

Technical Memo



To: Benjamin Reister, Minnesota Power, Inc.

From: Luke Toso, Wenck Associates, Inc.

CC: Wade Isaacson, and Scott Monroe, Minnesota Power, Inc.

Date: June 14, 2018

Subject: Bison IV Reclamation Investigation, Case PU-13-127 & I-15-0195

Introduction

Minnesota Power, Inc. (Minnesota Power) completed construction of the Bison IV Wind Project (Project) in 2015. Since that time, concerns have been raised about final reclamation on a landowner's property (subject property). Minnesota Power and the landowner have been in negotiations regarding these issues for several years. The North Dakota Public Service Commission (NDPSC) visited the subject property in May 2017 to respond to these complaints. Since negotiations with the landowner stalled, the NDPSC requested Minnesota Power to submit weekly reclamation reports until the landowner's concerns have been addressed. Minnesota Power contracted Wenck Associates, Inc. (Wenck) to conduct an independent inspection to determine what actions, if any, would be needed to meet reclamation standards.

Regulatory Background

On April 14, 2017 the NDPSC visited the subject property in response to a complaint submitted by the landowner. The NDPSC summarized four separate issues raised by the landowner (NDPSC PU-13-127, Docket #109). The focus of this memorandum is on the first point summarized by the NDPSC:

- "There are areas with washouts, ruts, rocks, weeds, and other minor reclamation issues including a need for further de-compaction and reseeding along portions of the crane walk paths."

Based on the map submitted with the complaint, there were 5 areas highlighted during the NDPSC visit to the subject property, which are shown in Figure 1:

- Noxious weeds along 58th Avenue Northwest,
- Final reclamation concerns and a washout along the collector line between T448 and T449,
- Final reclamation concerns along the collector line southeast of Turbine 449 crossing pasture and haylands,
- Final reclamation concerns along the collector line between T450 and T451,
- Compaction and reclamation concerns along the crane walk path,
- Washouts and erosion near T440.

117 PU-13-127 Filed 06/19/2018 Pages: 19
Technical Memo regarding Bison IV Reclamation Investigation
Wenck Associates, Inc.

Standards for reclamation were set prior to construction of the Project. The NDPSC Certifications Relating to Order Provisions includes several items relating to reclamation and restoration following construction (NDPSC PU-13-127, Docket #40):

18. Company understands and agrees that reclamation, fertilization, and reseeding is to be done according to the Natural Resources Conservation Service recommendations, unless otherwise specified by the landowner and approved by the Commission.
19. Company understands and agrees that its obligation for reclamation and maintenance of the approved site will continue throughout the life of the energy conversion facility.
27. Company agrees that it shall, as soon as practicable upon the completion of the construction of each wind turbine, restore the area affected by the activities to as near as is practicable to the condition as it existed prior to the beginning of construction.

Language relating to reclamation is also included in the easement signed by the landowner, as noted in bold below. The easement states:

6.4 Construction Easement. Owner grants Developer an easement for purposes of constructing, maintaining, repairing, replacing, and removing all or any part or element of the Wind Project Improvements. This easement is referred to as the "Construction Easement" and the property subject to the burden of this easement is referred to as the "Construction Easement Property." The Construction Easement Property is generally shown in Exhibit B. Developer may exercise its right to use all or any part of the Construction Easement Property as and when Developer deems it necessary or advisable to do so to perform the activities for which this Construction Easement is granted. In exercising its rights under this Construction Easement, Developer agrees to minimize interference with the necessary movement of Owner's livestock across the Owner's Property. **After each use of the Construction Easement, Developer to the extent reasonably possible shall restore the Construction Easement Property to the condition it was in before Developer's use.** [Emphasis added]

Methods

On June 6, 2018 Luke Toso (Wenck) and Minnesota Power representatives Wade Isaacson, Scott Monroe, and Benjamin Reister visited areas of reclamation concern. Botanical surveys were conducted within each of these areas. Vegetation was compared between areas used by the Project and adjacent unused areas. Plant communities were documented by recording each species encountered and estimating the absolute cover of dominant species. Soil conditions were assessed by visual observation of surface soils and vegetation growth; soil pits were not excavated to avoid surface disturbance. Photographs were taken throughout the subject property to show land use, vegetation composition, and soil conditions.

T448-T449 Collector Line

A washout and revegetation concerns were reported along the collector line between T448-T449 (**Photo 2**). The collector line crosses through a gently rolling pasture. Based on the site conditions, the collector line and adjacent areas appeared nearly indistinguishable; there was no evidence of erosion, washouts, or other revegetation concerns (**Photo 3, 4**). Alfalfa (*Medicago sativa*), western wheatgrass (*Pascopyrum smithii*), Kentucky bluegrass (*Poa pratensis*), and fringed sagewort (*Artemisia frigida*) were typical species observed in both the reclaimed collector line and surrounding area. Grasses and forbs had comparable percent cover and distribution to the surrounding areas, with the exception of alfalfa, which was more abundant within the reclaimed area. Soil conditions appeared to be flatter in the reclaimed area as compared to the subtle hummocks in the pasture. This collector line appears to have been restored to as near as is practicable to the condition as it existed prior to the beginning of construction. No further action is recommended.



Photo 2. Facing: Northeast. Location: 47.016456, -101.719680
View of the collector line between T448 and T449. The collector line scar is nearly indistinguishable compared to the surrounding landscape.



Photo 3. Location: 47.016433, -101.719672

View of the vegetation cover within the pasture undisturbed by construction of the project.



Photo 4. Location: 47.016528, -101.719636

View of the vegetation cover within the collector line corridor. Alfalfa was more abundant in this area compared to the surrounding area. Grasses and other forbs were comparable in composition to the surrounding areas.

Collector Line Southeast of T449

Revegetation and rutting concerns were reported along the collector line route southeast of T449. The line crosses through moderately rolling native pasture and hayland. Vegetation establishment was overall excellent along this route with between 70-80% vegetative cover (**Photo 5-7**). Vegetation was not fully established in some areas; however, the seeded vegetation was in excellent condition and will continue to establish given time (**Photo 7**). Western wheatgrass, yarrow (*Achillea millefolium*), alfalfa, and green needlegrass (*Nassella viridula*) were typical species observed in both the reclaimed area and surroundings. Regarding soil concerns, a subtle ridge was observed along the collector line corridor that spanned approximately 10 feet and was about 1 to 2 inches high (**Photo 8**). The ridge likely formed as soil settled following reclamation. The short length and low height of the ridge should not pose a hazard or impediment to livestock or vehicles and is similar to natural features throughout the pasture. In comparison to the surrounding site, this collector line appears to have been restored to as near as is practicable to the condition as it existed prior to the beginning of construction. No further action is recommended.



Photo 5. Facing: Northeast. Location: 47.010414, -101.717378
View of the southwestern extent of the collector line southeast of T449. The corridor was nearly indistinguishable to the surrounding area.



Photo 6. Facing: Southwest. Location: 47.018928, -101.706300
View of the collector line southeast of T449 in the hayed area. Alfalfa and grass cover in this area was comparable to the surrounding areas.



Photo 7. Facing: Northeast. Location: 47.018928, -101.706300
View along the collector line southeast of T449. T451 is visible in the northwest corner of the photo. This area had the least vegetation cover observed along the route, but still had a satisfactory stand of seeded native grasses that will continue to establish over time without intervention.



Photo 8. Facing: Northeast. Location: 47.019089, -101.706239
View of a soil ridge along the collector line southwest of T449. This ridge was likely formed from soil settlement after construction.

T450-T451 Collector Line

Similar to the other two collector lines discussed in this memo, revegetation concerns were reported along the T450-T451 collector line. The line crosses through a moderately rolling native pasture. Based on current site conditions, vegetation establishment was excellent in this area, with vegetation cover between 70-80% (**Photo 9-11**). Typical species observed included western wheatgrass, green needlegrass, yarrow, fringed sagewort, and Kentucky bluegrass. Vegetation composition in the surrounding area was similar to what had been seeded in the reclaimed corridor. No erosion, rutting, or other soil issues were noted during the inspection. This collector line appears to have been restored to as near as is practicable to the condition as it existed prior to the beginning of construction. No further action is recommended.



Photo 9. Facing: Northeast. Location: 47.021992, -101.710267
Overview of the collector line between T450 and T451 from the southwest end. The route of this line is nearly indistinguishable to the surrounding area.



Photo 10. Location: 47.022080, -101.710152

View showing the vegetation cover outside of the disturbed area. Vegetation litter was greater in this area compared to the collector line corridor, but otherwise vegetation cover and composition were similar in both areas.

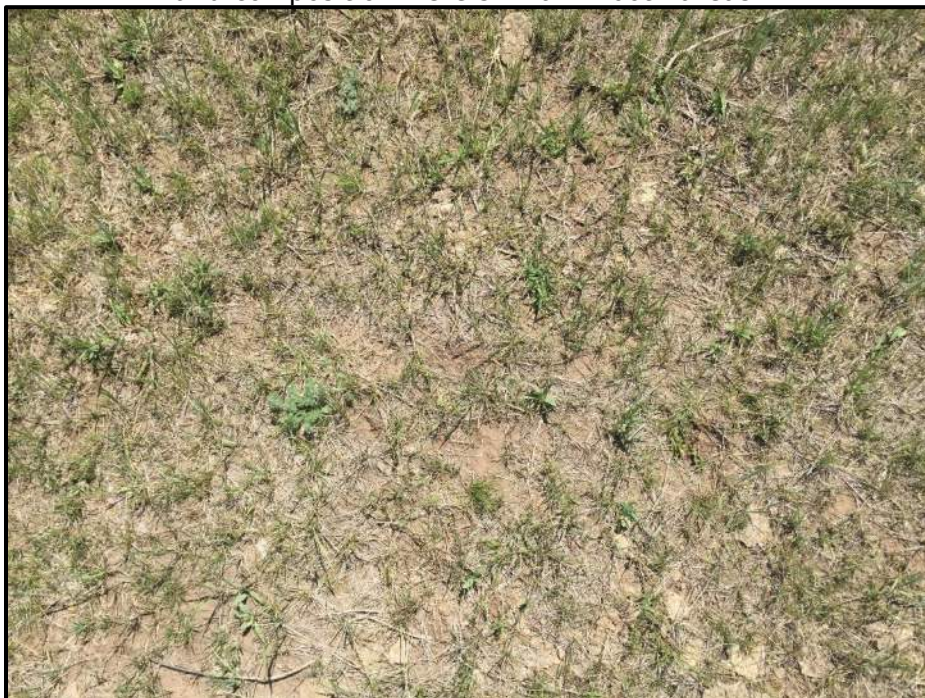


Photo 11. Location: 47.022030, -101.710097

View of the typical vegetation cover within the collector line disturbance corridor.

Crane Walk Path

Decompaction and re-seeding along the crane walk path were specifically noted in the NDPSC Reclamation Memo. The crane walk path crosses through rolling native pasture. Based on the site visit, the entire crane walk path had excellent vegetative cover (70-90% absolute cover), with an abundance of the native species western wheatgrass, sun sedge (*Carex inops*), little bluestem (*Schizachyrium scoparium*), field sagewort (*Artemisia ludoviciana*), and green needlegrass (**Photo 11-18**). There was no evidence of extensive or problematic soil compaction along the route, which would have been evident with a lower abundance of native vegetation. One location along the route had a subtle ridge approximately 5 feet long and 2-3 inches high that was formed by the crane compacting the soil (**Photo 15**). The short length and low height of the ridge should not pose a hazard or impediment to livestock or vehicles and is similar to natural features throughout the pasture. In comparison to the surrounding site, the crane walk path appears to have been restored to as near as is practicable to the condition as it existed prior to the beginning of construction. No further action is recommended.



Photo 11. Facing: Northwest. Location: 47.026733, -101.703439
View from the southern extent of the crane walk path, which is nearly indistinguishable from the surrounding area.



Photo 13. Location: 47.026628, -101.703439
View of the vegetation cover within the crane walk path. The vegetation cover and composition was identical to the surrounding area.



Photo 14. Location: 47.026522, -101.703414
View of the vegetation cover outside of the crane walk path.



Photo 15. Location: 47.031628, -101.706214

View of a subtle ridge created by the crane along a hillside. No erosion concerns were noted in this area, with vegetation well established throughout.



Photo 16. Facing: Northwest. Location: 47.033522, -101.707322

The crane walk path in this pasture was indistinguishable from the surrounding native pasture.



Photo 17. Facing: Southeast. Location: 47.036189, -101.708947
Note the uniformity of vegetation cover in this view of the crane walk path near its northern extent.



Photo 18. Facing: Southeast. Location: 47.036189, -101.708947
View of the northernmost extent of the crane walk path.

T440 Washout

The outlet of the culvert along the T440 access road was noted as having erosion and rills forming. This area did appear to have washed out this spring. Absinthe wormwood was present at the base of the culvert (**Photo 19**). This area should be stabilized to prevent further erosion to the ditch bank and sedimentation to the nearby pasture. The wormwood should be sprayed as a part of annual operation and maintenance to prevent from spreading. A fall spraying is recommended to help control this species.



Photo 19. Facing: Southeast. Location: 47.028850, -101.690619

View east from the access road showing a washout forming at the outlet of a culvert. Note the absinthe wormwood in the background, a weed that should be controlled this season to avoid spreading further into the adjacent pasture.

Conclusion

The Project appears to have been reclaimed in a responsible manner, following applicable NDPSC orders and the easement signed between the landowner and Minnesota Power. The collector lines, crane walk path, and access roads were in excellent condition and had been restored to as near as is practicable to the condition as it existed prior to the beginning of construction. The only recommendation for further action would be to stabilize and restore a washout forming along the T440 access road and to otherwise continue annual control of noxious weeds; a fall spraying is recommended to control absinthe wormwood. One area did not have fully established seeded vegetation and two locations had minor ridges in the soil; however, additional actions are not recommended for these areas. Additional reseeding would likely cause more harm than benefit in this case. Reseeding would require heavy equipment and the disturbance and re-handling of soils which are currently stabilized. The existing stand of seeded vegetation is satisfactory at over 70% cover and is continuing to establish by vegetatively spreading and producing seed; disturbance to this area would set back the already successful reclamation in this area. The subtle soil ridges observed appear similar to other natural hummucks present in the surrounding native pasture land.

Regrading or blading these areas would result in disturbance to previously undisturbed areas, which would provide little benefit to the pasture.

The services performed by Wenck scientists for this project have been conducted in a manner consistent with the degree of care and technical skill appropriately exercised by professionals currently practicing in this area under similar time and budget constraints. Recommendations and findings contained in this report represent our professional judgment and are based upon available information and technically accepted practices at the present time and location. Other than this, no warranty is implied or expressed.

If you have any questions, please feel free to call me at (701) 751-6129 or at ltoso@wenck.com.

Sincerely,



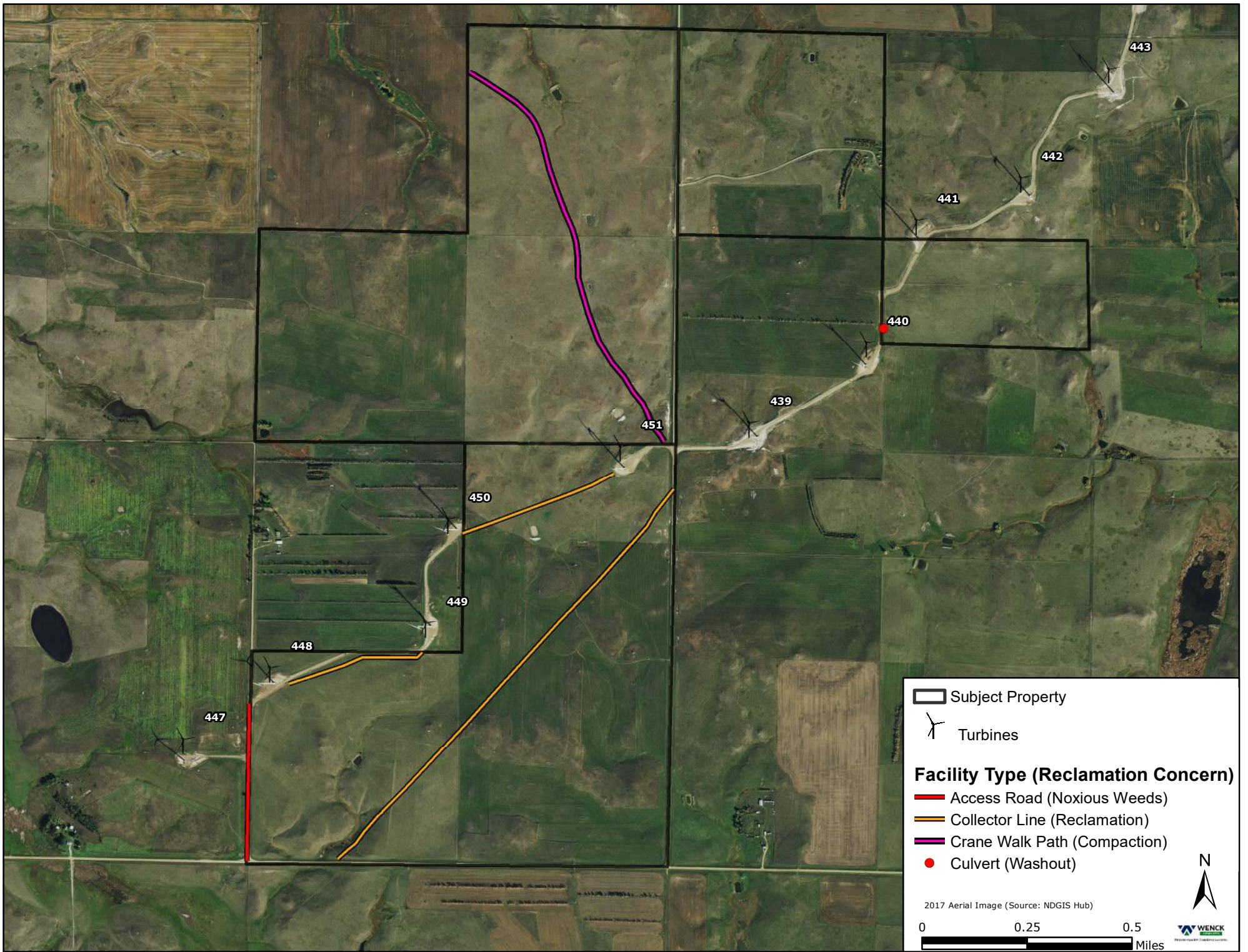
Luke Toso, Wetland Scientist

June 14, 2017
Date

Enclosed
Attachment 1: Figures and Maps

Attachment 1

Figure 1: Overview of Reclamation Areas
Figure 2: Photo Map



Subject Property

Turbines

Facility Type (Reclamation Concern)

- Access Road (Noxious Weeds)
- Collector Line (Reclamation)
- Crane Walk Path (Compaction)
- Culvert (Washout)

2017 Aerial Image (Source: NDGIS Hub)

0 0.25 0.5 Miles



