr. Vol. 3, at 148:8-13; DEQ Ex. 9.

ii. Lower EFAC Impairment

95. In 2008 the Water Quality Planning Bureau assessed the lower portion of EFAC, from Colstrip to its confluence with the Yellowstone River, to determine if that portion of the creek was meeting applicable water quality standards. DEQ Ex. 10, at 1.

96. The resulting "Water Quality Standards Attainment Record" concluded that the creek was "Not Supporting" its designated use of supporting "Aquatic Life." DEQ Ex. 10, at 18. The "Water Quality Standards Attainment Report" determined with low confidence that the causes of the impairment were "Specific Conductance," "Total Dissolved Solids [TDS]," "Nitrate/Nitrite (Nitrite + Nitrate as N)," and "Nitrogen (Total)." *Id.* at 19. The "Water Quality Standards Attainment Record" identified "Coal Mining" as one unconfirmed source of the excessive TDS and specific conductance. *Id.*; Hrg. Tr. Vol. 3, at 155:15-156:2, 156:24-157:23, 157:15-23, 15:15-19.

97. The Lower EFAC Attainment Record identifies three possible, unconfirmed sources of the pollution: transfer of water from an outside watershed, agriculture, and coal mining. DEQ Ex. 10.

98. Typically, the Water Quality Planning Bureau lists impairment causes with low confidence, indicating that additional investigation is needed, before drawing conclusions about the cause. Hrg. Tr. Vol. 3, at 160:23-161:4.

99. The Water Quality Planning Bureau does not usually confirm a source of impairment until the next phase of the assessment process, which is development of a Total Maximum Daily Load ("TMDL"). Hrg. Tr. Vol. 3, at 150:7-12.

100. Of the potential impairment causes, coal mining is only associated with specific conductance and TDS; coal mining is not identified as a potential source of nitrate/nitrite or total nitrogen. DEQ Ex. 10 at 19; Hrg. Tr. Vol. 3, at 157:4-158:3.

101. The "Water Quality Standards Attainment Record" further stated: "The [specific conductance] values do not appear to be vastly different from other drainages in the region; however, the probable impact from municipal sources and industrial pond seepage cannot be ignored. The past and present impacts from changes in groundwater chemistry, surface flow, and atmospheric deposition

merit[] further investigation. Salinity/TDS/chlorides will remain a cause of impairment." DEQ Ex. 10.

102. In the CHIA, the Coal Section of DEQ distinguished the impacts of mining on TDS or specific conductance in Lower EFAC from the impacts on those parameters that are attributable to other sources. DEQ Ex. 1A, at 9-85 to 9-87.

103. DEQ has identified the town of Colstrip, discharges from the water treatment plant, infiltration and runoff from the golf course, agriculture, and grazing as sources of nitrogen, specific conductance, and TDS in Lower EFAC. Because the contribution from mining, which was analyzed in the CHIA, is not significant and because the section of Upper EFAC closest to and immediately downstream of the mine exhibits better water quality than Lower EFAC, DEQ concluded that mining is not a likely cause of the impairment. DEQ Ex. 1 at 9, ¶ 4; DEQ Ex. 1A, at 9-6 to 9-7, 9-79; Hrg. Tr. Vol. 2, at 207:11-25, 229:3-231:24.

104. Information available to the Coal Section of DEQ at the time it was evaluating the AM4 Permit application and reflected in the CHIA contradicts the unverified, anecdotal information utilized by the Water Quality Planning Bureau. Specifically, Department inspections and records demonstrate that WECO had not mined through the creek bed and mining at the Rosebud Mine was never closer than 300 feet from EFAC. Hrg. Tr. Vol. 3, at 147:15-148:13; DEQ Ex. 1A, at 8-2, 9-9.

105. Mining associated with the AM4 Permit will not cause violations of water quality standards. Hrg. Tr. Vol. 2, at 211:17-212:12, 265:6-12; DEQ Ex. 1A, at 9-26 to 9-27, 10-1.

106. Although Lower EFAC was impaired for TDS, mining is not the source of that impairment because the "data right next to the mine" from Upper EFAC, which provides the most appropriate determination of mine impacts, does not show increased TDS. Hrg. Tr. Vol. 2, at 231:1-24.

H. Total Dissolved Solids (TDS), Salt, and Salinity

107. Salinity is a term that generally describes how salty water is. TDS, which is simply a measure of the total weight of dissolved solids in a liter of water, serves as the most reliable way to measure salinity in water. Electrical conductivity, which is a measurement of how easily water transmits an electrical current, is another way to measure of salinity in water which is proportional, but not equal to TDS. Hrg. Tr. Vol. 2, at 236:2-15; DEQ Ex. 1A, at 9-28.

108. In EFAC, TDS values and electrical conductivity values are nearly commensurate with each other and may be used somewhat interchangeably. Hrg. Tr. Vol. 3, at 232:15-233:5.

109. EFAC exhibits extremely variable flow and a specific conductance (or electrical conductivity) that ranges widely from 2,000 to 10,000 microsiemens per

centimeter. Hrg. Tr. Vol. 3, at 231:1-7, 232:4-14, 235:18-236:16; Hrg. Tr. Vol. 4, at 88:13-89:23.

110. Over time, TDS loading in EFAC has gone down, although not significantly. Hrg. Tr. Vol. 4, at 90:20-25.

111. The Probable Hydraulic Consequences Addendum to the CHIA included a mass water balance calculation that determined the estimated increase of 13% over baseline TDS concentrations in the EFAC alluvium. Hrg. Tr Vol. 2, at 235:15-236:1; DEQ Ex. 6A, at 4, 29; DEQ Ex. 1A, at 9-31; DEQ Ex. 1, at ¶ 10.

112. The CHIA describes the effects of the predicted 13% increase in both TDS and specific conductance on the EFAC alluvium based (as noted) on the reasonable assumption that the increase in each parameter would be proportional. Hrg. Tr. Vol. 3, at 100:4-9; DEQ Ex. 1A, at 9-33.

113. Alluvium consists of unconsolidated geologic deposits of valley fill material which is typically composed of differing amounts of silt, sand, and gravel depending on degree of stream development, which a river or stream deposits and erodes. DEQ Ex. 1A, at 8-7; Hrg. Tr. Vol. 1, at 219:22-220:16.

114. Alluvium is often found as a narrow body of geologic material that surrounds a stream on either side in the floodplain, where groundwater and surface water connect and interact as the alluvial groundwater moves generally down gradient and parallel to the stream. Hrg. Tr. Vol. 1, at 220:9-16.

115. The EFAC alluvium has a wide range of natural specific conductance which varies both spatially and temporally over a range from approximately 1,800 to over 4,000 microsiemens per centimeter. Hrg. Tr. Vol. 3, at 97:19-24, 218:6-24, 246:20-25, 247:9-25, Vol. 4, at 24:19-25:1, 25:22-27:17; *see also* DEQ Ex. 1A, at 8-8, 9-23, well WA-104.

116. The median and average concentrations for specific conductance in the EFAC alluvium in baseline conditions, which is undisturbed by mining, is Class III. Hrg. Tr. Vol. 3, at 97:25-98:3.

117. Monitoring wells in EFAC frequently change between the ranges of Class II and Class III groundwater in the natural condition. Hrg. Tr. Vol. 3, at 100:23-25; DEQ Ex. 1A, at 9-33.

118. This phenomenon is illustrated by CHIA Figure 9-23, which shows EFAC alluvial monitoring wells which are upgradient of mining responding to natural changes in water level and quality between the Class II and Class III ranges. Hrg. Tr. Vol. 3, at 101:6-10; DEQ Ex. 1A, Figure 9-23.

119. The graphs depicted in CHIA Figure 9-23 illustrate the natural variability in both time and space in TDS concentrations in the EFAC alluvium, with the hydrograph for monitoring well WA-118 showing TDS variability between about 1,600 to about 3,000 milligrams per liter. Hrg. Tr. Vol. 3, at 101:20-25; DEQ Ex. 1A, Figure 9-23.

120. While it is likely that a 13% increase in TDS in the EFAC alluvium would cause some monitoring wells located therein (which are just below the threshold of Class II/Class III groundwater) to fall within the conductivity range of Class III (*see* ARM 17.30.1006), this type of change also occurs naturally (*see* CHIA Figure 9-23, well WA-104) and in much larger magnitude than a 13% change. These changes are not therefore likely to be distinguishable from natural variations. DEQ Ex. 1A, at 9-33; ARM 17.30.1005(3); Hrg. Tr. Vol. 3, at 218:6-24.

121. A 13% increase in TDS in the EFAC alluvium does not constitute a change in water quality at the level of the hydrologic unit (that is, the alluvial aquifer). Hrg. Tr. Vol. 3, at 102:7-103:11, 76:13-77:14.

122. The 13% predicted increase in TDS in the EFAC alluvium would result from currently permitted mining, and the mining operations associated with the AM4 Amendment would not result in any increase in the TDS concentration in the EFAC alluvium. Hrg. Tr. Vol. 3, at 98:9-20; DEQ Ex. 1A, at 9-33.

123. Conservation Groups offered expert testimony from Professor William Gardner, who testified generally that additional mining associated with the AM4 Amendment would result in shorter- and longer-term impacts on the salt load in EFAC. Hrg. Tr. Vol. 1, at 174:3-9.

124. According to Prof. Gardner, the long-term salinity load will be increased in EFAC as migrating spoil water, which has higher TDS than Rosebud coal water, replaces Rosebud coal discharge to the alluvial system. Hrg. Tr. Vol. 1, at 185:21-186:7.

125. Professor Gardner, however, did not calculate an increase in salinity in EFAC associated with the AM4 Amendment. Hrg. Tr. Vol. 1, at 260:23-261:5, 265:6-267:7.

126. Nor did Prof. Gardner consider the fate and transport of calcite and gypsum, which he agreed would affect the volume of TDS, and therefore the amount of salt, that could migrate downstream. Hrg. Tr. Vol. 1, at 261:3-5, 262:2-19.

127. Instead, Prof. Gardner calculated an "observable" 20% increase in TDS for alluvial groundwater. Hrg. Tr. Vol. 1, at 260:23-261:5, 265:2-11.

128. Professor Gardner's testimony also did not address the extent to which the AM4 Amendment would increase the long-term salt-loading to EFAC. Hrg. Tr. Vol. 1, at 260:23-261:5, 264:5-16.

129. Nor did Prof. Gardner's testimony address the question of whether the claimed increase in salt loading to EFAC from the AM4 Amendment would be significant. Hrg. Tr. Vol. 1, at 264:5-16.

130. Instead, Prof. Gardner offered an unsubstantiated opinion that any addition of salt to the hydrologic system constituted an addition of salt to the hydrologic system. Hrg. Tr. Vol. 1, at 264:5-16.

131. DEQ's experts Dr. Emily Hinz and Mr. Martin Van Oort convincingly refuted Prof. Gardner's contentions. Hrg. Tr. Vol. 2, at 232:7-234:8.

132. The AM4 Amendment could not increase the salinity to EFAC because a large section of previously-mined and since-reclaimed spoil area lies between AM4 mining area and EFAC, and therefore mining at AM4 will not increase the concentration of TDS in the existing spoil water which is already migrating towards EFAC. Hrg. Tr. Vol. 2, at 231:25-233:4.

133. The magnitude of the salt loading to EFAC will not increase as a result of the AM4 Amendment; although the duration of the loading will increase. Hrg. Tr. Vol. 2, at 233:13-16, 238:5-13.

134. Regarding the "longer duration of increased TDS entering the alluvium," and "which a portion of that would enter into base flow," the "increased TDS entering the alluvium" that DEQ considered in the CHIA was the increase from *all* mining, including the AM4 Permit:

> Q. Dr. Hinz, you talked about the impacts of mining on East Fork Armells Creek surface water. Is it your understanding that mining from the AM4 expansion will lead to additional salt moving into East Fork Armells Creek?
> A. It is my understanding that it would not result in additional salt beyond what would have occurred from the spoils already approved

and in place in the Area B permit between East Fork Armells Creek and AM4.

Hrg. Tr. Vol. 2, at 264:23-265:2.

135. Dr. Hinz also testified, "The spoil from AM4 would just basically result in additional spoil, so it would result in more of the same. Essentially the water has a carrying capacity of salt that's going through the groundwater, and it just doesn't pick up more than is already going to be picked up." Hrg. Tr. Vol. 2, at 265:6-12.

136. Probabilistic analyses conducted of pre-mine and post-mine salinity in the EFAC alluvium and surface water control reach estimate that only a "very, very, small quantity" of TDS is attributable to mining when compared to the background loading in the system, and the TDS contributions from mining "would not be measurable." Hrg. Tr. Vol. 4, at 24:19-25:1, 33:24-34:9.

137. Because the conducted probabilistic analyses account for all TDS contributions from all prior mining activities on the control reach — Area A, Area B and Area C — it can be expected that the AM4 Permit would contribute a significantly smaller quantity of TDS than that estimated by the probabilistic analysis of all mining and in concentrations not measurable or detectable. Hrg. Tr. Vol. 4, at 14:15-16:4, 38:9-20, 63:8-64:25.

138. The AM4 Permit will not cause an additional increase in TDS levels in groundwater. The AM4 Permit will extend the duration of time that TDS

concentrations increase in groundwater in the vicinity of the Rosebud Mine as a result of all permitted mining. Hrg. Tr. Vol. 3, at 98:12-20, at 236:17-24, 238:14-22, Hrg. Tr. Vol. 2, at 186:12-187:17.

139. Because groundwater inflow to the alluvium provides a minor contribution to EFAC surface water, TDS levels in EFAC will not be significantly impacted by groundwater TDS levels associated with the AM4 Permit. Hrg. Tr. Vol. 2, at 186:12-187:17, 233:25-234:7; Hrg. Tr. Vol. 3, at 239:8-240:3.

140. The "amount of change [of TDS caused by mining associated with the AM4 Permit] would not be statistically significantly measurable" due to other sources of TDS and the "inherent variability of the system." Hrg. Tr. Vol. 3, at 218:6-24.

141. A statistical analysis shows that differences in the pre-mine and post-mine condition resulting from all mining, in terms of TDS levels, cannot be measured. Hrg. Tr. Vol. 3, at 246:20-25.

142. Mining associated with the AM4 Permit will not impact that statistical analysis. Hrg. Tr. Vol. 3, at 247:9-25.

143. Conservation Groups did not calculate the degree to which mining associated with the AM4 Permit would allegedly change the concentration of TDS in EFAC. Hrg. Tr. Vol. 1, at 260:23-261:5, 261:25-262:4, 266:10-267:7, 268:18-23; Hrg. Tr. Vol. 3, at 218:25-219:24.

144. Mining associated with the AM4 Permit will cause "no measurable change to quantity or quality of ephemeral runoff ... off the permit area into East Fork Armells Creek." Hrg. Tr. Vol. 2, at 186:12-22.

145. The AM4 Permit will not change the Class III groundwater classification of EFAC alluvium because the AM4 Permit will not increase the TDS concentrations in groundwater in the vicinity of the Rosebud Mine. Hrg. Tr. Vol. 3, at 98:4-11; 102:6-103:5.

146. The anticipated 13% increase in the concentration of TDS in EFAC would not adversely affect the aquatic life in the water body. Hrg. Tr. Vol. 3, at 66:10-67:1.

147. No evidence was presented showing that mining associated with the AM4 Permit will change the concentration of TDS outside the permit boundary in a manner or to an extent that the C-3 designated uses of EFAC would be adversely affected. Hrg. Tr. Vol. 2, at 201:3-24.

I. Nitrogen

148. The CHIA does not explicitly reference numeric standards for total nitrogen from DEQ-12A, however the data and conclusions in the CHIA demonstrate that the AM4 Permit is designed to prevent material damage from nitrogen impacts. Hrg. Tr. Vol. 3, at 72:20-73:21.

149. The CHIA determined that any addition of nitrate/nitrite to EFAC from AM4 permitted mining would essentially be so diluted as to be immeasurable, and thus well below the DEQ-12A total nitrogen standard of 1.3 milligrams per liter. Hrg. Tr. Vol. 3, at 33:4 to 34:6, 73:15-21; DEQ Ex. 1A, at 9-26.

150. There is a potential for residual blasting agents such as nitrogen, nitrate and nitrite to remain in the spoils after mining. However, the current Rosebud Mine MSUMRA permit identifies blasting techniques as part of the plan for the protection of the hydrologic balance. Hrg. Tr. Vol. 3, at 18:10-14, 19:20-21; DEQ Ex. 1A, at 9-26, 9-57, and 9-78 to 9-79.

151. The current DEQ-approved blasting plan requires the use of the best technology available, including the utilization of an emulsion and ammonium nitrate fuel oil (rather than dynamite), which more completely consumes the blasting agents. Hrg. Tr. Vol. 3, at 196:3-6, 197:4-21.

152. DEQ does not anticipate that any residual nitrogen or nitrate/nitiate associated with the AM4 Amendment will reach EFAC in concentrations of concern. Hrg. Tr. Vol. 3, at 18:15-19:4, 26:1-7; DEQ Ex. 1A, at 9-26.

153. Nitrogen, if any, occurs in the spoils at low levels and does not necessarily migrate to the surface water system or move downstream in the surface water system. Hrg. Tr. Vol. 4, at 30:15-22.

154. Historical residual nitrogen (not associated with the AM4 Permit) remaining in the spoils after historical mining adjacent to EFAC, if any, potentially migrated to EFAC. Hrg. Tr. Vol. 3, at 18:15-19:2. However, the AM4 Permit, being over 6,000 feet upgradient from and not adjacent to EFAC, has less potential to contribute nitrogen to EFAC than historical mining adjacent to EFAC. Hrg. Tr. Vol. 3, at 19:2-7; DEQ Ex.1A, at 9-26.

155. DEQ's conclusion that no material damage would result to EFAC from nitrogen, nitrate or nitrite from AM4 Amendment mining operations was based on an analysis of 30 years of modern data from Rosebud Mine spoils to determine the mobility and likelihood of movement of nitrate/nitrite through those spoils. Hrg. Tr. Vol. 3, at 28:25-29:4.

156. Thirty years of EFAC water samples have not detected a mining signature for nitrogen. Hrg. Tr. Vol. 3, at 38:23-24.

157. As mining has expanded, nitrogen has decreased in EFAC. Hrg. Tr. Vol. 3, at 38:8-24, 79:17-18.

158. Figure 9-17 of the CHIA was created based on monitoring data, and shows that as mining expanded at the Rosebud Mine the data did not reflect any correlating annual increases in nitrate/nitrite in stream samples (which would indicate that mining was the source of nitrate/nitrite exceedances), but instead

show decreasing concentrations of nitrogen. Hrg. Tr. Vol. 3, at 36:16-22, 38:15-24, 77:17-78:9, 79:10-18; DEQ Ex. 1A, at Figure 9-17.

159. There is no discernable trend in the correlation between increased mining and concentrations of nitrogen in EFAC. Hrg. Tr. Vol. 3, at 79:10-16.

160. Upper EFAC does not exceed nitrogen water quality standards. Hrg. Tr. Vol. 2, at 229:14-16.

161. Lower EFAC exceeds nitrogen water quality standards, but the excess nitrogen is not attributable to mining. Hrg. Tr. Vol. 2, at 228:25-230:25; DEQ Ex. 1A, at 9-26.

162. Excess nitrogen in Lower EFAC is attributable to the town of Colstrip, a golf course, a sewage treatment plant, a power plant, municipal run-off, and agriculture. Hrg. Tr. Vol. 2, at 229:3-230:8, 277:10-279:12; Hrg. Tr. Vol. 3, at 80:4-81:12.

163. Excess nitrogen concentrations detected in surface waters downstream of active mining (Lower EFAC) are likely attributable to livestock rather than mining. Hrg. Tr. Vol. 2, at 277:10-12; DEQ Ex. 1A, at 9-26.

164. Excess nitrogen concentrations detected in groundwater wells are aomalous and likely attributable to anthropogenic and agricultural sources rather than mining. DEQ Ex. 1A at 9-78 to 9-79.

165. Residual nitrogen may remain in the AM4 Permit spoils after mining, but if any remains, it is not likely to migrate from the AM4 Permit spoils to EFAC or the EFAC alluvium because of distance and dilution. Hrg. Tr. Vol. 3, at 18:15-19:7, 21:5-12, 33:1-8.

166. AM4 Permit mining is not expected to contribute measurable nitrogen to EFAC. Hrg. Tr. Vol. 3, at 73:15-17.

167. Contributions of nitrogen to EFAC, if any, resulting from the AM4 Permit will be diluted and not in concentrations of concern. Hrg. Tr. Vol. 3, at 29:5-8, 33:4-18.73:15-17.

168. Mining associated with the AM4 Permit will not cause violations of water quality standards, including water quality standards for nitrogen and nitrate + nitrite. Hrg. Tr. Vol. 2, at 211:17-212:12; DEQ Ex. 1A, at 9-26 and 9-27, 10-1.

169. Conservation Groups' experts did not analyze impacts from mining associated with the AM4 Permit specific to nitrogen levels in groundwater or in EFAC surface water.

J. Aquatic Life

170. In a June 2014 deficiency letter (prior to permitting), the Coal Section's surface water hydrologist, Dr. Hinz, made the following request of WECO:

> EFAC existing and anticipated uses included water for livestock, wildlife, and aquatic life. Please confirm, based on current

> and future anticipated concentrations in the stream, that uses have not or will not be impaired. Three aquatic life surveys were completed in the 1970's but there have been none since that time. Please conduct a current aquatic survey along stretches of EFAC adjacent to the Rosebud Mine permit areas (Areas A, B, and C) to identify assemblages of aquatic life using the stream habitat. This information also will be useful for future permit revisions in Area A and Area C.

Western Energy Ex. FFF, at 2.

171. Dr. Hinz requested that WECO collect updated macroinvertebrate sampling data so that DEQ could qualitatively assess whether, for MSUMRA purposes, EFAC was supporting aquatic life and also to compare such data to sampling data from the 1970s. Hrg. Tr. Vol. 2, at 219:20-220:11, 221:18 to 222:2; Hrg. Tr. Vol. 3, at 69:6-9.

172. Flow data coupled with observations of EFAC during regular mine inspections indicate that the reach between the Area A facilities and the Area A Tipple may have intermittent to perennial water, at least since 2011. DEQ Ex. 1A at 9-7.

173. Dr. Hinz explained the impact of this intermittent water with respect to the CHIA:

> So as we were writing the hydrological impact assessment, we became concerned that there was a section of stream that could be intermittent, the section I described before between the Area A facilities and the juncture of [EFAC] with the highway. Because it would be intermittent, it – if it was intermittent, then different standards would apply as I described before where we would have some numeric standards relating to aquatic life. So part of our assessment was to ask the mine to collect some current

> macroinvertebrate data so that we could qualitatively assess the use of that stream for aquatic life, plus we had some data from the 1970s and some anecdotal data from the '90s that stated that this section was supporting aquatic life. So we used it purely as just yet one more line of evidence to determine if the [EFAC] was currently supporting its uses and -- with respect to just being an intermittent stream. It was not meant to go beyond the scope of MSUMRA.

Hrg. Tr. Vol. 2, at 219:14-220:11.

174. Aquatic life surveys were conducted in the 1970s along EFAC in connection with prior permitting for the Rosebud Mine, and only used as a general analysis of stream habitat conditions, rather than to determine specific stressors. DEQ Ex. 1A, at 9-7.

175. In response to Dr. Hinz's request, WECO engaged Penny Hunter from ARCADIS U.S., Inc., who surveyed aquatic macroinvertebrates in EFAC in October 2014, and produced a report (Arcadis Report). DEQ Ex. 7.

176. The 2014 Arcadis Report was not intended to serve as a water quality assessment; therefore, calculation of metrics such as the O:E and Bray Curtis indices and comparison to reference stream were not necessary and were not part of the 2014 Arcadis Report. Hrg. Tr. Vol. 1, at 298:13-20, Vol. 2, at 18:6-25, Vol. 3, at 162:25-163:14, 164:4-6, Vol. 4, at 179:17-20, 187:3-22, 261:4-20, 263:2-22.

177. Western Energy, through ARCADIS, conducted the aquatic life survey consistent with guidance provided by DEQ regarding appropriate methodology and protocols and submitted the aquatic life survey to DEQ on

February 2, 2015, with its response to the seventh deficiency letter from June 2014. Western Ex. GGG; DEQ Ex. 7; MEIC Ex. 45; DEQ Ex. 11; MEIC Ex. 25; Western Ex. V.

178. The 2014 Arcadis Report produced data showing macroinvertebrate diversity in EFAC. Hrg. Tr. Vol. 1, at 298:13-20.

179. Dr. Hinz discussed her request for Upper EFAC macroinvertebrate sampling data from Western Energy in connection with the AM4 Amendment with staff of DEQ's Water Quality Planning Bureau before she requested WECO gather updated macroinvertebrate data. Hrg. Tr. Vol. 3, at 162:8-17; MEIC Ex. 15.

180. DEQ directed ARCADIS to utilize DEQ's Sample Collecting, Sorting, Taxonomic Identification, and Analysis of Benthic Macroinvertebrate Community Standard Operating Procedure (March 2012), (MEIC Ex. 25), to collect, but not analyze, updated macroinvertebrate data from upper EFAC in connection with the AM4 Amendment permitting process. Hrg. Tr. Vol. 3, at 165:20-166:4, 183:22-184:8, MEIC Ex. 43; Hrg. Tr. Vol. 2, at 87:24-90:1.

181. Water Quality Planning Bureau Chief Eric Urban, advised DEQ Coal Section staff, consistent with DEQ's Water Quality Assessment Methods (Nov. 2011) (DEQ Ex. 11 Table A-2), that analyzing macroinvertebrate data in conjunction with indices of biologic integrity would not provide an accepted or reliable indicator of aquatic life support functionality in an eastern Montana

ephemeral stream for Section 303(d) listing purposes. Hrg. Tr. Vol. 3, at 163:8-14, 164:1-6.

182. Consistent with DEQ's Water Quality Assessment Methods (DEQ Ex. 11) Mr. Urban directed his staff to report on taxa and assist with any discussions of what the stand-alone sampling showed. Hrg. Tr. Vol. 3, at 163:8-14; 164:1-23; *see also* MEIC Ex. 15, at 2.

183. Mr. Urban did not disagree that the macroinvertebrate data at issue could be used to assess individual species, or be utilized from another angle or discipline other than the direct assessment of overall stream health for 303(d) listing and assessment purposes. Hrg. Tr. Vol. 3, at 164:1-6; *see also id.*, at 179:1-11.

184. DEQ's Water Quality Assessment Methods, reflects the Departments findings that the ephemeral nature of ephemeral streams affects the communities of aquatic biota that a stream is capable of supporting and thus affects the types of analytical data which could be gathered from such streams, thereby limiting the usefulness or reliability of macroinvertebrate data for the purposes of determining whether an ephemeral stream is in compliance with water quality standards. DEQ Ex. 11, at Table A-2; Hrg. Tr. Vol. 3, at 151:7-24, 179:4-11.

185. In November of 2011, and after extensive investigation and consideration, DEQ revised its Water Quality Assessment Methods to reflect its

determination that naturally occurring variables such as low flow, high temperatures, poor sediment, and high salinity (all of which are indistinguishable from anthropogenic impacts) preclude macroinvertebrate sampling from serving as a reliable or useful metric for assessing the aquatic life support functions of eastern Montana prairie streams for purposes of DEQ's Clean Water Act Section 303(d) impaired waters list. Hrg. Tr. Vol. 3, at 136:4-138:24, 166:23-176:3, DEQ Ex. 11, at Table A-2.

186. DEQ accordingly does not utilize or consider analyses of macroinvertebrate data via indices of biological integrity such as the Montana Hilsenhoff Biotic Index (MT-HBI) or Montana Observed: Expected model (MT O:E) or any "reference stream" approach to assess aquatic life support standard compliance in prairie streams for 303(d) listing purposes. Hrg. Tr. Vol. 3, at 167:4-25; 168:2-4; 169:1-8.

187. DEQ instead assesses aquatic life support functions of eastern Montana ephemeral prairie streams with important physical metrics such as streamside alteration of vegetative habitat. Hrg. Tr. Vol. 3, at 154:16 to 155:14; DEQ Ex. 9.

188. In connection with DEQ's AM4 material damage determination, Dr. Hinz appropriately utilized the updated macroinvertebrate sampling data via a qualitative analysis as an indicator of whether or not aquatic life was still being

supported in EFAC at its current TDS concentrations. Hrg. Tr. Vol. 2, at 221:18-222:12, 226:21-24.

189. A qualitative analysis differs from a quantitative analysis, which typically involves a statistical assessment of numeric data or using of one or more selected metrics. Hrg. Tr. Vol. 2, at 220:20-221:2.

190. Dr. Hinz's concluded the updated macroinvertebrate survey empirically demonstrated that a diverse community of macroinvertebrates, consisting of taxa commonly found in eastern Montana prairie streams, was using the stream reach at issue. Hrg. Tr. Vol. 2, at 257:1-5, 258:1-7, 259:2-4; Hrg. Tr. Vol. 3, at 87:1-13; DEQ Ex. 1A, at 9-8; DEQ Ex. 1, at 9.

191. Dr. Hinz also compared the updated (2014) macroinvertebrate sampling data to the 1970s macroinvertebrate data to conclude that the data from 2014 was consistent, in terms of taxa richness (that is, numbers), with the data collected in the 1970s. DEQ Ex. 1A, at 9-7, Table 6-3.

192. The prior 1970s macroinvertebrate sampling data provided a baseline of conditions in EFAC before a large amount of mining took place in the EFAC drainage basin. Hrg. Tr. Vol. 2, at 223:15-225:25.

193. The 2014 Arcadis Report shows that EFAC's beneficial use of aquatic life is supported and is consistent with natural conditions of ephemeral prairie

streams and with historic data. Hrg. Tr. Vol. 2, at 221:14-222:11; Hrg. Tr. Vol. 4, at 189:7-13, 258:11-259:12, 260:23-261:20.

194. "[T]axa richness was similar at all the sites sampled along East Fork Armells Creek" in the 1970s, and the 2014 Arcadis Report demonstrates similar diversity of the macroinvertebrate community in EFAC. DEQ Ex. 1A, at 9-7 to 9-8.

195. Ms. Hunter, a qualified expert in aquatic toxicology and biological monitoring, agreed with Dr. Hinz's conclusion that the taxa richness had remained consistent in EFAC between the sampling events in the 1970s and 2014. Hrg. Tr. Vol. 4, at 174:22-175:5, 184:4-187:2.

196. DEQ obtained and utilized the updated macroinvertebrate sampling data for purposes of an impact assessment for material damage determination under MSUMRA rather than to assesses whether EFAC was currently meeting water quality standards under Section 303(d) of the Clean Water Act. Hrg. Tr. Vol. 3, at 88:6-13.

197. Dr. Hinz assessed multiple lines of evidence (physical, chemical and biological) in order to reach her determination that there would be no material damage to the aquatic life uses of EFAC from the AM4 Amendment. Hrg. Tr. Vol. 3, at 70:21-71:2; Hrg. Tr. Vol. 2, at 228:3-10; DEQ Ex. 1A at 9-7 to 9-8, 9-11, 9-26.

198. As the CHIA demonstrates, DEQ Coal Section staff assess available biological, physical, and chemical data in its entirety in order to make a material damage determination. Hrg. Tr. Vol. 3, at 71:1-6.

199. Sean Sullivan, an expert in aquatic ecology and taxonomy, understood that macroinvertebrate monitoring can be conducted for purposes other than an attainment demonstration under the 303(d) list, and agreed that macroinvertebrate data could be used to assess the question of whether there was macroinvertebrate life in EFAC. Hrg. Tr. Vol. 2, at 98:6-10, 114:10-115:13.

200. Mr. Sullivan's fieldwork experience has predominantly involved western Montana streams, which have significantly different physical, chemical and biological characteristics as compared to eastern Montana streams. His fieldwork has not included eastern Montana prairie streams, and he has not visited or observed conditions in East Form Armells Creek. Hrg. Tr. Vol. 2, at 37:3-25, 38:12 to 39:9.

201. Streams in eastern Montana differ significantly from western Montana streams in terms of geomorphology, stream channel formation, substrates, aquatic life habitat and overall system ecology. Hrg. Tr. Vol. 3, at 129:23-130:5.

202. Eastern Montana streams typically originate in an ephemeral nature, being snowmelt-driven, which usually occurs in a February to March timeframe. Hrg. Tr. Vol. 3, at 129:14-22.

203. Mr. Sullivan did not conduct a material damage assessment in this case, nor has he ever conducted such an assessment as of the date of his testimony. Hrg. Tr. Vol. 2, at 44:22-45:10.

204. Unlike DEQ staff, Mr. Sullivan, did not compare any of the water chemistry upstream of the mine to water chemistry downstream from the mine. Hrg. Tr. Vol. 2, at 74:3-7.

205. Mr. Sullivan's testimony did not include any kind of causal assessment or empirical data addressing any potential cause of impairment in EFAC. Hrg. Tr. Vol. 2, at 69:24-72:4.

206. Mr. Sullivan understood and agreed that DEQ does not use macroinvertebrate data to make attainment demonstrations for purposes of the 303(d) list in the Eastern Montana prairie streams, although Mr. Sullivan does not really know how DEQ went about making its 303(d) determination that EFAC is impaired for aquatic life use support. Hrg. Tr. Vol. 2, at 80:10-15, 95:10-17.

207. Mining associated with the AM4 Permit will not cause violations of water quality standards, including water quality standards designed to protect aquatic life. Hrg. Tr. Vol. 2, at 211:17-212:12; DEQ Ex. 1A at 9-26-9-27, 10-1.

208. Coal mining has never been a confirmed "source of impairment" for aquatic life beneficial use in either Upper EFAC or Lower EFAC. Hrg. Tr. Vol. 3,

at 123:11-124:19, 125:17-126:14, 126:19-127:9, 142:17-143:7, 148:8-149:3, 156:12-157:10, 160:13-161:4.

K. Material Damage

209. The AM4 CHIA assesses the cumulative hydrologic impacts of the AM4 Amendment and provides an affirmative demonstration that material damage to surface water or groundwater will not result from mining associated with the AM4 Amendment. DEQ Ex. 1A at 9-1 to 9-87, 10-1 to 10-2; *see also* Hrg. Tr. Vol. 2, at 195:4-17, 197:24-198:6, 197:7-15.

210. The CHIA includes a cumulative impact analysis of all mining that would interact with AM4. Hrg. Tr. Vol. 3, at 72:9-13; DEQ Ex. 1A, at 2-7.

211. DEQ's determination material damage assess impacts to the hydrologic balance at the level of a hydrologic unit, such as an aquifer (in the case of groundwater) or a stream basin or sub-basin (in the case of surface water). Hrg. Tr. Vol. 2, at 196:18-22, 196:23-197:5, 196:18-197:5.

212. DEQ determined for every impact analyzed in connection with the AM4 Amendment that it was more likely than not that there would be no material damage from AM4 to the hydrologic balance outside of the permit boundary. Hrg. Tr. Vol. 2, at 211:6-10, 211:11-16.

i. Surface Water Material Damage Assessment

213. For surface waters, DEQ's material damage criteria include narrative, numeric and other generally applicable water quality standards, except in the case of ephemeral streams to which numeric water quality standards are inapplicable. Hrg. Tr. Vol. 2, at 211:17-212:12; DEQ Ex. 1A, at 2-3 to 2-5.

214. DEQ's surface water assessment here analyzed multiple lines of data (physical, biological and chemical) to identify the likely impacts of the AM4 Amendment outside the permit boundary. Hrg. Tr. Vol. 2, at 212:3-6.

215. The CHIA concluded that mining associated with the AM4 Amendment would not result in any additional water quality impacts to EFAC or cause EFAC to fail to meet designated uses of the C-3 classification outside the permit boundary. Hrg. Tr. Vol. 2, at 186:20-22, 201:9-12; DEQ Ex. 1A, at 9-9 and 9-11.

216. For example, mining from the AM4 expansion will not lead to higher salt concentrations in EFAC beyond those already resulting from spoil currently in place between EFAC and AM4 which was previously approved in the Area B permit and analyzed under earlier CHIAs. Hrg. Tr. Vol. 2, at 264:20-265:2.

217. Groundwater in spoil has what is essentially a carrying capacity in terms of salt saturation beyond which salt concentrations are not likely to increase, which in this case is not expected to cause exceedances of material damage

thresholds, although the duration of increased salt concentrations and the overall load of salt are expected to increase as a result of the AM4 Amendment. Hrg. Tr. Vol. 2, at 232:11-233:4, 265:8-12.

218. Surface water and groundwater systems are considered to be connected. Hrg. Tr. Vol. 1, at 219:9-11.

219. The duration of an impact below the material damage threshold has no effect on a material damage determination, because material damage is merely a magnitude threshold. Hrg. Tr. Vol. 2, at 190:4-12, 234:3-6.

220. After mining, the additional spoil water associated with the AM4 Amendment would flow through the existing spoils and eventually reach EFAC, resulting in more similar-quality spoil water reaching the creek, without increasing the concentration of TDS at any given time in EFAC. Hrg. Tr. Vol. 2, at 233:5-234:8.

221. The process by which groundwater moves from bedrock adjacent to the alluvium into the alluvium is known as "lateral recharge." Hrg. Tr. Vol. 1, at 219:12-18.

222. Although Prof. Gardner posited that lateral recharge from the Rosebud coal to the alluvium plays an important role contributing to the surface water flow dynamics of EFAC, the data shows that the groundwater discharge from the alluvium (with contributions from Rosebud coal) to EFAC is insignificant and not

a critical component of the groundwater balance. Hrg. Tr. Vol. 1, at 223:5-224:7, 269:15-272:19; MEIC Ex. 6, at 157-158; Hrg. Tr. Vol. 2, at 236:16-237:4.

223. Previously approved mining adjacent to EFAC in Area B was completed decades ago (generally in the 1970s and 1980s), and the spoil from this mining has become saturated in the intervening years and developed the existing concentrations of TDS. Hrg. Tr. Vol. 2, at 233:17-24; DEQ Ex. 1A, at 9-58 to 9-59.

224. The monitored water quality in EFAC downstream of the Rosebud Mine and upstream of the town of Colstrip nonetheless shows that the water exiting the permit area has lower specific conductance, TDS and nitrate-nitrite concentrations than samples taken downstream of the mine in Colstrip where EFAC is subject to multiple non-mining anthropogenic impacts. Hrg. Tr. Vol. 2, at 228:16-231:24; DEQ Ex. 1 at 9.

225. The AM4 Amendment is located over 6,000 feet upgradient from EFAC and is not adjacent to the creek. Hrg. Tr. Vol. 3, at 19:2-4; DEQ Ex. 1A, at 9-26.

226. During mining, ponds and impoundments for the AM4 Amendment will be located along the edge of the permit boundary between the mining area and the stream, and will intercept surface runoff to EFAC, resulting in reduced surface runoff to the stream during mining. Hrg. Tr. Vol. 2, at 181:18-23.

227. These structural best management practices are, however, designed to protect water quality by preventing excess sediment from disturbed ground which has been stripped of vegetation from reaching EFAC until approximate pre-mine conditions are restored. Hrg. Tr. Vol. 2, at 183:4-7.

228. Increases in sediment in runoff are the primary changes in surface water quality associated with the AM4 Amendment. Hrg. Tr. Vol. 2, at 183:2-4.

229. While strip-mining causes impacts to surface water quality and quantity, once the excavation is backfilled and replaced with graded, post-mine topography, measurable changes to the quantity and quality of surface runoff from the Rosebud Mine are not expected. Hrg. Tr. Vol. 2, at 186:12-22.

230. Following mining and reclamation, surface water quantity and quality is expected to return to pre-mine conditions. Hrg. Tr. Vol. 2, at 182:20-183:2, 186:15-22.

231. The AM4 Permit will cause no measurable change in the quality of ephemeral runoff flowing over the surface of the land and into EFAC. Hrg. Tr. Vol. 2, at 186:15-20.

232. Mining associated with the AM4 Permit, as presented in the application and as analyzed by DEQ, would not result in material damage to surface water. Hrg. Tr. Vol. 2, at 197:7-15, 201:3-24.

ii. Groundwater Material Damage Assessment

233. In terms of water quantity impacts to groundwater, the AM4 Amendment will increase the drawdown or reduction in water levels which already exists from previous mining in the immediate vicinity of those additional mine cuts that are shown in Figure 3-1 in the CHIA. Hrg. Tr. Vol. 2, at 188:3-13; DEQ Ex. 1A, at 9-80 to 9-81, Figure 9-84.

234. The CHIA concluded that the AM4 Amendment would have impacts to groundwater quantity, particularly in the overburden and the Rosebud coal near the mine pits, although not in a manner or to the extent that material damage will occur to the hydrologic balance outside the permit area. Hrg. Tr. Vol. 2, at 210:9-15; DEQ Ex. 1A, at 9-83.

235. The additional proposed mining associated with the AM4 Amendment is expected to take approximately six years, which will extend the Area B drawdown by six years, expand the spoils aquifer by roughly 8%, and proportionally extend the time for the Area B spoils aquifer to re-saturate by roughly the same amount (8%). Hrg. Tr. Vol. 2, at 189:5-10, 17-25.

236. Given that groundwater in the vicinity of Rosebud Mine (like all groundwater in Montana) is classified based on the natural specific conductance of the groundwater, DEQ looked at each hydrologic unit and what the concentrations of specific conductance were for those units, and determined which standards

apply based upon the class of those groundwater units. Hrg. Tr. Vol. 2, at 212:19-213:4; DEQ Ex. 1A, at 2-5.

237. In general, the groundwater units in the Rosebud Mine area fall into Class II and Class III waters. Class II groundwaters waters have specific conductance between 1,000 and 2,500 microsiemens per centimeter, while Class III groundwaters waters have specific conductance between 2,500 and 15,000 microsiemens, and narrative standards also apply to both classes based on the uses designated for such classes. Hrg. Tr. Vol. 2, at 213:5-15; DEQ Ex. 1A, at 2-5.

238. Figure 9-21 depicts with cross-sections the subsurface hydrologic units assessed in the CHIA. Hrg. Tr. Vol. 2, at 208:3-7; DEQ Ex. 1A, Figure 9-21.

239. The first layer depicted in CHIA Figure 9-21 is alluvial material, consisting of highly permeable and transmissive gravel and silt, and unconsolidated material. Hrg. Tr. Vol. 2, at 208:14-25; DEQ Ex. 1A, at Figure 9-21.

240. Below the alluvium, water-bearing bedrock units depicted in Figure 9-21 include overburden, which consists of a varied series of sedimentary rocks including sandstone, silt stone and mud stone. Hrg. Tr. Vol. 2, at 209:4-16; DEQ Ex. 1A, at Figure 9-21.

241. Beneath the overburden is the Rosebud coal seam, followed in descending order by a layer of sedimentary interburden, the McKay coal seam and

the sub-McKay underburden. Hrg. Tr. Vol. 2, at 209:19-210:5; DEQ Ex. 1A, at Figure 9-21.

242. In terms of water quality, the spoil that is produced as a result of the AM4 mining is expected to have a similar water quality as the previously existing and currently permitted spoil areas, so it is not expected to have any impact on the offsite water quality. Hrg. Tr. Vol. 2, at 188:14-19, 210:16-25.

243. Mining associated with the AM4 Permit will only increase the duration of time that groundwater impacts the small intermittent reach of EFAC closest to the mine; mining associated with the AM4 Permit will not increase the severity of the impact. Hrg. Tr. Vol. 2, at 186:23-187:5.

244. Mining associated with the AM4 Permit "would have no change to the water quality impacts from mining on EFAC." Hrg. Tr. Vol. 2, at 186:20-22.

245. The hydrologic consequences and cumulative hydrologic impacts of mining associated with the AM4 Permit, specifically the anticipated increase in surface water TDS, will not preclude existing land uses outside the mining area. DEQ Ex. 1A, at 10-1.

246. EFAC is classified as a C-3 surface water and the designated uses of EFAC outside the AM4 Permit area, but within the cumulative impacts area, are bathing, swimming, recreation, growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and fur bearers and marginal support of drinking,

culinary, and food processing purposes, agriculture and industrial water supply. Historic and current surface water uses in and adjacent to the mine include domestic, livestock, wildlife and industrial. However, because EFAC is "predominantly ephemeral, many of these uses are really only in existence when water is flowing." Hrg. Tr. Vol. 2, at 201:3-24; DEQ Ex. 1A, at 6-1 to 6-3.

247. Mining associated with the AM4 Permit would not result in any changes to the C-3 designated uses of EFAC. Hrg. Tr. Vol. 2, at 201:3-24.

248. No evidence was presented showing that mining associated with the AM4 Permit will cause any changes outside the permit boundary in a manner or to an extent that land uses would be adversely affected. Hrg. Tr. Vol. 1, at 260:23-261:5, 261:25-262:4, 266:10-267:7, 268:18-23; Hrg. Tr. Vol. 4, at 245:22-246:9.

DISCUSSION

B. TDS and Material Damage

In their Notice of Appeal, Conservation Groups alleged that DEQ's permit "did not support a negative material damage determination with respect to ... violations of water quality standards in the upper and lower segments of [EFAC], which DEQ has previously attributed to operations of the Rosebud Mine." Notice of Appeal, at 3. Conservation Groups essential argument is that because EFAC is already listed as a 303(d) impaired water (*i.e.*, already violating water quality standards for salinity and not supporting its Class III beneficial uses), *any*

increased violations of water quality standards—(*e.g.*, in salinity) to EFAC will necessarily cause material damage to EFAC and therefore violate Mont. Code Ann. § 82-4-227(3)(a) and Admin. R. Mont. 17.24.405(6).[3]

First, the evidence presented at hearing belied Conservation Groups' claim, that EFAC's existing impairment was "previously attributed to operations of the Rosebud Mine." Testimony from Mr. Urban, Dr. Hinz, and Mr. Van Oort, in conjunction with exhibits DEQ 10 and DEQ 1A, at 9-85 to 9-87, showed that the Water Quality Planning Bureau and the Coal Section did not believe EFAC's existing impairments were attributable to coal mining. Rather, the evidence showed that salinity in Upper EFAC was likely attributable to its inherent nature as an ephemeral stream and the loss of streamside vegetation, most likely as a result of agriculture. *See supra,* at FOF § G. With respect to Lower EFAC, impairments were likely attributable to other downstream sources (*e.g.*, the town of Colstrip). *Id.* Similarly, Upper EFAC was not supporting most of its beneficial uses (*e.g.*, wading, swimming, salmonid fishes, etc.) because of its ephemeral nature. *Id.*

[3] Conservation Groups also make much of the fact that DEQ has not completed a Total Maximum Daily Load (TMDL) analysis for EFAC. However, Conservation Groups point to no law that requires a TMDL analysis for the purpose of MSUMRA's "material damage" assessment. If DEQ were required to undertake a TMDL for EFAC (which is by no means certain), such a requirement would be found in the Water Quality Act, not MSUMRA. The only issue in this case is the analysis of the AM4 Amendment pursuant to MSUMRA: is the permit designed to prevent "material damage." Therefore, absent some law engrafting the Water Quality Act's TMDL requirements onto MSUMRA's material damage assessment (as the water quality standards have been engrafted pursuant to Mont. Code. Ann. § 82-4-203(31) and Admin. R. Mont. 17.24.301(68)), discussion of a TMDL for EFAC is irrelevant to the present case.

Conservation Groups did not produce any convincing evidence that EFAC's existing impairment was previously attributed to operations of the Rosebud Mine.

Second, Conservation Groups' conclusion (that the AM4 will increase salinity and therefore necessarily cause increasing violations of water quality standards) is faulty both as a matter of fact and as a matter of law.

As a matter of fact, Conservation Groups' conclusion fails because there is no evidence that the AM4 Amendment, which is the only permitting decision at issue in this case, will cause any increase in salinity to the EFAC alluvium. Conservation Groups make much of a calculation in the PHC Addendum to the CHIA that salinity will increase 13% over baseline TDS concentrations in EFAC alluvium. DEQ Ex. 6A, at 29. However, Conservation Groups fail to grasp (or intentionally oviscape) the fact that this calculation in the PHC is for groundwater in the spoils of all of Areas A and B of the mine after mining is complete. *Id.* The exact quote from the PHC is:

> The transport of groundwater containing higher TDS concentrations will increase with time as groundwater levels in spoils recover toward pre-mine conditions in both Areas A and B. Once those water levels fully recover, it is estimated that increase in TDS in the alluvium will be about 13 percent when compared to baseline conditions.

Id. Thus, the 13% increase in TDS is not specific to the amount of TDS added to the alluvium by the AM4 Amendment, but rather the overall TDS that is added to the groundwater by all the mining in the area, including previously permitted areas.

Conservation Groups repeatedly confuse this potential 13% increase in the total TDS alluvium groundwater under Areas A and B of the mine to mean that the AM4 amendment "will increase salt by at least 13% in EFAC." *See, e.g.*, MEIC Resp. to Prop. FOFCOL, at 17. This is simply not a fact. Nothing in the evidence indicates that the surface water in EFAC (to the extent it exists at all in the ephemeral portions) will have a 13% salt increase as a result of the AM4 Amendment. The only evidence of any 13% increase in TDS concentrations is the PHC's estimation for all the groundwater alluvium, including previously-permitted Areas A and B.

Regarding AM4 specifically (which is all this case concerns), DEQ and Intervenors presented convincing expert testimony to support the CHIA's conclusion that even a 13% increase in salinity (if the general impact from all mining presented by the PHC Addendum were applied specifically to the EFAC alluvium) would not materially damage EFAC's alluvium. DEQ's and Intervenors' experts explained that this type and level of change occurs naturally and in much larger magnitude than a 13% change within the EFAC alluvium. *See, e.g.*, CHIA Figure 9-23, well WA-104; Hrg. Tr. Vol. 3, at 218:6-24. Therefore, the "amount of change would not be statistically significantly measurable" due to other sources of TDS and the "inherent variability of the system." Hrg. Tr. Vol. 3, at 218:6-24, 246:20-25, 247:9-25. The TDS, or salt loading, caused by all previous

mining (not just mining associated with the AM4 Permit) provides a "very, very small quantity" of the salt load in the basin when compared to the natural background levels of salt in EFAC. Mining may only contribute less than 2 percent of the load. Hrg. Tr. Vol. 4, at 24:19-25:1, 25:22-27:17.

As a matter of law, Conservation Group's arguments regarding salinity fail because there must be some causal connection between the permitted mining activity and a water quality violation. If water is already exceeding water quality standards for reasons *not* associated with mining, as is the case with EFAC, then exceedance alone cannot be the basis for denial of a mining permit application. The analysis is whether "the proposed operation is designed to prevent the probable cumulative impacts from causing material damage to the hydrologic balance outside the permit area." Mont. Code Ann. § 82-4-227(3)(a)). As Intervenors explain:

> material damage is defined as "degradation or reduction by coal mining and reclamation operations of the quality or quantity of water outside the permit area in a manner or to an extent" that the impact meets one of three thresholds: (1) land uses or beneficial uses of water are adversely affected; (2) water quality standards are violated; and/or (3) water rights are impacted. These three thresholds implicate specific portions of the Montana Water Quality Act. But in the context of material damage determinations, the analysis must focus on whether the impact from mining complies with the specific portions of the Montana Water Quality Act, not whether existing conditions in the stream overall do. Therefore, the analysis must focus on the impacts from mining.
>
> The Montana Water Quality Act does not treat beneficial uses as "water quality standards." Instead, it distinguishes between

beneficial uses, which are used to classify state water (Mont. Code Ann. § 75-5-301(1)), and water quality standards, which are designed to "protect the beneficial uses set forth in the water use descriptions for the . . . classifications of water." Admin. R. Mont. 17.30.620; Mont. Code Ann. § 75-5-301(2). MSUMRA's material damage definition, which treats beneficial uses and water quality standards as distinct elements, is consistent with this feature of the Montana Water Quality Act.... .

MSUMRA does not ask whether impacts from proposed mining will "contribute to existing violations of water quality standards" but whether the mine has been "designed to prevent material damage," *i.e.*, "degradation or reduction by coal mining and reclamation operations in a manner or to an extent that . . . water quality standards are violated." Petitioners do not and cannot demonstrate that the AM4 Permit will cause violations of water quality standards. Petitioners cite two chemical parameters – salinity and nitrogen – in support of their claim, but the evidence demonstrates that the AM4 Permit has been designed to prevent material damage on both of these parameters...

Petitioners' argument on salinity fails because the record clearly demonstrates that the AM4 Permit will not change the salinity in the affected waters and because Petitioners have identified no water quality standard violation. The Department applies a narrative standard to evaluate impacts from salinity. Admin. R. Mont. 17.30.637(1)(d). To demonstrate that the AM4 Permit will cause a violation of this narrative water quality standard, Petitioners must provide proof of causation between mining under the AM4 Permit and the presence of salts in the water at toxic or harmful levels. Admin. R. Mont. 17.30.637(1). Petitioners presented no evidence that salinity from current mining (which will remain unchanged under the AM4 Permit), is toxic or harmful, let alone any evidence that salinity from the AM4 Permit alone is toxic or harmful. Petitioners' proposed conclusions relating to increased "salt loading" misstate the testimony, fail to establish any violation of this narrative water quality standard, and fail to connect the mine's impact to violation of this narrative water quality standard.

Intervenors Resp. Prop. FOFCOL at 2-5.

Conservation Groups also argue that, as a factual matter, the increase in salinity from the AM4 specifically will increase the amount of time it takes for the groundwater to return to pre-mine conditions. However, Conservation Groups failed to provide sufficient evidence even to make this hypothesis into a more likely than not probability. Dr. Gardner only hypothesized about an increase in salt migrating to the alluvium of EFAC based on removal of Rosebud coal; he never actually calculated a change in TDS concentration or load for EFAC and did not consider the fate and transport of calcite and gypsum, which would affect the volume of TDS that could migrate downstream. Hrg. Tr. Vol. 1, at 261:3-5, 262:2-19, 278:5-12. Further, Dr. Gardner testified that the AM4 Permit "has the potential to either increase the TDS or maintain higher concentrations for longer." Hrg. Tr. Vol. 4, 233:21-25. Thus, Prof. Gardner provided two options. The experts who actually did the calculations (testifying for DEQ and Intervenors) concluded the result would be the later, not the former. The calculations support the conclusion, consistent with the PHC Addendum (as explained above), that the AM4 Permit will not cause an additional increase in TDS levels in groundwater.

Conservation Groups point to Dr. Hinz's testimony on cross-examination regarding the "longer duration of increased TDS entering the alluvium, which a portion of that would enter into base flow." Hrg. Tr. Vol. 2, at 264:23-25, 265:1-2. However, again Conservation Groups fail to point out that the "increased TDS

entering the alluvium" that was being considered was the increase from *all* mining, including the AM4 Permit. DEQ Ex. 6A, at 29. Dr. Hinz again clarified her answer when asked again:

> The spoil from AM4 would just basically result in additional spoil, so it would result in more of the same. Essentially the water has a carrying capacity of salt that's going through the groundwater, and it just doesn't pick up more than is already going to be picked up.

Hrg. Tr. Vol. 2, at 265:6-12. Here, Dr. Hinz was explaining that DEQ had considered the cumulative impact of all mining, including the AM4 Permit, and had concluded that the impact would not change with the *additional* mining associated with the AM4 Permit. DEQ's conclusion was the latter of the two options provided by Prof. Gardner — that it would "maintain higher concentrations for longer." Hinz, Vol. 2, 187:23-24 ("the duration would increase"); *see also* Hrg. Tr, Vol. 2, at 188:14-25, 189:1-10 ("In terms of water quality, the spoil that is produced as a result of the AM4 mining is expected to have a similar water quality as the previously existing and currently permitted spoil areas, so it is not expected to have any impact on the offsite water quality" but would extend the recovery time).[4]

[4] Neither side presented any convincing evidence about exactly how or to what extent the duration of time for "salt loading" would actually increase because of the AM4 Amendment specifically. The most detailed evidence provided on the subject was the Intervenor's, which stated that: the additional proposed mining associated with the AM4 Amendment is expected to take approximately six years, which will extend the Area B drawdown by six years, expand the spoils aquifer by roughly 8%, and proportionally extend the time for the Area B spoils aquifer to re-saturate by roughly the same amount (8%). Hrg. Tr. Vol. 2, at 189:5-10, 17-25. DEQ's expert, Dr. Hinz, stated generally that the duration of time could increase "some tens to hundreds of years" but noted that "[i]t's very hard to

DEQ and Intervenors explain that, as a matter of law, this increase in duration of time is not measurable or relevant for a material damage analysis because a "[m]aterial damage is merely a magnitude threshold." Hrg. Tr. Vol. 2, at 235:3-6. The anticipated impact of the AM4 Amendment, including the increased duration, was calculated and considered by DEQ in the context of a material damage determination where it is the magnitude of the *impact* that matters. Hrg. Tr., Vol. 2, at 190:4-8. In this case, DEQ found the magnitude of the impact from the AM4 Permit to be indistinguishable from the current mining impact. Therefore, the AM4 Permit causes no increase in salinity and no material damage. As DEQ explains:

> [W]hile the AM4 Amendment will increase duration of increased salt concentrations and the overall load of salt to the alluvium over time, it will not increase the concentration of such salt in the alluvium Tr. Vol. 2 at 232:11-233:4; 265:8-12, Vol. 4 at 39:4-20. From a scientific perspective, simply saying that there will be "more" salt in the system fails to differentiate between load and concentration. *Id.* The distinction is critical for the purposes of a material damage assessment, however, since the narrative and numeric standards applicable to groundwater in the area of the Rosebud Mine are expressed in terms of pollutant concentrations. *See* ARM 17.30.1006. Concentrations are always expressed in units in mass per volume of water, typically milligrams per liter. Tr. Vol. 4 at 63:23-64:10. The narrative and numeric standards applicable to [EFAC] are likewise expressed in terms of pollutant concentrations. *See* ARM 17.30.637(1)(d);17.30.629(f) and (h). The AM4 Amendment will not increase the concentration of salt (zero "contribution") but it will

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give exact numbers for spoil recovery." Hrg. Tr. Vol. 2, at 187:23 to 188:2. As this was the most precise evidence offered, and apparently precise evidence on this point may be impossible, it is difficult to know how to value the potential increase in the duration of time from the AM4 Amendment with respect to a "material damage" determination.

increase the duration of the increased TDS entering the alluvium. Tr. Vol. 2 at 264:18-265:12. As Mr. Van Oort explained:

> The changes in the PHC and CHIA which were discussed —and, again, Dr. Dicklin's 13 percent estimate is an estimate that is the changes in TDS from the currently permitted mining. AM4 will not increase that estimate because it simply extends the duration of time that that same amount or same concentration of spoil water will enter the stream. So, the addition of AM4 does not add to the concentration of TDS for conductivity in the [EFAC] alluvium. Tr. Vol. 3 at 98:12-20; *see also* DEQ-1A at 9-33.

MEIC's expert, Professor Gardner, by contrast, did not address changes in pollutant concentrations and instead simply testified that any additional TDS from mining would add more salinity to the hydrologic system. Tr. Vol. 1 at 174:3-175:6, 185:20-186:7, 187:7-10, 260:23-261:5, 264:5-16, 277:5-278:14, Vol. 4 at 233:7-234:5. Professor Gardner also did not calculate an increase in salinity in [EFAC] associated with the AM4 Amendment. Tr. Vol. 1 at 260:23-261:5, 265:6-267-7.

DEQ Resp. Prop. FOFCOL at 89-90.

As a matter of law, a material damage assessment is a threshold determination because it must be determined by water quality standards. *Signal Peak*, No. BER 2013-07 SM, at ¶¶ 48, 131 ("it is violation of water quality standards...that is the standard for material damage.") (*citing* Mont. Code Ann. §§ 82-4-203(31), 227(3)(a)); Admin. R. Mont. 17.24.301(68), 17.24.405(6)(c). Water quality standards are, in turn, evaluated through pollutant concentrations. Admin. R. Mont. 17.30.1006. Essentially, either a pollutant concentration is exceeded, or it is not; and, if the pollutant concentration is not exceeded, then there

is no water quality violation. Here, the AM4 will not violate a water quality standard for TDS because it will not increase the pollutant concentration (or will not increase it beyond what has already been permitted). As the AM4 will not violate a water quality standard, it will not cause "material damage." *Signal Peak*, No. BER 2013-07 SM, at ¶ 131; Mont. Code Ann. §§ 82-4-203(31), 227(3)(a)); Admin. R. Mont. 17.24.301(68), 17.24.405(6)(c).

In other words, there is no way to scientifically or legally measure (or at least none was presented in this case) the increase in the duration of time vis-à-vis a water quality standard. Because the increase in the duration of time has no meaning for the determination of a pollutant concentration, and therefore for a water quality standard, time legally cannot be a measure of material damage. Even assuming, *arguendo*, that there were evidence to conclusively establish that the AM4 Amendment specifically will extend the duration of the "salt loading" in the EFAC alluvium by any amount of time (which there is not), Conservation Groups have not shown how this could legally constitute "material damage" under MSUMRA, pursuant to Mont. Code. Ann. § 82-4-227(3)(a) and Admin. R. Mont. 17.24.405(6)(c) and all the definitions that apply.[5]

[5] Conservation Groups cite no case law that would support a conclusion of law finding a duration of time to constitute "material damage" under MSUMRA. *See* MEIC Resp. Prop. FOFCOL at 17. The only case that Conservation Groups cite in connection to their argument on this point is *Friends of Pinto Creek v. EPA*, 504 F.3d 1007, 1011-15 (9th Cir. 2007). *Pinto Creek* is a federal case in which a federal court addressed the EPA's issuance of an NPDES permit under § 402 of the Clean Water Act and found a discharge of copper violative. *Id. Pinto Creek* does not apply MSUMRA (or even it's federal equivalent), does not contain the words "material damage," and does

Ultimately, the burden of proof in this action falls to Conservation Groups to present a more-likely-than-not probability that a water quality standard could be violated by the permitted action. Conservation Groups have not met that burden. Dr. Gardner's generalized hypothesis regarding "salt loading" was unconvincing and not supported by facts sufficient to rebuff the experts from Intervenors and DEC, who convincingly articulated that, because the AM4 amendment will not result in any violation of narrative or numeric water quality standards, it was designed such that "the hydrologic consequences and cumulative hydrologic impacts will not result in material damage to the hydrologic balance outside the permit area." Admin. R. Mont. 17.24.405(6).

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not concern any increase in the duration of time for anything. It is therefore neither precedential nor on point. Although not raised by any party, in *Signal Peak*, the BER rejected DEQ's "mistaken belief that the material damage determination may be limited to an arbitrary 50-year horizon" and found that "[i]n short, there is no basis in law for limiting the material damage assessment and determination to 50 years." No. BER 2013-07 SM, at ¶¶ 126-129. This indicates that the BER has been previously concerned with the duration of time and a material damage assessment. *Id.* However the main problem the BER had with the Signal Peak permit was DEQ's total failure to address water quality standards in the CHIA. *Id.* at ¶ 48. Therefore, the analysis of the duration of time in Signal Peak was wrapped up with the failure to address water quality standards: essentially the BER was concerned about the significant evidence before them that "degraded gob water" was going to migrate outside of the permit area either during or after DEQ's 50-year horizon. Id. at ¶¶ 126-129. DEQ has not imposed any horizon on its consideration of material damage in the present case, and it has certainly considered water quality standards in the CHIA. Therefore, DEQ (and WECO) have addressed the BER's concerns in Signal Peak. Additionally, nothing in Signal Peak provides a legal standard for when or how an increase in the duration of time might be evaluated with respect to a material damage assessment under MSUMRA. The hearing examiner simply found no law instructive on this point.

CONCLUSIONS OF LAW

From the foregoing findings of fact, the Board makes the following conclusions of law:

A. Standing

1. "[E]nvironmental plaintiffs adequately allege injury in fact when they aver that they use the affected area and are persons 'for whom the aesthetic and recreational values of the area will be lessened by the challenged activity.'" *Friends of the Earth v. Laidlaw*, 528 U.S. 167, 183 (2000) (quoting *Sierra Club v. Morton*, 405 U.S. 727, 735 (1972)). In addition to injury in fact, the plaintiff must show that "the injury is traceable to the challenged action of the defendant" and that "the injury will be redressed by a favorable decision." *Laidlaw*, 528 U.S. at 181.

2. Under Montana law, "an association can assert associational standing without a showing of injury to itself when '(a) at least one of its members would have standing to sue in his or her own right, (b) the interests the association seeks to protect are germane to its purpose, *and* (c) neither the claim asserted nor the relief requested requires the individual participation of each allegedly injured party in the lawsuit." *New Hope Lutheran Ministry v. Faith Lutheran Church of Great Falls, Inc.*, 2014 MT 69, ¶ 27, 374 Mont. 229, 328 P.3d 586 (quoting *Heffernan v. Missoula City Council*, 2011 MT 91, ¶ 43, 360 Mont. 207, 255 P.3d 80) (emphasis

added).

3. Steve Gilbert has already been determined to have standing to challenge actions involving water at the Rosebud Mine. *Mont. Envtl. Info. Ctr. v. Mont. Dep't of Envtl. Quality*, No. CDV-2012-1075, 2016 Mont. Dist. LEXIS 14, at **21-24 (Mont. 1st Jud. Dist., Seeley, J. (Mar. 14, 2016). Although not dispositive, this is persuasive authority.

4. Mr. Gilbert's and Ms. Bonogofsky's testimony shows that their aesthetic and recreational values in the area of the Rosebud Mine will be lessened by continued mine expansion, which is attributable to DEQ's and Intervenors' action in this case. As they are members of the Conservation Groups, and the three factors in *New Hope* are met, the Conservation Groups have standing.

B. Burden of Proof

5. "[A]s the party asserting the claim at issue, MEIC had the burden of presenting the evidence necessary to establish the facts essential to a determination that the Department's decision violated the law." *MEIC*, 2005 MT 96, ¶ 16. The "facts essential" must be proved by a preponderance of the evidence. *Id.* ¶ 22. In this contested case hearing, therefore, MEIC has the burden of proving by a preponderance of the evidence that DEQ's decision to issue the permit violated the law. *Id.*

6. DEQ may not approve the AM4 Amendment unless the application

affirmatively demonstrates that the assessment of the probable cumulative impact of all anticipated mining in the area on the hydrologic balance has been made by DEQ and the proposed operation of the mine has been designed to prevent material damage to the hydrologic balance outside the permit area. Mont. Code Ann. § 82-4-227(3)(a); Admin. R. Mont. 17.24.405(6)(c).

7. With respect to protection of the hydrologic balance, "material damage" means:

> (a) degradation or reduction by coal mining and reclamation operations
> (b) of the quality or quantity of water outside of the permit area
> (c) in a manner or to an extent that land uses or beneficial uses of water are adversely affected, water quality standards are violated, or water rights are impacted.

Violation of a water quality standard, whether or not an existing water use is affected, is material damage. Mont. Code Ann. § 82-4-203(32).

8. A material damage determination must assess whether the action at issue will cause a violation of water quality standards. *Signal Peak*, BER-2-13-07-SM at 87 (citing Mont. Code Ann. § 82-4-203(31)).

9. The narrative and numeric standards applicable to groundwater in the area of the Rosebud Mine are expressed in terms of pollutant concentrations. *See* Admin. R. Mont. 17.30.1006.

10. Concentrations are always expressed in units in mass per volume of

water, typically milligrams per liter. Hrg. Tr. Vol. 4, at 63:23-64:10.

11. The narrative and numeric standards applicable to East Fork Armells Creek are likewise expressed in terms of pollutant concentrations. *See* Admin. R. Mont. 17.30.637(1)(d), 17.30.629(f) and (h).

12. Conservation Groups have the burden to show, by a preponderance of the evidence, that DEQ had information available to it at the time of issuing the permit that indicated that the project at issue is not designed to prevent land uses or beneficial uses of water from being adversely affected, water quality standards from being violated, or water rights from being impacted. Mont. Code Ann. §§ 82-4-203(31), 203(32), 222(1)(l), 226(8), 227(3)(a); Admin. R. Mont. 17.24.401-405; *Signal Peak*, BER-2-13-07-SM at 87.

C. Relevance

13. The relevant analysis and the agency action at issue is that contained within the four corners of the Written Findings and CHIA. Issued Dec. 4, 2015, BER-2-13-07-SM, at ¶¶ 56, 66, 124.

14. The only relevant facts are those concluded by the agency in the permitting process before the agency makes its permitting decision. *Id.*

15. For the reasons stated in the Order on Motions in Limine, at 7, incorporated herein by reference, relevant evidence is limited to those issues contained in the administrative record, including those issues raised by

Conservation Groups in their August 3, 2015 objections and also preserved in the January 4, 2016 Notice of Appeal.

16. For the reasons stated in the Order on Motions in Limine, at 7, incorporated herein by reference, and as stated in the Procedural History herein, the following issues were properly excluded from consideration for failure by Conservation Groups to preserve:

a. Arguments related to the definition of "anticipated mining" and potential interactions between the AM4 Permit and Area F (Vol. 1, 134:5-25, 137:7-13, 158:2-5);

b. Arguments related to the Department's alleged failure to make a material damage determination regarding alleged dewatering of EFAC regarding the entire interaction of the AM4 Permit with all previous mining (Vol. 1, 227:20-228:9);

c. Arguments related to alleged impacts of the AM4 Permit on Rosebud Creek (Vol. 1, 43:15-44:25);

d. Arguments related to the alleged impacts from blasting (Vol. 1, 56:15-17, 60:24-61:5);

e. Arguments regarding the impact of dissolved oxygen levels in EFAC on aquatic life (Vol. 1, 302:22-303:12);

f. Arguments regarding the impact of chloride levels in EFAC on aquatic life (Vol. 2, 32:18-33:25).

17. For the reasons stated in the Order on Motions in Limine, at 7, incorporated herein by reference and as stated in the Procedural History herein, Conservation Groups challenge to the AM4 Permit was therefore appropriately limited to the following issues preserved in their Public Comments and Notice of

Appeal and Request for Hearing:

a. The material damage determination regarding increased TDS levels in EFAC.

b. The material damage determination regarding increased nitrogen levels in EFAC.

c. The material damage determination regarding aquatic life use of EFAC.

D. Material Damage

18. Conservation Groups did not provide sufficient evidence to show that the AM4 Amendment is not designed to prevent "material damage" as defined in Mont. Code. Ann. §§ 82-4-203(24), (31) and Admin. R. Mont. 17.24.301(31), (32), (55), (68). Mont. Code Ann. §82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c).

19. To the contrary, the evidence demonstrates that (first) WECO met its obligation and affirmatively demonstrated in its application that "the hydrologic consequences and cumulative hydrologic impacts will not result in material damage to the hydrologic balance outside the permit area." Mont. Code Ann. §§ 82-4-203(31), 82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c), 17.24.301(68).

20. The evidence also shows that (second) DEQ discharged its responsibilities with respect to gathering additional information—both on its own and through public comment. Admin. R. Mont. 17.24.405(6). DEQ appropriately "confirmed" what WECO's application affirmatively demonstrated, and what the evidence at the hearing showed: based on the information available at the time,

"the hydrologic consequences and cumulative hydrologic impacts" of the proposed AM4 amendment "will not result in material damage to the hydrologic balance outside the permit area." Mont. Code Ann. § 82-4-227(3)(a); Admin. R. Mont. 17.24.405(6).

21. The cumulative hydrologic impacts which must be assessed in determining material damage include the expected total qualitative and quantitative, direct and indirect effects of mining and reclamation operations on the hydrologic balance. Mont. Code Ann. § 82-4-227(3); Admin. R. Mont. 17.24.301(31).

22. As defined in the context of a material damage assessment, "hydrologic balance" describes the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit, such as a drainage basin, aquifer, soil zone, lake, or reservoir, and encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in groundwater and surface water storage. Mont. Code Ann. § 82-4-203(25). Assessing material damage accordingly requires a determination as to whether mining and/or reclamation operations have degraded the water quality of an off-site hydrologic unit (such as an aquifer, soil zone or drainage basin) in a manner or to an extent that land uses or beneficial uses of the hydrologic unit are adversely affected, the water quality standards of the hydrologic unit are violated, or water

rights in the hydrologic unit are impacted. Mont. Code Ann. §§ 82-4-227(3), 82-4-203(25) and (32); Admin. R. Mont. 17.24.301(31); *see also* Hrg. Tr. Vol. 2, at 195:4-197:4.

23. The evidence presented at the hearing demonstrated that the AM4 Amendment will not degrade the water quality of an off-site hydrologic unit (such as an aquifer, soil zone or drainage basin) in a manner or to an extent that land uses or beneficial uses of the hydrologic unit are adversely affected, the water quality standards of the hydrologic unit are violated, or water rights in the hydrologic unit are impacted. Mont. Code Ann. §§ 82-4-227(3), 82-4-203(25) and (32); Admin. R. Mont. 17.24.301(31); *see also* Hrg. Tr. Vol. 2, at 195:4-197:4.

24. The AM4 CHIA assessed the probable cumulative impact of all anticipated mining in the area on the hydrologic balance and sufficiently determined in writing and on affirmative record evidence that the proposed AM4 Amendment mining operation is designed to prevent material damage to the hydrologic balance outside the permit area. Mont. Code Ann. § 82-2-227(3)(a), Admin. R. Mont. 17.24.405(6)(c); *Signal Peak*, BER-2-13-07-SM at 56.

25. The AM4 CHIA and Written Findings assessed all expected total qualitative and quantitative, direct and indirect effects of mining and reclamation operations on the hydrologic balance. Admin. R. Mont. 17.24.301(31); Mont. Code Ann. § 82-4-227(3).

26. DEQ's Written Findings and CHIA provide and articulate specific reasons for its permitting decision based on a defensible level of reliable scientific confidence and sufficient supporting record evidence, including the application or otherwise compiled by DEQ in the record. *Signal Peak*, BER-2-13-07-SM at 56 (*citing* Admin. R. Mont. 17.24.405(5) and (6)).

27. DEQ's AM4 Written Findings and CHIA assessed and responded to comments made on the AM4 Amendment application and PHC. Mont. Code Ann. § 82-4-227(3)(a), Admin. R. Mont. 17.24.314(5) 17.24.405(6)(c). (*See* Written Findings at pp. 8-14); *see also* or Mots. In Limine (excluding Conservation Groups' issues not raised in their comments).

i. EFAC Impairment

28. The beneficial uses of Class C-3 surface waters, the degradation of which cannot be permitted, include suitability for bathing, swimming, and recreation, and growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers. Admin. R. Mont. 17.30.629(1).

29. The quality of Class C-3 surface waters is naturally marginal for drinking, culinary, and food processing purposes, agriculture, and industrial water supply uses. Admin. R. Mont. 17.30.629(1).

30. Ephemeral streams are not subject to the specific water quality standards of Admin. R. Mont. 17.30.620 through 17.30.629 (including Circular

DEQ-7, Montana Numeric Water Quality Standards). Admin. R. Mont. 17.30.637(4). DEQ Ex. 1A at 2-3.

31. In assessing whether water quality standards have been violated, DEQ does not require that groundwater discharges be treated to a purer condition than the natural condition of the receiving water. Admin. R. Mont. 17.30.1005(3).

32. Conservation Groups' evidence offered in support of their claims of existing water quality violations was limited to water quality assessments and Clean Water Act 303(d) impairment determinations made by DEQ's Water Quality Planning Bureau.

33. As a matter of law, water quality assessments (or Attainment Records) and impairment determinations made by the Water Quality Planning Bureau pursuant to the Clean Water Act do not equate to determinations of water quality standard violations or "material damage" determinations that may prevent permit approval pursuant to MSUMRA. *Compare* Mont. Code Ann. § 82-4-201, *et seq.* with 40 CFR Subchapter D.

34. Attainment Records (like DEQ Ex. 9) are used for informational and planning purposes and do not conclusively identify any prohibited activity or pollutant source for the purpose of MSUMRA. Instead, water quality violations are shown through enforcement mechanisms, such as when DEQ takes action against an entity identified as being responsible for causing pollution, violating a

permit, causing degradation, or conducting other prohibited activity. *Compare* Mont. Code Ann. §§ 75-5-701 through 75-5-705, *with* Mont. Code Ann. §§ 75-5-601 through 75-5-641.

35. The Water Quality Planning Bureau's Impairment determinations and DEQ's Attainment Records for Upper EFAC and Lower EFAC do not show that EFAC's impairments are attributable to mining. Testimony at the hearing from Mr. Urban, Dr. Hinz, and Mr. Van Oort, in conjunction with exhibits DEQ 10 and DEQ 1A, at 9-85 to 9-87, convincingly confirmed (what the Water Quality Planning Bureau and the Coal Section believed at the time of issuing the permit) that EFAC's existing impairments were not attributable to coal mining.

36. Instead, the salinity in Upper EFAC was likely attributable to its inherent nature as an ephemeral stream and the loss of streamside vegetation, most likely as a result of agriculture and Lower EFAC, impairments were likely attributable to other downstream sources (*e.g.*, the town of Colstrip). Similarly, Upper EFAC was not supporting most of its beneficial uses (*e.g.*, wading, swimming, salmonid fishes, etc.) because of its ephemeral nature.

37. Conservation Groups did not produce any convincing evidence that EFAC's existing impairment was "previously attributed to operations of the Rosebud Mine."

38. Conservation Groups failed to present evidence necessary to establish the existence of any water quality standard violations with respect to the AM4 Amendment that would prohibit DEQ from approving the AM4 Permit. Mont. Code Ann. §§ 82-4-203(31), 82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c), 17.24.301(68).

ii. TDS

39. For the reasons stated in Subsection B of the Discussion Section, above (as amended by the Board), and which is incorporated herein by reference, Conservation Groups failed to present evidence necessary to establish the facts essential to a determination that the AM4 Permit is not designed to prevent material damage to the hydrologic balance outside of the permit boundary by increasing TDS levels in EFAC. Mont. Code Ann. § 82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c).

iii. Nitrogen

40. Conservation Groups failed to present evidence necessary to establish the facts essential to a determination the AM4 Permit is not designed to prevent material damage to the hydrologic balance outside of the permit boundary by increasing nitrogen levels in EFAC to an extent that land uses, the Class C-3 designated uses, or water rights would be impacted or adversely effected. Mont. Code Ann. §§ 82-4-203(31), 82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c),

17.24.301(68).

41. No evidence was presented showing that nitrogen exceedances in Lower EFAC are specifically attributable to mining.

iv. Aquatic Life

42. Conservation Groups failed to present evidence necessary to establish the facts essential to a determination that the AM4 Permit is not designed to prevent material damage to aquatic life use of EFAC. Mont. Code Ann. §§ 82-4-203(31), 82-4-227(3)(a), Admin. R. Mont. 17.24.405(6)(c), 17.24.301(68).

43. WECO and DEQ presented convincing evidence—through expert testimony and the ARCADIS Report—that EFAC is supporting aquatic life sufficiently to satisfy its the requirements of MSUMRA. Mont. Code Ann. § 82-4-201, *et seq*; Admin. R. Mont. 17.24.301(68), 17.24.405(6).

RECOMMENDED DECISION

44. Based on the foregoing Findings of Fact and Conclusions of Law Conservation Groups have failed to meet their burden of proof to show that DEQ's action in approving the AM4 permit amendment violated the law.

Therefore, IT IS ORDERED

a. that Intervenor and DEQ's Motion for Directed Verdict is GRANTED;

b. Judgment is entered in favor of DEQ and the Intervenors, Conservation Groups' appeal is DISMISSED, and DEQ's

approval of the AM4 Permit is AFFIRMED.

DATED this 6th day of June, 2019.

Christine Deveny

CHRISTINE DEVENY
Board Chair
Board of Environmental Review

CERTIFICATE OF SERVICE

I hereby certify that I caused a true and accurate copy of the foregoing Proposed Findings of Fact and Conclusions of Law to be mailed to:

Lindsay Ford
Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
Lindsay.Ford@mt.gov

Mark Lucas
Sarah Christopherson
Montana Department of Environmental Quality
1520 East Sixth Ave.
Helena, MT 59601
jnorth@mt.gov
Mark.Lucas @mt.gov
Sarah.Christopherson@mt.gov

Shiloh Hernandez
Laura King
Western Environmental Law Center
103 Reeder's Alley
Helena, MT 59601
Hernandez@westernlaw.org

Derf Johnson
Montana Environmental Information Center
107 W. Lawrence St.
Helena, MT 59601
DJohnson@meic.org

Walton D. Morris, Jr.
Morris Law Office, P.C.
1901 Pheasant Lane
Charlottesville, Virginia 22901
wmorris@fastmail.net

Roger Sullivan
McGarvey, Heberling, Sullivan & Lacey
345 1st Ave. E.
Kalispell, MT 59901
rsullivan@mcgarveylaw.com

William W. Mercer
Victoria A. Marquis
Holland & Hart LLP
401 North 31st Street
Suite 1500
P.O. Box 639
Billings, MT 59103
wwmercer@hollandhart.com
vamarquis@hollandhart.com

John C. Martin
Holland & Hart LLP
P.O. Box 68
25 South Willow Street
Jackson, WY 83001
jcmartin@hollandhart.com

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