STATE OF NORTH DAKOTA
NORTH DAKOTA PUBLIC SERVICE COMMISSION

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| IN THE MATTER OF A FORMAL HEARING REGARDING COYOTE CREEK MINING COMPANY'S APPLICATION FOR MINING PERMIT NACC-1302 | ) | PSC Case No. RC-13-850<br><br>OAH File No. 20140505<br><br>**COMPLAINANTS' CLOSING ARGUMENT** |

## INTRODUCTION

Casey and Julie Voigt ("the Voigts"), the complainants in this action, own the surface rights to several thousand acres of land at North American Coal Corporation's proposed Coyote Creek Mine ("CCM") in Mercer County, North Dakota. The Voigts' livelihood depends upon ranching this land—which has been in their family since 1971—and they hope to one day pass this land on to their children. Although they signed a coal lease to allow surface mining on a portion of their property, they have a substantial interest in ensuring that mining takes place in accordance with North Dakota's implementation of the Surface Mining and Reclamation Control Act ("SMCRA"), a law passed in order to "strike a balance between protection of the environment and agricultural productivity and the Nation's need for coal." 30 U.S.C. § 1202(f). The Voigts are confident that any mine that meets all requirements of SMCRA will allow them to continue their agricultural livelihood for generations to come while simultaneously allowing for coal production on their property.

The Voigts requested this formal hearing because they are deeply concerned that the PSC's proposed permit for Coyote Creek Mine will upset the careful balance between ranching and mining that they envisioned when they agreed to allow mining on their property. In short, they do not believe that this mining permit has been issued in accordance with the requirements of SMCRA. The Voigts have two main concerns with the factual and legal basis for conditionally approved permit NACC-1302, the permit in question. First, the Voigts contend that the PSC incorrectly determined that an alluvial valley floor ("AVF") does not exist within the permit area when available evidence points steeply to the contrary. Second, the permit raises significant risks that the Voigts' land will not be reclaimed to its existing use as pristine, native grassland.

At the hearing, the Commissioners appeared to have several questions that the Voigts wish to address upfront. First, the Commissioners raised questions as to whether this permitting action is the proper time to address reclamation given that mining has not yet begun. It is. SMCRA, by design, requires mining companies to plan for reclamation before mining ever begins. It does so by requiring mining companies to submit reclamation plans *at the same time* as they submit mining plans. Thus, initial mining permits cover both mining and reclamation. CCM's NACC-1302 illustrates this: the "Permit to Engage in Surface Coal Mining *and Reclamation* Operations" encompasses all aspects of mining and reclamation.[1] This early planning is largely what makes SMCRA effective, and this proceeding is the primary means through which the Voigts can ensure that their concerns related to reclamation planning are addressed. Although the Voigts will have later opportunities to participate in PSC reclamation decisions through bond release proceedings, this present permitting action is the *only* opportunity for the Voigts to address upfront reclamation planning.

The Commissioners also raised questions as to whether this proceeding is the appropriate time and venue to discuss updates to reclamation regulations. The Voigts do not intend by this hearing for the Commissioners to update PSC regulations. Indeed, the Voigts would agree that this is not the appropriate venue to do so.[2] However, the PSC as a public agency is obligated to interpret its existing regulations and to refine its interpretation of these regulations as needed. The Voigts contend that a combination of failed reclamation across the state and advances in soil science have created precisely such a need. Without addressing these issues, there is a substantial risk that permit NACC-1302 will not lead to timely and adequate reclamation under SMCRA.

## ARGUMENT

### ***Alluvial Valley Floors: Definitions and applicable law***

1. Federal and state law provides that "No [mining] permit or revision application shall be approved unless the application affirmatively demonstrates … that ... the proposed surface coal mining operation, if located west of the one hundredth meridian west longitude, would—

    a. not interrupt, discontinue, or preclude farming on alluvial valley floors that are irrigated or naturally subirrigated...; [and]

    b. not materially damage the quantity or quality of water in surface or underground water systems that supply these valley floors…"[3]

[1] CC Exhibit 10 at 1, 2 (finding No. 2).
[2] The Voigts do however believe that the PSC's regulations establishing reclamation targets could specifically benefit from up-to-date science on methods to achieve these targets, and they plan to discuss the possibility for additional study outside of this hearing.
[3] 30 U.S.C. § 1260(b)(5) (emphasis added); N.D.C.C. § 38-14.1-21(3)(e); N.D.A.C. 69-05.2-08-13(1).

2. Federal and state law also requires mining operations to "preserv[e] throughout the mining and reclamation process the essential hydrologic functions of alluvial valley floors in the arid and semiarid areas of the country" (i.e., areas west of the one hundredth meridian).[4]

3. Coyote Creek Mine is located west of the one hundredth meridian.[5] Thus, SMCRA places the burden squarely on CCM to "affirmatively demonstrate" that an AVF does not exist at Coyote Creek.

4. Importantly, there is no exception for areas *near* the 100th meridian. SMCRA draws a strict boundary—all areas west of the one hundredth meridian must go through the exact same analysis. This is by design. Congress made a conscious choice to ensure that AVFs, which "form the backbone of the agricultural and cattle ranching economy" in "arid and semiarid coal mining areas" receive adequate protection.[6]

5. Federal and state law define "Alluvial valley floor" as "the unconsolidated stream-laid deposits holding streams where water availability is sufficient for subirrigation or flood irrigation agricultural activities."[7]

6. Further refining this statutory definition, OSM's guidance states that an AVF exists "when the following criteria are met":

    i. Geologic criteria:

        a. A topographic valley with a continuous perennial, intermittent, or ephemeral stream channel running through it; and

        b. Within that valley , those surface landforms that are either flood plains or terraces if these landforms are underlain by unconsolidated deposits; and

        c. Within that valley, those side-slope areas that can reasonably be shown to be underlain by alluvium and which are adjacent to flood plain or terrace landform areas.

    ii. Water availability criteria:

        a. Water is available by surface-water irrigation or subirrigation and is being, or has successfully been, used to enhance production of agriculturally useful vegetation; or

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[4] 30 U.S.C. § 1265(b)(10)(F); N.D.C.C. § 38-14.1-24(8)(g); N.D.A.C. 69-05.2-10-03(6)(b)(2)(b).
[5] Transcript 452-53, Norris.
[6] National Wildlife Fed'n v. Hodel, 839 F.2d 694, 729 (D.C. Cir. Jan. 29, 1988) (quoting H.R. Rep. No. 95-218 at 116, 95th Cong. 1st. Sess. (Apr. 22 1977)).
[7] 30 U.S.C. § 1291(1) (federal definition); N.D.C.C. § 38-14.1-02(1) (parallel state definition).

b. Surface water is available and could be used to enhance production of agriculturally useful vegetation.[8]

7. Additionally, "'Flood irrigation' means, with respect to alluvial valley floors, supplying water to plants by natural overflow, or the diversion of flows in which the surface of the soil is largely covered by a sheet of water."[9]

8. "'Subirrigation' means, with respect to alluvial valley floors, the supplying of water to plants from a semisaturated or saturated subsurface zone where water is available for use by vegetation. Subirrigation may be identified by:

    a. Diurnal fluctuation of the water table, due to the differences in nighttime and daytime evapotranspiration rates;

    b. Increasing soil moisture from a portion of the root zone down to the saturated zone, due to capillary action;

    c. Mottling of the soils in the root zones;

    d. Existence of an important part of the root zone within the capillary fringe or water table of an alluvial aquifer; or

    e. An increase in streamflow or a rise in ground water levels, shortly after the first killing frost on the valley floor."[10]

***Review of the PSC's applicable alluvial valley floor determinations***

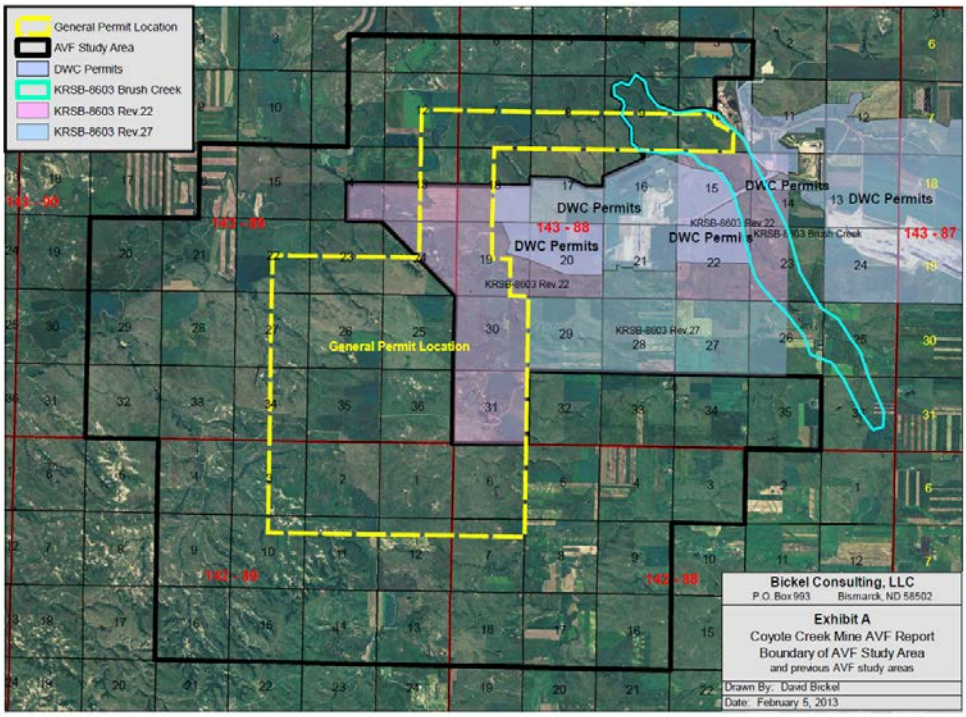
9. Finding Number 5 of the PSC's conditionally approved NACC-1302, "Permit to engage in surface coal mining and reclamation operations," states that "The proposed mining operations will not interrupt, discontinue, or preclude farming on alluvial valley floors that are irrigated or naturally sub-irrigated or materially damage the quantity or quality of water in surface or underground water systems that supply these alluvial valley floors." The finding goes on to state that "it has been determined that there are no alluvial valley floors within or adjacent to the permit area."[11]

10. Finding Number 5 of conditionally approved NACC-1302 is based upon two separate AVF determinations made by the PSC. This is most clearly shown in the map contained in Section 2.6.2 of CCM's application.[12] This color map depicts

[8] OSM guidance II-11.
[9] N.D.A.C. 69-05.2-01-02(34); *see also* 30 CFR 701.5.
[10] N.D.A.C. 69-05.2-01-02(103); *see also* 30 CFR 701.5.
[11] CC Exhibit 10, at 4.
[12] CC Exhibit 10 at 2.6.2.

two distinct AVF study areas, each of which led to separate AVF determinations by the PSC. For convenience, that map is copied here:

Section 2.6.2 Alluvial Valley Floor Study Area Map




11. The first AVF determination (hereafter "2009 AVF Determination") was completed for Revision 22 to Dakota Westmoreland Company's ("DWC") mining permit KRSB-8603. This determination included a large portion of the valley of Coyote Creek, which is contained in part in Sections 19, 30, and 31 of T143N, R88W.

12. The PSC's 2009 AVF Determination was based on two documents: a study completed by DWC (hereafter "2009 AVF study"),[13] and a field study completed by the PSC (hereafter "2009 PSC field review").[14]

13. The second AVF determination (hereafter "2013 AVF Determination") was completed for CCM's NACC-1302 and encompasses all areas bounded in black in the map above not included in the 2009 AVF determination, principally the Knife River.

14. Like the PSC's 2009 AVF Determination, the PSC's 2013 AVF Determination was based on two documents: a study completed by CCM (hereafter "2013 AVF study"), and a field study completed by the PSC (hereafter "2013 PSC field review").

[13] CV Exhibit 5.
[14] PSC Exhibit 9.

15. To be clear, the 2009 AVF determination and the 2013 AVF determination, along with their supporting studies, encompassed different geographic areas as shown in the map above. Together, the two AVF determinations form the basis for the PCS's finding number 5 of conditionally approved permit NACC-1302.

***The 2009 AVF Determination lacks credible evidence to support its negative AVF finding***

16. The sole question regarding the 2009 AVF Determination as it supports Finding Number 5 of NACC-1302 is whether Coyote Creek, or any portion of Coyote Creek, meets the definition of "alluvial valley floor" set forth in paragraphs five and six, *supra*.

17. During the January 2nd date of the formal hearing in this matter, Mr. Bickel, CCM's designated expert on alluvial valley floors, agreed that Coyote Creek meets the geologic requirements of an AVF as described in paragraph six, *supra*.[15] The Voigts concur[16] with this conclusion, and this question is not in dispute.

18. Thus, the only questions that are in dispute relate to the water availability criteria, specifically, whether at or along Coyote Creek:

    a. "Water is available by surface-water irrigation…and *is being, or has successfully been*, used to enhance production of agriculturally useful vegetation";

    b. "Water is available by…subirrigation and *is being, or has successfully been*, used to enhance production of agriculturally useful vegetation";

    c. "Surface water is available and *could be used* to enhance production of agriculturally useful vegetation"[17]

19. As noted previously, CCM must "affirmatively demonstrate" that Coyote Creek is *not* an AVF.[18] Specifically, CCM's AVF "decision must be based on and supported by adequate technical data and analyses."[19]

[15] Question from Derrick Braaten: "…is it your understanding that with respect to number one, the geologic criteria, everybody has agreed that the criteria has been met with respect to an AVF determination in the study area? Answer from David Bickel: "Yes." Transcript at 463 lines 1-8; *see also* CV Exhibit 3 at 30 ("The geologic criterion for alluvial valley floors - streamlaid unconsolidated deposits – is assumed").
[16] *See, e.g.*,, Transcript at 174 line 18 (Charles Norris's description of the 2009 AVF Study, explaining that "The Westmoreland report accepted existing interpretations that the sediments in Coyote Creek were water-deposited unconsolidated sediments," i.e., alluvial sediments).
[17] OSM Guidance, II-11 (emphasis added).
[18] 30 U.S.C. § 1260(b)(5).
[19] 48 Fed.Reg. 29802–03 (1983) (preamble to OSM AVF Guidance) (emphasis added); *see also*. National Wildlife Fed'n v. Hodel, 839 F.2d 694, 729 (D.C. Cir. Jan. 29, 1988) (citing preamble to OSM AVF

20. Additionally, here, the burden on CCM is particularly steep: OSM has already determined that Coyote Creek is "likely"[20] to meet the definition of an Alluvial Valley Floor based on likelihood that it meets *all three* water availability criteria (even though only one is necessary), i.e., actual beneficial subirrigation, actual beneficial surface irrigation, and present water availability for beneficial surface irrigation.[21] Specifically, OSM's 1983 AVF reconnaissance survey stated that in addition to "tributary water from Coyote Creek [being] used" to support "intensiv[e] irrigation" along the Knife River "between Crooked Creek and Elm Creek,"[22]

> Coyote Creek['s]…broad second terrace…is extensively used for pasture and hayfields. The lower parts of this terrace flood during high runoff; the other parts could be flood irrigated by spreading and/or pumping runoff water. Deep-rooting alfalfa probably receives beneficial moisture through subirrigation…[and additionally,] lower parts of [the upper reach of Coyote Creek] will occasionally flood, and all of it is flood irrigable.[23]

21. As noted in DWC's 2009 AVF study, OSM's 1983 reconnaissance study "utilized field investigations, supplemented by interviews with agricultural producers, information from regulatory and land management agencies, from published reports, and from aerial photographs and Landsat imagery."[24]

22. Complainants do not suggest that these findings in OSM's reconnaissance survey are binding on the PSC. Rather, the purpose of OSM's Reconnaissance Survey was to document areas that should be studied in greater detail, i.e., areas whereby AVF determinations must be supported by "adequate technical data and analysis."[25] Here, given the extent of OSM's findings, the quantity of quality of technical data and analysis needed to support a negative AVF determination is substantial.

23. The PCS's regulations state that "studies performed during the [AVF] investigation by the applicant…must include an appropriate combination, adapted to site-specific conditions, of" the following:

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Guidance in decision determining that OSM's regulatory *reductions* leading to this Guidance had not been adequately justified by OSM, thus strongly suggesting that "adequate technical data and analysis" is the bare minimum standard for a supportable AVF determination).

[20] CV Exhibit 2 at 1.

[21] *Id. at* 20, attached map.

[22] *Id.* at 12 at 12 (note that this page's numbering is missing, but the page can be identified as between page numbers 11 and 13, both of which are marked). Elm Creek is located at approximately 47.340742,-101.461759, just west of Stanton, and Crooked Creek is located at approximately 47.191987,-102.587171 between Marshall and Manning. Coyote Creek is located between these two points.

[23] *Id.* at 20, attached map.

[24] CV exhibit 3 at 2.

[25] *See generally*, CV Exhibit, OSM Guidance, Ch. II (describing the purpose of reconnaissance surveys in relation to more detailed, later study).

a. Mapping of the probable alluvial valley floor;

b. Mapping of all lands included in the area used for agricultural activities;

c. Topographic maps of all lands that are or were historically flood irrigated, showing the location of each diversion structure, ditch, dam, and related reservoir;

d. Documentation that areas identified in this section are, or are not, subirrigated, based on ground water monitoring data, representative water quality, soil moisture measurements, and measurements of rooting depth, soil mottling, and water requirements of vegetation;

e. Documentation, based on representative sampling, that areas identified under this subdivision are, or are not, flood irrigable, based on streamflow, water quality, water yield, soils measurements, and topographic characteristics;

f. Analysis of a series of aerial photographs, including color infrared imagery capable of showing any late summer and fall differences between upland and valley floor vegetative growth and of a scale adequate for reconnaissance identification of areas that may be alluvial valley floors.[26]

24. Although the 2009 AVF Study appears[27] to contain the maps described in subparts "a," "b," and "c" above, it contains <u>almost none</u> of the information described in subparts "d," "e," and "f." Importantly, these latter three subparts all relate to present day water availability, and therefore this information is crucial to affirmatively show whether or not an area meets the AVF water availability criteria. The following table depicts what information described in subparts "d," "e," and "f" is contained in the 2009 AVF study in relation to Coyote Creek:

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| Groundwater monitoring data (N.D.A.C. 69-05.2-08-13(d)) | **Data not collected**. Although the 2009 AVF study contains groundwater information on other areas *outside* of Coyote Creek, the study specifically states that "Little is known about the specific geology and groundwater flow characteristics of the Coyote Creek stream valley."[28] The report then goes on to make "interpretations"[29] about |

[26] N.D.A.C. 69-05.2-08-13.
[27] These maps were never provided to complainants, in spite of an open records request asking for "all information" in support of NACC-1302.
[28] CV Exhibit 3 at 24.
[29] *Id.*

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| | Coyote Creek's groundwater based upon information collected from *outside* of the valley. It also collects "insights" based upon extremely limited data from two wells near the Voigts' farmstead collected 45 years prior.[30] The report does not identify the location of the wells. In other words, no "groundwater monitoring data" was collected by the study relevant to Coyote Creek. |
| Groundwater quality data (N.D.A.C. 69-05.2-08-13(d)) | **Data not collected**, see above. |
| Soil moisture measurements (N.D.A.C. 69-05.2-08-13(d)) | **Data not collected**. |
| Measurements of rooting depth (N.D.A.C. 69-05.2-08-13(d)) | **Data not collected**. However, the report does note OSM's previous determination that "deep-rooting alfalfa probably receives beneficial moisture through subirrigation" along Coyote Creek.[31] |
| Measurements of soil mottling (N.D.A.C. 69-05.2-08-13(d)) | **Data not collected**. The word "mottling" does not appear anywhere in the report. Nor do other related words appear such as "bore," "boring," "spade," "dig," or "dug." |
| Water requirements of vegetation (N.A.C.C. 69-05.2-08-13(d)) | **Data not collected**.[32] |
| Sampling of streamflow (N.A.C.C. 69-05.2-08-13(e)) | **Primary data not collected, but older data relied upon supports a positive AVF determination** (see "water yield data below). The report provides no explanation for why water quality samples were collected for this study (see below) and water quantity samples were not obtained contemporaneously. |
| Sampling of surface water quality (N.A.C.C. 69-05.2-08-13(e)) | **Data collected supports a positive AVF determination**. Water quality data was collected, but only for salt content. The report found that Coyote Creek's salt content was 1,784 µmhos/cm and that this is near, but <u>below</u> 2,000 µmhos/cm, a "limit at which…water should not be used continuously on soils with restricted drainage." In other words, the limited data collected established that surface water quality was adequate for use in agriculture. |
| Water yield data (N.D.A.C. 69-05.2-08-13(e)) | **Data extrapolated supports a positive AVF determination.** Specifically, data was extrapolated from the 1977-1983 USGS streamflow data, as described above. |

[30] *Id.* at 28.
[31] *Id.* at 2.
[32] *See id.* at 25 ("vegetation" section of report, describing vegetation only in a very general sense and in no way describing water requirements of existing vegetation).

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| | Problems with the fact that "flow data for Coyote Creek is limited"[33] notwithstanding, the 2009 AVF Study concluded that even excluding one purportedly abnormal year with four times as much flow as average, average water yield from Coyote Creek was sufficient for irrigation of 102 acres of crops with a foot of water based on June flows, and an additional 70 acres of crops with a foot of water based on July flows.[34] |
| Soils measurements (N.D.A.C. 69-05.2-08-13(e)) | **Data not collected**. Rather, the 2009 AVF Study merely discussed soil types generally.[35] |
| Topographic characteristics (N.D.A.C. 69-05.2-08-13(e)) | **Data collected supports a positive AVF determination**. The report relies on a "USGS topographic quad map" and a "more detailed presentation of topographic contours for part of the area" to determine that at least certain portions of Coyote Creek contain a "nearly level floodplain" of widths measuring from "1,200 to 1,500 feet" across.[36] |
| Analysis of aerial photographs, including infrared imagery capable of showing any late summer and fall differences between upland and valley floor vegetative growth (N.D.A.C. 69-05.2-08-13(f)) | This **data was not collected** or used even though the PSC had this information on file.[37] |

25. In short, the 2009 AVF Study collected/compiled almost none of the data described in N.D.C.C. 69-05.2-08-13(d),(e),(f). Of the very little relevant data that was actually compiled for the 2009 AVF Study, the only first-hand, primary data that was collected (i.e., data not collected from others) was the collection of a single water sample that was tested for salt content. Because the information described in N.D.C.C. 69-05.2-08-13(d),(e),(f) all relate directly to proving or disproving whether the "water availability criteria" have been met, the absence of data described in these regulations means that the 2009 AVF Study did not "include an appropriate combination" of data in support of its negative determination.

[33] *Id.* at 26.
[34] Id. at 26.
[35] *Id.* at 25.
[36] *Id.* at 8.
[37] *See* Voigt Exhibits 20 and 21

26. Regardless of the lack of data collected, the 2009 AVF Study determined that "Coyote Creek stream valley does not contain an alluvial valley floor." The study based this conclusion upon several subfindings, including that "subirrigation is not playing a role in enhancement of crop production."[38]

27. The 2009 AVF study determined that "subirrigation is not playing a role in enhancement of crop production" even though the study contained no information described in N.D.C.C. 69-05.2-08-13(d),(f), the applicable sections relating to subirrigation. Moreover, the study contained no information described in North Dakota's definition of subirrigation, which states that "Subirrigation may be identified by:

    a. Diurnal fluctuation of the water table, due to the differences in nighttime and daytime evapotranspiration rates;

    b. Increasing soil moisture from a portion of the root zone down to the saturated zone, due to capillary action;

    c. Mottling of the soils in the root zones;

    d. Existence of an important part of the root zone within the capillary fringe or water table of an alluvial aquifer; or

    e. An increase in streamflow or a rise in ground water levels, shortly after the first killing frost on the valley floor."[39]

28. Rather, the 2009 AVF Study's entire rationale for finding no subirrigation on the Coyote Creek Valley can be summed up in two mere sentences in this report.[40] These sentences state, in full: "The floodplain of Coyote Creek was walked in the spring of 2009…Surveys revealed that those plants nearest to the creek which should have the best access to subirrigation were, if anything, in poorer condition and/or had poorer population densities than the average plant in the field. The most productive plants were the beneficiaries of additional surface water, not ground water, by virtue of their location in or near the footslope position."[41]

29. A visual survey of vegetation as described above is not recognized by North Dakota law as evidence tending to indicate subirrigation.[42] More is required. Moreover, the Voigts' AVF expert found that he could not agree with the 2009 AVF Study's subirrigation conclusion for five reasons:

[38] CV Exhibit 3 at 30.
[39] N.D.A.C. 69-05.2-01-02(103).
[40] Transcript at 177 lines 3-16 (testimony of Charles Norris).
[41] CV Exhibit 3 at 29.
[42] *See* N.D.A.C. 69-05.2-08-13(d),(f) (containing no reference to visual walkovers of vegetation as appropriate method for determining existence of subirrigation); N.D.A.C. 69-05.2-01-02(103) (same).

a. First, "the walkover of the field was conducted at the worst time of the year to assess the impact of subirrigation. It was done in early spring, mid-May, at a time of early annual growth. Late summer, long after spring rains, snowmelts, the spring water are gone, is the appropriate time to investigate subirrigation."[43] This is because this is "the time of year when subirrigation will be supporting the plant growth. During the spring there's lots of water in virtually any area for the early growth of crops. It's in the mid and late summer when things heat up, dry out, that you've lost the impact of spring rains and snowmelt, that there is not enough active water being provided by precipitation for active plant growth. That's the time of year when the influence of subirrigation can be observed."[44]

b. The second "problem is that the subjective perception that there are progressive changes of plant vigor and population across the site is without any supporting data or documentation at least in the report … There was no photographic evidence … of the vegetative trends. There were no counts of plant density, numbers and varieties or any quantification of plant vigor."[45]

c. Third, the walkover's "observations are not the result of the [] 2009 growing season. They're the conditions going into the 2009 growing season. The previous winter, December of '08, January and February of '09, were exceptionally wet in Beulah. Those three months were 250 percent -- precipitation was 250 percent of the 30-year climatic average. March of 2009 recorded seven and a half times the normal precipitation. This is based on USDA climate data, the WETS table, that can be found at agacis.rec-acis.org/38057… There was no consideration that, for example, what was being looked at in terms of plant distributions was not stressed to the area, observed that the stress to the area was simply the result of perhaps prolonged submergence and scouring by flood waters in the areas nearest the stream in response to exceptional March precipitation that followed immediately after an unusually wet, snowy winter. Something other than a dismissal of subirrigation would appropriately have been considered and discussed, particularly since it was not the time of year when you can even see the effects of subirrigation."[46]

d. Fourth, "If the plant patterns perceived by the author in the 2009 report in fact exist, those patterns reflect drought stress rather than

[43] Transcript at 177 lines 19-25.
[44] *Id.*
[45] *Id.* at 178-79.
[46] *Id.* at 179-80.

some other end -- I'm sorry -- if those patterns reflect drought stress rather than some other process or event. That stress is found exactly where it would be expected in the alluvial valley sediments that do not have subirrigation support. It is a verification of the observation of OSM in 1985 that subirrigation in Coyote Creek drainage is important and it is a confirmation of OSM's expectation that AVF is likely."[47]

e. Fifth, the second sentence of the 2009 AVF Study stating that "The most productive plants were the beneficiaries of additional surface water, not ground water, by virtue of their location in or near the footslope position" is "inaccurate or misleading" and "without merit."[48] Specifically, "There is no evidence that any of the crops are receiving water from anything but groundwater. For the sake of argument perhaps, there is more surface water recharging the alluvial valley in the vicinity of the footslope at the site of the valley. It's irrelevant. Regardless of its origin, the water is alluvial groundwater when it is taken up by the plants on the floodplain, and it is that groundwater that is taken up by the plants that enhances the agricultural production. And everyone agrees that the floodplain has higher production."[49]

30. Finally, although the PSC conducted its own very brief 2009 AVF field review—essentially a walkover of portions of Coyote Creek that included shoveling to 18 inches and reviewing the soil—this AVF field review contains no scientifically defensible data to support a negative AVF determination, especially across the entirety of the Creek.

    a. First, this field review did not visit the entirety of Coyote Creek and never visited the Voigts' alfalfa fields in Section 31 of T143N, R88W (these fields are described in greater detail in the following section). In fact, no PSC staff appears to ever have visited the Voigts' alfalfa fields to determine the existence of an AVF at that location. Instead, PSC staff indicated their belief that visiting Section 31 was unnecessary because "subirrigation, if present, would have been more likely in the Section 19/30 cropland tract rather than in Section 31."[50]

[47] *Id.* at 183; *see also* CV Exhibit 15 (OSM guidelines) at C-36 (showing, in OSM case study involving alfalfa subirrigation, that subirrigation first increases as you move away from the valley floor, eventually peaks with distance, and then decreases).
[48] *Id.* at 184.
[49] *Id.* at 185.
[50] PSC Exhibit 12 at par 4 (second affidavit of Bruce Beechie).

This logic is faulty and circular. First, hydrology on one part of a stream can be very different than at another part of a stream.[51] Second, even if, solely for the sake of argument, it is accepted as true that subirrigation is less likely in Section 31, Section 31 contains alfalfa, whereas sections 19 and 30 contained corn. Alfalfa roots *much* more deeply than corn.[52] For example, in OSM's case study of alfalfa subirrigation, it found alfalfa was receiving 25% of its water needs from subirrigation even though the water table was at 15.8 feet below ground level.[53] Because subirrigation is defined by SMCRA as "the supplying of water to plants from a semisaturated or saturated subsurface zone," consideration of plants' rooting depths is required for a defensible analysis.[54]

b. Second, this field review, like the 2009 AVF Study, was conducted at the wrong time of year to determine subirrigation, here, the middle of June. "Late summer, long after spring rains, snowmelts, the spring water are gone, is the appropriate time to investigate subirrigation."[55]

31. Information contained in the 2009 AVF Study and 2009 PSC field review, even taken together, is not sufficient to "affirmatively demonstrate" that an AVF does not exist at Coyote Creek. This is particularly true in light of the first-hand data collected by OSM that points steeply to the contrary, i.e., that Coyote Creek "likely" meets the definition of an AVF.

***In addition, the totality of evidence, including new evidence from this hearing, points to the contrary: an AVF exists on Coyote Creek***

32. The 2009 AVF Study found that even excluding one purportedly abnormal year with four times as much flow as average, average water yield from Coyote Creek was sufficient for irrigation of 102 acres of crops with a foot of water based on June flows, and an additional 70 acres of crops with a foot of water based on July flows.[56]

33. This is the textbook definition that "Surface water is available and *could be used* to enhance production of agriculturally useful vegetation,"[57] especially in light of the fact that this study also determined that portions of Coyote Creek have a flat

[51] Transcript at 227-28 (testimony of Charles Norris indicating that site-specific understanding of hydrology is required, and general rules don't work for hydrology/hydrogeology).
[52] *See generally*, Voigt Exhibit.
[53] CV-15 at C-34.
[54] N.D.A.C. 69-05.2-01-02(103) (defining subirrigation); N.D.A.C. 69-05.2-08-13(d) (listing rooting depth as an important component to determine subirrigation);
[55] Transcript at 177 lines 19-25.
[56] Id. at 26.
[57] OSM Guidance, II-11 (emphasis added).

flood-plain, which would tend to allow for flood irrigation.[58] Based on these findings, the 2009 AVF Study's conclusion that an AVF does not exist at Coyote Creek is plainly erroneous. Rather, these findings require that Coyote Creek be classified as an AVF because they affirmatively show that the following water availability requirement is met: "Surface water is available and could be used to enhance production of agriculturally useful vegetation."[59]

34. Moreover, the Voigts' expert on AVF issues, Charles Norris, disagreed with the 2009 AVF Study's conclusion that subirrigation is not present along Coyote Creek. Rather, Mr. Norris stated that he believes "to a reasonable degree of scientific certainty" that "AVF is demonstrated to exist in the Coyote Creek drainage where the Voigt property is used for hay production," i.e., Section 31 of T143N, R88W. He further stated that he "share[s] the opinion of OSM in 1985 that AVF is likely to occur elsewhere in the Coyote Creek drainage."[60]

35. Two particularly important pieces of evidence strongly suggesting the existence of subirrigation were revealed during this hearing. This evidence was not previously reviewed by the PSC, and the PSC is required to consider it and address it under the Administrative Practices Act.[61] First, Mr. Voigt shared production records showing that his lowland alfalfa fields are more productive than his upland alfalfa fields. Second, Mr. Norris reviewed late summer infrared photos which showed that the lowland fields appear to receive beneficial moisture, even during the moisture stress period of late summer.

36. The Voigts' production records show that their lowland fields are substantially better producing than their upland alfalfa fields. The years 2009-2011 and 2013 represent the Voigts' best data for direct quantitative comparison because the Voigts did not graze any of their fields in those years, and therefore production was quantified for all lowland and upland fields. For convenience, the following table illustrates the Voigts' production records, which are also set forth in Voigt Exhibit 7:

| | Alfalfa "by the house" (lbs/acre) | Alfalfa "by the scoria" (lbs/acre) | Alfalfa: Branding corral north field (lbs/acre) | Alfalfa:: branding corral south field (lbs/acre) |
|---|---|---|---|---|
| 2009 first cutting | 7057 | 5951 | 3952 | 3859 |
| 2009 second cutting | 2105 | 1560 | 0 | 0 |
| 2010 first cutting | 6500 | 4160 | 4316 | 4225 |
| 2010 second | 2940 | 1300 | 0 | 0 |

[58] CV Exhibit 3 at 24.
[59] OSM guidance II-11.
[60] Transcript at 185-86.
[61] N.D.C.C. 28-32-46(7).

| | | | | |
|---|---|---|---|---|
| cutting | | | | |
| 2011 first cutting | 5107 | 6038 | 4316 | 4428 |
| 2011 second cutting | 3683 | 1964 | 520 | 772 |
| 2013 first cutting | 3400 | 3018 | 4984 | 5338 |
| 2013 second cutting | 2300 | 2738 | 1008 | 963 |
| 2013 third cutting | 900 | 467 | 0 | 0 |
| Average production from 2009, 2010, 2011, 2013 (lbs/acre)[62] | 8498 | 6799 | 4774 | 4896.25 |

37. Mr. Voigt identified the fields "by the house" and "by the scoria" as being located next to his farmstead and immediately adjacent to Coyote Creek. These fields are located in Section 31 of T143N R88W and are the two fields that the Voigts contend are underlain by an alluvial valley floor. The two branding corral fields are located "About a mile north and west" of the farmstead, away from Coyote Creek in Section 25 of T143N R89W.[63]

38. The two lowland fields together averaged 7648 lbs/acre of production annually, while the upland fields averaged 4835 lbs/acre of production annually.[64] Comparing the production of the lowland fields to the upland fields shows that the lowland fields produced 58% more alfalfa[65] than the upland fields. Moreover, Voigts' 2012 production records (not included above, but included in Voigt Exhibit 7) indicate that the lowland fields produce two cuttings even in exceptionally dry years, whereas the upland fields do not.

39. The 58% difference in productivity cannot be explained by different soil types, as CCM's witness Ms. Flath claimed at the hearing.[66] Section 2.4.7.3 of CCM's application compared expected productivity of Section 25 T143N R89W to that of Section 31 of T143N R88W, i.e., the areas in question. This comparison was based on average productivity of soil types in each of these locations.[67] Section 2.4.7.3 of CCM's application found that based on existing soils in each of these areas, Section 31 of T143N R88W should average 1,916 lbs/acre of production,

[62] These numbers were derived by summing all production for each field and then dividing by four, i.e., the number of years represented in this sample.
[63] Transcript at 232.
[64] These numbers were derived simply by averaging the production for these fields together (e.g., (8498 x 6799)/2 yields the average productivity for the lowland fields).
[65] This percentage is derived from 7648 divided by 4835, which yields about 1.58, i.e., a 58% difference in productivity.
[66] *See* Transcript at 535-36.
[67] Soil types for the cropland itself was not provided, thus the average productivity of these sections on the whole provides the closest proxy based on available data in Section 2.4.7.3 of the mining permit application.

and Section 25 of T143N R89W should average 2,158 lbs/acre—a difference of 12.6% *in favor* of Section 25. The only reasonable conclusion is that the remaining 70.6% additional productivity necessary to account for the Voigts' 58% greater lowland alfalfa production relative to their upland production is necessarily due to subsurface water at the lowland fields that is not available at the upland fields. In other words, the enhanced production at the lowland fields is due to due to subirrigation as defined under SMCRA. Therefore, these lowland fields are alluvial valley floors.

40. Although not used as a basis for the PSC's 2009 AVF Determination, the 2013 AVF Study conducted for CCM further substantiates the Voigts' production records. That Study explained that during the dry year of 2012, "The only observation of a second cutting, to date, came from the SE4 Section 31, 143-88 near the Casey Voigt ranch."[68]

41. Additionally, Mr. Bickel, CCM's AVF expert, revealed at the hearing that he had reviewed groundwater data for two wells within a couple hundred feet of the Voigts' two lowland alfalfa fields. Both wells showed that, over the course of August 2012 to September 2014, the water table in the area ranged from 8.68 to 10.84 feet.[69]

42. OSM's case study of alfalfa subirrigation indicates that at groundwater depths of 8.68 to 10.84 feet, "on the average, subirrigation supplied a large portion of the water requirements of alfalfa."[70] In other words, at these groundwater depths, the expectation is that the Voigts' alfalfa fields should receive beneficial subirrigation that would enhance their production. This is particularly true in dry years when water from precipitation may be limited, and in such years, these fields would be particularly important to the overall ranching operation since they would supply a larger total percentage of hay for the ranch than in high precipitation years.

43. Mr. Bickel, CCM's AVF expert, agreed with the conclusion that the Voigts' fields are subirrigated, stating that "I think from all -- all testimony there -- there's no refuting that when you plant alfalfa on Mr. Voigt's two fields, there is the potential that those plants can reach and utilize groundwater."[71] In other words, based upon testimony at the hearing, CCM's AVF expert disagrees with a key conclusion of the 2009 AVF Study, i.e., that "Subirrigation is not playing a role in enhancement of crop production" along Coyote Creek.[72]

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[68] CV Exhibit 5 at 20.
[69] Transcript at 430-440; CC Exhibit 15 (well readings); CC Exhibit 16 (well readings).
[70] CV Exhibit 15, at C-34.
[71] Transcript at 467.
[72] To the extent that Mr. Bickel instead relied upon the possibility that the Voigts' alfalfa fields are not significant to their ranching operation, there is no evidence in the record to refute or prove this statement. More importantly though, it is legally irrelevant. The first question that must be asked is whether an AVF exists.

44. Separate from production records and groundwater depths, Mr. Norris also reviewed a near-infrared photograph[73] taken during the moisture stress period of late summer. Although this photograph was on file with the PSC, it was inexplicably not relied upon for either the 2009 AVF Determination or the 2013 AVF Determination.[74]

45. Mr. Norris explained that Voigt Exhibit 18, numbered "291" and taken on September 8, 1978, "appear[s] to be [a] high-resolution, near infrared image[] of the areas in question for both the 2009 and 2013 AVF determinations. Near-infrared imagery depicts growing vegetation (*i.e.*, water bearing) in colors of red…."[75] "Two of the fields located in Section 31 of T143N R88W in Photograph 291 containing deep red coloring are at the same location as Mr. Voigt's present day alfalfa fields."[76]

    These photographs were "taken during the moisture-stress period of the late growing season."[77] Mr. Norris further stated that "Based upon precipitation data for Beulah, 1978 was slightly below the climatic average of 16 inches per year. September 8 would represent a late season condition, long removed from spring snowmelt and rain and early summer precipitation, and is, therefore, a time when areas with subirrigation might be identifiable and recognizable via both aerial and Landsat imagery…"[78]

46. Mr. Norris found that photograph 291 contains "significant fields of red and pink along Coyote Creek, filling in areas along and between the easily seen meanders of the creek. These are fields that still contain plants with significant moisture content, even on September 8, at the end of summer in a drier than normal year. Artificial irrigation is not used in this valley. The water that supports this late-season vegetation, vegetation levels not seen on the surrounding uplands, can only be coming from naturally occurring subirrigation."[79]

47. Based on the above, Mr. Norris concluded that "the PSC should have studied the Coyote Creek valley closely, in particular the reddened areas of photos 291 and 306, and done so at the appropriate time of year, prior to making its two AVF determinations."[80] This statement is further substantiated by OSM's AVF Guidance, which states that "Color infrared photography is the most useful

[73] CV Exhibit 18.
[74] PSC Exhibit 11 at par. 4 (confirming that the PSC did not review this photo); CV Exhibit 3 at 2 (2009 AVF Study, containing no discussion of reliance on aerial or infrared photography, but noting that OSM relied on this photography); CV Exhibit 5 at 3 (2013 AVF Study, stating that aerial photography was reviewed, but providing no analysis or indication of the purpose for reviewing this photography or explanation of what aerial photography was examined).
[75] CV Exhibit 22 at par. 10.
[76] *Id.* at par. 16.
[77] CV Exhibit 2 at 5.
[78] CV Exhibit 22 at par. 13.
[79] *Id.* at par. 15.
[80] *Id.* at par. 18.

method for reconnaissance identification [i.e., determination of areas for further study] and mapping of subirrigated areas" and that "Aerial photographs taken with color infrared film can distinguish actively transpiring plant communities from those which are senescent."[81]

48. In sum, an AVF is present along Coyote Creek for two reasons. First, information contained in the 2009 AVF study clearly indicates that "Surface water is available and could be used to enhance production of agriculturally useful vegetation."[82] Second, production records, infrared photography, and the testimony of CCM's own AVF expert show that "Water is available by…subirrigation and *is being, or has successfully been*, used to enhance production of agriculturally useful vegetation" at the Voigts' lowland alfalfa fields.[83]

***Reclamation—applicable law***

49. SMCRA requires mining companies to "Restore the land affected to a condition capable of supporting the uses which it was capable of supporting prior to any mining, or higher or better uses."[84]

50. At the Voigts' property, 92% of the land is native grassland,[85] a use defined under SMCRA as "land on which the natural potential plant cover is principally composed of native grasses, grasslike plants, forbs, and shrubs valuable for forage and is used for grazing, browsing, or occasional hay production. Land used for facilities in support of ranching operations which is adjacent to or an integral part of these operations is also included."

51. SMCRA further requires mining companies to, "at the minimum…[r]estore lands affected by the surface coal mining operation which have been designated for postmining agricultural purposes to the level of productivity equal to or greater than non-mined agricultural lands of similar soil types in the surrounding area, under equivalent management practices. For…grasslands, a diverse, effective and permanent vegetative cover shall be established of the same seasonal variety native to the area to be affected and capable of self-regeneration, plant succession, and at least equal in extent of cover and productivity to the natural vegetation of the area."[86]

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[81] CV Exhibit 15 at C-39.
[82] OSM guidance II-11; *see also* 30 U.S.C. § 1291(1) and N.D.C.C. § 38-14.1-02(1), both of which define alluvial valley floor as "the unconsolidated stream-laid deposits holding streams *where water availability is sufficient for* subirrigation or *flood irrigation* agricultural activities" (emphasis added).
[83] OSM guidance II-11; *see also* 30 U.S.C. § 1291(1) and N.D.C.C. § 38-14.1-02(1), both of which define alluvial valley floor as "the unconsolidated stream-laid deposits holding streams *where water availability is sufficient for subirrigation* or flood irrigation agricultural activities" (emphasis added).
[84] N.D.C.C. § 38-14.1-24(2).
[85] Transcript at 496 (testimony of Donn Steffen).
[86] NDCC 38-14.1-24(17); *see also* N.D. Admin. Code 69-05.2-22-01; N.D. Admin. Code 69-05.2-22-02(3).

***Concerns with reclamation***

52. In several instances throughout the hearing in this matter, it was mentioned that North Dakota's reclamation standards are more stringent than required under SMCRA. For example, in North Dakota, Native Grassland must be reclaimed to 100% of original productivity, whereas the federal standard is 90%. This is something that we should all be proud of, and the Voigts are not arguing that North Dakota's existing reclamation goals are wrong.

53. Rather, the problem is with how we achieve these standards. On the basis of Mr. Deutsch's reclamation numbers, even though North Dakota may have excellent reclamation goals set forth in regulations, mines across the state are having a very difficult time achieving these standards. Stringent standards mean little if they are not achieved.

54. For example, not a single acre of native or tame grassland has ever been bond released at the Falkirk Mine.[87] Throughout the history of North Dakota's reclamation program, only 1,684 acres of native grasslands have received final bond release.[88] And throughout that same time period, only 20.3% of all disturbed lands have ever attained final bond release, regardless of land use.[89]

55. In short, the Voigts' main concern is that the PSC's excellent reclamation goals are limited by a lack of guidance on how to achieve them. Sufficient data now exists showing that a refined interpretation of the PSC's regulations are needed—specifically to set forth potential methods to achieve satisfactory reclamation.

***Reclamation Changes***

56. The most logical place to make changes at this point is to require companies to gather more data on soil health during the reclamation process. Without adequate soil health, it is impossible to achieve productivity. Thus, this is almost certainly where the problem lies.[90]

57. Mr. Merrill, a soil scientist involved in mining reclamation studies for many decades, provided a recommended path to gather this soil health data. He noted that this data would be particularly helpful for reducing reclamation time. For example, he noted that mining companies could actively make changes to their management of reclaimed land based upon this proposed soil health data.[91] Mr. Merrill specifically recommended the following:

[87] PSC Exhibit 7.
[88] *Id.*
[89] Math derived from PSC Exhibit 8 as follows: 14984acres / (14984 acres +58799 acres)).
[90] *See generally*, testimony of Steve Merrill, Transcript at 238-78.
[91] Transcript at 256-57.

a. One year after initial reclamation
    i. A reconnaissance of topographic aspects of reclaimed the soils, "specifically examination of the soil floor" for "sinkholes" and "compaction" through a "penetrometer test."[92]

b. Three to four years after initial reclamation, a general soil reconnaissance by a qualified soil surveyor examining the following:
    i. To a depth of four feet, examination of profile of soil structure, root penetration, compaction, and electrical conductivity to determine salinity.
    ii. To a depth of one foot, measurements of soil organic carbon, microbial biomass carbon, infiltration, soil aggregate stability, and respiration.[93]

58. These recommendations reflect the fact that soil science has advanced substantially over the past forty years. Today, soil health necessarily considers three overarching components: physical, chemical, and *biological* characteristics of soils. Healthy soils must exhibit positive aspects of all three categories, and modern soil science places particular emphasis on the biological component.[94]

59. The PSC need not issue new regulations to achieve these information gathering changes—it can do so simply by interpreting its existing regulations. The PSC's Revegetation Standards provide an excellent example of how this could be done. The Standards are best described as interpretive guidance setting forth a path for companies to comply with reclamation regulations—the standards themselves are not binding law. Like the PSC has done with its Revegetation Standards, the Voigts believe it is necessary for the PSC to interpret its existing laws requiring restoration of the prior land use and restoration of productivity on that land use as further requiring gathering information to help facilitate these goals throughout the reclamation process.

60. Apart from the need to gather soil health information throughout the reclamation process, the Voigts also are concerned that the PSC's revegetation requirements will allow substandard reclamation to take place that cannot reasonably be construed as leading to reclamation of the existing land use. Rather, up to 35% tame grasses will be allowed, a far cry from the pristine native grassland presently on their property

61. Mark Anderson, an expert in rangeland management and soils, explained that tame grasses are not as productive as native grasses.[95] Therefore, the PSC's 35% allowance for tame grass by definition cannot yield native grasslands restored to

[92] Transcript at 250-51.
[93] Transcript at 252.
[94] Transcript at 249.
[95] Transcript at 343.

"productivity equal to or greater than non-mined agricultural lands of similar soil types in the surrounding area" as required by North Dakota law.[96] The tolerated increase in cool season grasses is also of concern. As such, the Voigts are requesting a special condition on this permit that only 10% tame grass be allowed for final bond release, which is more than the Voigts' 8% tame grass that presently exists on their property.

62. For all of the reasons explained above, the Voigts respectfully request that the North Dakota Public Service Commission issue Findings of Fact, Conclusions of Law, and an Order in the form being filed with this brief.

Dated this 6th day of March, 2015

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[96] NDCC 38-14.1-24(17); *see also* N.D. Admin. Code 69-05.2-22-01; N.D. Admin. Code 69-05.2-22-02(3).