Merricourt-Ellendale Transmission Line Construction Inspection Report

Montana-Dakota Utilities Co.

Prepared for:

NORTH DAKOTA PUBLIC SERVICE COMMISSION
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Wenck
Engineers • Scientists

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Executive Summary

The North Dakota Public Service Commission (PSC) retained Wenck Associates, Inc. (Wenck) to complete a construction inspection of the Merricourt-Ellendale Transmission Line in Dickey and McIntosh Counties, ND owned and operated by Montana-Dakota Utilities Co. (MDU). Construction for the Project began in September 2011 and is scheduled for completion in May 2012. The purpose of the construction inspection was to ensure the Project was constructed in compliance with the siting laws and rules and the applicable PSC Order for the Project. Prior to the construction inspection, Wenck reviewed all Project documents to identify those which required site verification.

The site was visually inspected on 3 April 2012 by Wenck, accompanied by a MDU representative. Overall, the project was very well-maintained and in good condition. It appeared to be constructed as planned with numerous efforts to minimize impacts. However, there were several non-critical issues that may need to be resolved for the Project to be considered in full compliance. Wenck recommends that the PSC request the following from the company upon Project completion: 1) written documentation of several particular aspects of Project implementation identified during document review, 2) final restoration/reseeding according to NRCS guidelines on any areas disturbed by construction activities, 3) fulfillment of Tree & Shrub replacement and survival monitoring, 4) provision of the final hardcopy, electronic copy, and GIS file as-built drawings, and 5) confirmation that bird deterrents were placed along the route in areas corresponding to wetland habitats. The PSC will need to decide whether these recommendations are necessary to fulfill Project obligations. Wenck expects most follow-up action taken by MDU to address these particular issues can be corroborated in writing. However, it may be prudent for another site visit to confirm that bird deterrents were put in place and final reclamation of the site was completed as specified.

1.0 Background

1.1 INTRODUCTION

The Merricourt Wind Farm to Ellendale Substation Transmission Line (Project) is scheduled for completion in early spring 2012. The Project is operated by Montana-Dakota Utilities Company (MDU). The Project comprises approximately 30 miles of 230 kV electric transmission line beginning at an existing substation near Ellendale, North Dakota and extending to a newly constructed substation located northeast of Ashley, North Dakota. The Project is under the jurisdiction of the North Dakota Public Service Commission (PSC), which issued its Findings of Fact, Conclusions of Law, and Order on Case No. PU-10-164 on 13 July 2011, granting a Certificate of Corridor Compatibility No. 120 and Route Permit No. 130 for the Project.

1.1 PURPOSE AND SCOPE OF INSPECTION

The North Dakota Energy Conversion and Transmission Facility Act (North Dakota Century Code Chapter 49-22) authorizes the Public Service Commission to determine that the location, construction, and operation of jurisdictional energy conversion and transmission facilities will produce minimal adverse effects on the environment and welfare of citizens of North Dakota. Construction inspections ensure the Project is constructed in compliance with siting laws, rules, and the applicable Commission Findings of Fact, Conclusions of Law, and Order (Order).

The North Dakota PSC retained Wenck Associates, Inc. (Wenck) to complete a construction inspection of the Project. The inspection process included a review of the Application for Corridor Compatibility and Route Permit, Order, and other applicable documents to determine Project-specific siting and construction requirements; a site visit and inspection of facilities; documentation of compliance; and a report summarizing findings. This report includes, but is not limited to, documentation of site visit observations, documentation of compliance deficiencies,

and a summary of issues that should be addressed for the Project to be considered complete and in full compliance.

2.0 Document Review

2.1 METHODS

Wenck reviewed North Dakota siting laws and rules, the Application for Certificate of Corridor Compatibility and Route Permit (Application), and the Order for the Project to identify what Project-specific documentation was required for compliance. Wenck then reviewed Project documents in the PSC Online Case Search (ND PSC 2012) to identify those siting laws, rules, and Application and Order assertions that already had written verification, those that still required documentation, and those that required physical site verification.

2.2 FINDINGS

The following table includes a list of components of the Project that were asserted in the Application and Order which could be documented during construction to verify compliance with siting laws, rules and the Order for the Project (Table 1), via either written documentation or physical site verification. If Wenck found written verification in the online PSC files for a particular Project component, this is marked in the second column. If physical site verification was possible, this was marked in the third column and that particular component was verified during the site inspection (Section 3.0).

Several components of the Project were asserted in the Application or proposed construction but have no written documentation showing that they were indeed implemented or constructed as planned, and physical site verification is not applicable. *This includes all items listed in Table 1 that have shaded boxes in the second column*, indicating written verification is appropriate, but is lacking from current files. To show that the Project is in full compliance, the PSC should request written verification from MDU for these items.

Table 1. Merricourt-Ellendale Transmission Line Project Document Review Summary

Description of Project Component/Assertion	Written Verification in PSC Files*	Site Verification
National Electric Safety Code Compliance		
No exclusion areas identified on route	X	
Waivers from residents within 500ft	X	
Cultural resources avoided on route		X
Woodland loss minimized on route		X
Wetlands avoided or spanned		X
No impact on Policy Criteria on route	X	X
Safety measures for traffic control/restrict public access		X
Avian impacts minimized by bird-safe designs. Line marking plan followed.		Ongoing
Pre-Construction conference record	X	
Permits/Approvals from other agencies	X	
Intent to start construction notice	X	
Weekly construction reports	Ongoing	
Construction according to Application and safety requirements	X	
17.4 miles of double circuit line from the Ellendale substation and 12.6 miles of new single-circuit line to Merricourt Substation.		X
Reports of presence of threatened, endangered species or bald or golden eagles, if applicable		
Reports of cultural, archeological, historical resources found, if applicable		
Reports of failure, injury, T & E, bird and bat deaths		
Roads restored to previous use		X
Reclamation and clean-up continuous with construction		X
Reclamation/reseeding according to NRCS or landowner		Ongoing
Compliance with "Tree and Shrub Mitigation Specifications"	X	Ongoing
Woodland crossing width limited to 120ft		X
Reclamation and maintenance throughout life of facility	X	X
Mitigation of television & radio interference		
Repair/replace all fences and gates, if applicable		X
As-built drawings and GIS within 90 days after construction		
Rare and unique natural resources avoided	X	X
NDGF requests: avoid placing above-ground structures in wetlands, disturbed areas reclaimed, overhead lines marked near water bodies.		X
USFWS requests: Avoid disturbance in LSB WPA, avoid wetland easements, defer construction post-Aug 1, avoid wetland fill, install erosion control, reseed with native species, replant trees 2:1, mark line within 1 mile of wetlands and potential whooping crane habitat, avoid native prairie	X	X
NDPR requests: avoid LWCF recreational lands, avoid species of concern and significant ecological communities, reseed with native species	X	X
NDHD requests: minimize fugitive dust, degradation of waterways, storm water management, noise		X
Compensation for landowners for crops and impacts to CRP status		
Aeronautics Commission requests: search of private airports, FAA consultation completed under Form 7460 (receipt of study results needed)		

*Note: Shaded boxes indicate documentation is lacking and site verification is not applicable.

3.0 Site Inspection

3.1 METHODS

Luke Toso of Wenck visited the Project area on 3 April 2012. Tom Crary, Senior Engineer for the Project and a Transmission Line Engineer for MDU, accompanied Wenck staff during the site visit and assisted with navigation, pointed out problem areas, and answered any questions.

The site was visually inspected along portions of the transmission line route by accessing as many points as feasible where road access was available. Some features were accessed by walking within the transmission line right-of-way (ROW). The survey began at the Ellendale laydown area in Section 11 of Township 129N, Range 63W in Dickey County. Inspection of the transmission line began in Section 10 of Township 129N, Range 63W, Dickey County at the Ellendale substation and followed the line to its west end at the Merricourt substation in Section 34 of Township 131N, Range 67W, McIntosh County. Digital photographs (Canon Power Shot SD1300 IS, 12.1 megapixels) were taken showing typical Project infrastructure and documenting problem areas (Appendix A). Geographic coordinates were recorded at observation points or potential problem areas using a handheld Global Positioning System (GPS) (Garmin eTrex Legend H; <10m accuracy; WGS 84 datum) (Figure 1; Appendix B)

3.2 OBSERVATIONS & FINDINGS

3.2.1 Engineering/Construction/Design & Soils

The following aspects pertaining to engineering, construction, or design of Project infrastructure were inspected at the site.

- *17.4 miles of double circuit line from the Ellendale substation in existing right-of-way and 12.6 miles of new single-circuit line to Merricourt Substation.* Wenck

observed the line followed the existing right-of-way (ROW) as a double circuit 41.6 kV/230 kV line from the Ellendale substation until observation point 114 (**Figure 1**). From this point, the line continued to the Merricourt substation as a single circuit 230 kV line. H-Frame structures were constructed according to the application and were within the 120ft ROW.

- *Roads Restored to Previous Use.* The Application stated no permanent access roads would be constructed for the Project, but that temporary access roads would be needed to access pole locations. It stated that temporary access roads would utilize existing public and private roads where possible and limit new roads to 20 feet in width. Wenck observed a remaining temporary access road at the Webster's laydown area, which was located approximately 0.5 miles south of the Ellendale substation; it was maintained and in good condition (**Appendix A, Photos 2 and 3**). A permanent access road at the Merricourt Substation was in good order with no erosion or other problems evident. Wenck noted that all minimum maintenance roads, county roads, and highways within the Project area appeared to be in good condition and properly maintained.

- *Reclamation and Maintenance Continuous With Construction.* At the time of the site inspection, all pole structures were in place but construction activities were ongoing, which included final line stringing and restoration activities. Wenck observed that removal of debris from most structure bases still needed to be completed (**Appendix A, Photos 15, 19, 29**). MDU stated that debris will be cleaned, spread, or hauled away upon Project completion (Tom Crary, pers. comm. 2012). All structure poles were upright and there were no locations where vegetation was in close proximity to the lines. Agricultural areas along the transmission route where soils may have been disturbed were indistinguishable from adjacent soils, topography, and recently planted crops.. Substations were both in order with erosion control measures in place (**Appendix A, Photos 4, 5, 35**).

- *Fences/Gates Repaired/Replaced.* Wenck observed that most fences and gates had been repaired as construction concluded. At the time of inspection, one gate was currently being repaired (**Appendix A, Photo 13**). MDU stated that remaining fences would be repaired as needed throughout the ROW (Tom Crary, pers. comm. 2012). The fact that fences were being repaired at the time of inspection shows that this statement was made in good faith and the remaining fences/gates would be repaired upon Project completion.

- *As-built Drawings and GIS files*. Project as-builts were not filed at the time of the site inspection because construction had yet to be completed. The Order states MDU should provide a hardcopy, electronic copy, and ESRI GIS files of the final as-built location of the Project within 3 months of completion. In order for the Project to be in full compliance, the PSC should request as-builts from MDU if none are submitted 3 months from Project completion.

- *Safety Measures for Traffic Control and Restricting Public Access*. Signage for restricting public access with appropriate warnings was in place at both the Ellendale and Merricourt substations. Traffic control appeared in place during construction operations.

- *NDDD (ND Department of Health) Requests: Minimize Fugitive Dust, Degradation of Waterways, Manage Storm Water and Noise.* To control for fugitive dust, dirt/gravel roads were sprayed with magnesium chloride to control dust and erosion to nearby residences. Wenck did not observe major erosion or sediment deposition problems to waterways due to line construction. Noise appeared to have been minimized during construction of the Project. It appeared all above measures were followed.

3.2.2 Natural Resources (Wildlife, Wetlands, Vegetation)

The following aspects pertaining to natural resources, including wildlife, wetlands, and vegetation, were inspected at the Project site.

- *Woodland Crossing Width Limited to 120 ft.* The Application stated impacts to native and planted woodlands would be minimized and any removed trees or shrubs would be replaced at a 2:1 ratio and monitored for 5 years. The Order allowed a 120 foot maximum clearing width and it appeared MDU followed this specification. Overall, it appeared clearing of woodlands for the Project had been done only where necessary.

- *Wetlands/Waterways Avoided or Spanned.* MDU anticipated numerous wetlands along the route and many were present, especially in the western region of the Project. They were to be avoided by pole placement and spanning. A wetland delineation report was submitted for the Project and was completed according to US Army Corps of Engineers (ACOE) guidelines ("Wetland Delineation Report, Merricourt Wind Farm to Ellendale 230 kV Transmission line, March 2011, HDR Engineering, Inc."). Along the transmission route, no wetlands were under USACE jurisdiction. Wenck observed numerous areas where wetlands were within the ROW, but all were avoided by pole placement and spanning (**Appendix A, Photos 7-11, 18, 22-26, 29-31**). The Application stated BMPs would be used during construction and operation of the transmission line to protect wetlands including: containing excavated material, protecting exposed soils, stabilizing restored material and vegetating disturbed areas. Wenck did not observe any evidence of erosion or sediment control materials during the site visit, but it appeared the above stipulations and measures were followed since there was no evidence of permanently disturbed or impacted wetlands or wetland vegetation. One crossing of note involved crossing a wetland to place a pole structure on an island (**Appendix A, Photos 8, 9**). Disturbance was minimized by use of a tracked vehicle without any erosion or sedimentation to the wetland observed.

- *Avian Impacts Minimized by Bird-Safe Designs.* The Application identified avian mortality as a concern with construction of the transmission line. The following mitigation measures were outlined in the Application to be used when practicable

to minimize impact on birds: use of H-frame structures; reduce the number of wire planes; marking shield wires in high use areas (within one mile of wetlands); preconstruction surveys for wetlands, native prairie, and woodlands; avoid or minimize disturbance of wetlands/drainages; installation of erosion control measures; replacement of shrubs removed at 2:1 ratio; soil and water conservation/BMPs; revegetation of non-cropland and pasture; control of noxious weeds. Wenck observed that all poles were H-Frame structures along the line and the number of wire planes was minimized. MDU also submitted documentation of pre-construction surveys of wetlands, native prairie, and woodlands for the Project, which appeared to be avoided when possible ("Wetland Delineation Report, Merricourt Wind Farm to Ellendale 230 kV Transmission Line, March 2011, HDR Engineering, Inc.", "Tree and Shrub Inventory Report, Merricourt Wind Farm to Ellendale 230 kV Transmission Line, March 2011, HDR Engineering Inc."). Erosion control measures, including soil and water conservation BMPs, appeared to be in place evidenced by no apparent erosion to waterways along the entire route. Nevertheless, bird deterrents had yet to be installed at the time of the site inspection, and final revegetation around pole structures had to be completed. The representative for MDU showed Wenck the purchase order for bird deterrents, and MDU plans to install them within 1 mile of wetlands throughout the route upon construction completion (Tom Crary, pers. comm. 2012). Disturbance along the route was minimal, thus restoration that will occur will be minimal and concentrated around structure bases.

- *Reclamation/Reseeding According to NRCS or Landowner, if applicable*. The Application stated disturbances would be limited to a 120 ft x 100 ft area around poles and that disturbed areas would be restored to original conditions in accordance with landowner requests. Reclamation activities anticipated were installation of erosion control measures, disposing of debris, restoring temporary facilities (staging, lay down areas, and roads) by disking to relieve compaction, leveling or filling tire cuts, and reseeding non-cultivated land areas per USFWS and NRCS recommendations. Final restoration of the site was ongoing at the time

of the site inspection. Wenck observed that most disturbances were concentrated to a small area around pole bases (**Appendix A, Photo 15**) much less than the 120 ft x 100 ft area of disturbance stated in the Application. Also, temporary facilities all appeared to be in good order with very little restoration necessary to restore them to their original condition (**Appendix A, Photos 1-3, 28**). Therefore, though restoration/reseeding remains to be completed in order for the Project to be in full compliance, construction disturbances were minimized, resulting in a relatively small area to be restored.

- *Compliance with "Tree and Shrub Mitigation Specifications"*. At the time of the site inspection, tree and shrub replacement had yet to occur. However, several documents have been submitted showing the necessary steps that MDU will take to replace trees and shrubs. Trees and shrubs were inventoried according to the specifications in a filed report titled "Tree and Shrub Inventory Report, Merricourt Wind Farm to Ellendale 230 kV Transmission Line, March 2011, HDR Engineering Inc." (ND PSC 2012, PU-10-164, Docket #62). A replacement plan was furnished to Wenck, but has not yet been docketed, titled "Tree and Shrub Replacement Plan, Merricourt Wind Farm to Ellendale 230 kV Transmission Line, March 2012, HDR Engineering Inc.". It appears trees and shrubs were cleared according to specifications, except 120 ft. width clearing was allowed rather than the typical 50 ft. width; Wenck did not observe any areas where it was necessary to cut to this width. The tree and shrub inventory found that 534 tree/shrubs would be removed, and 1068 trees/shrubs would be replaced with similar species suitable for North Dakota growing conditions; this meets the 2:1 PSC requirement for replacement. In order for the Project to be in full compliance, the PSC should request the "Tree and Shrub Replacement Plan" dated March 2012, verify that tree and shrubs are replaced as planned, and verify survival is monitored for 3 years after planting.
- *Woodland Crossing Width Reduced to 120ft.*. The Application stated impacts to native and planted woodlands would be minimized. At the preconstruction conference, it was stated that cuts would be limited to 120 ft. Wenck did not

observe any areas where cuts were greater than allowed because most of the route traveled through agricultural land without many trees present.

- *Rare and Unique Resources Avoided.* Historic locations of potentially sensitive species and habitats were identified by the ND Parks and Recreation Department (NDPR) and the USFWS provided information regarding potential threatened or endangered species present in the Project area. Sensitive species found nearby the Project area were red-necked grebe (*Podiceps grisegena*) and the swamp sparrow (*Melospiza georgiana*), which both nest in wetland habitats; sensitive habitat included bur oak and upland woodland, and needle and thread mixed grass prairie, first order streams, and permanent open water. MDU performed preconstruction wetland delineations and tree and shrub inventories of the Project area ("Tree and Shrub Inventory Report, Merricourt Wind Farm to Ellendale 230 kV Transmission Line, March 2011, HDR Engineering Inc., "Wetland Delineation Report, Merricourt Wind Farm to Ellendale 230 kV Transmission line, March 2011, HDR Engineering, Inc."). The Application showed that there may be potential impacts to Piping plover (*Charadrius melodus*), Grey wolf (*Canis lupus*), and Bald eagle (*Haliaeetus leucocephalus*), but it was unlikely this Project would have any affects to these species or their habitat because either no reports or no habitat exists for these species within the Project area. No habitat for Piping plovers is in the Project area because they utilize alkali lakes and wetlands for nesting and forging habitat. Habitat for Grey wolves may be present within the Project area, but wolves are most frequently observed around the Turtle Mountains in northern North Dakota, more than 150 miles from the Project area. Bald eagles typically roost near coastlines, rivers, or open streams where adequate food is available, but no roosting or forging habitat is in the Project area. Whooping crane roosting habitat was present in the Project area in wetlands; however there was minimal disturbance to wetlands during construction of the Project and this disturbance was temporary. Wenck confirmed that all areas of potential habitat for these sensitive species and sensitive habitats were avoided. No impacts were noted to wetland habitats. Therefore, sensitive species were

taken into account in the design of the Project, and no impacts to these species were noted.

- *NDGF (ND Game & Fish Dept.) Requests: Protect Wetlands, Disturbed Areas Reclaimed, Overhead Lines Marked Near Water Bodies.* As discussed in above sections, various measures in the Application for the Project addressed these NDGF concerns and Wenck observed that measures appeared to have been implemented, or would be implemented to minimize potential impacts.

- *USFWS (US Fish & Wildlife Service) Requests: Avoid Disturbance in LSB WPA, Avoid Wetlands, Defer Construction Post August 1st, Install Erosion Control Measures, Reseed with Native Species, Replace Trees at 2:1 Ratio, Mark Line Within 1 Mile of Wetland and Potential Whooping Crane Habitat*. Several of these concerns were discussed previously in this report, including design, wetland fill, erosion control, reseeding, tree replacement, and line marking near wetlands. Wenck verified that measures described in the Application to address these issues were indeed implemented. USFWS requests not previously addressed were to avoid impacts to the LSB WPA and timing restrictions to construction. Wenck observed construction impacts to the LSB WPA were minimal and related to surface disturbance directly around pole structures; no erosion or sedimentation occurred to the wetland complex (**Appendix A, Photos 22-26**). Weekly construction reports indicated construction of the line did not begin until 14 September 2011, which would have avoided migratory bird nesting season.

- *NDPR (ND Parks & Recreation Dept.) Requests: Avoid Land and Water Conservation Fund (LWCF) Recreational Lands; Avoid Species of Concern and Significant Ecological Communities, Re-seed with Native Species.* Avoidance to species of concern and reseeding with native prairie were addressed above in previous sections and verified by Wenck. The Application for the Project showed on Exclusion/Avoidance area maps that LWCF recreational lands were avoided by the route; this was confirmed by Wenck during the site visit.

3.2.3 Cultural Resources

The following aspects pertaining to cultural resources were inspected at the Project site.

- *Cultural Resources Avoided.* An initial Class I Cultural Resource Inventory (CRI) as presented in a survey memo was submitted to the State Historical Society of ND (SHPO) in February of 2011 and found acceptable. Two further cultural resource inventories were completed for the new Merricourt substation and the transmission line as a whole ("Class II Archeological Resource Inventory for a 230 kV Transmission Line from Merricourt Wind Farm to the Ellendale Junction Substation, Dickey and McIntosh Counties, North Dakota, HDR Engineering, Inc., June 2011", "Merricourt Substation: A Class III Cultural Resource Inventory in McIntosh County, North Dakota, Kadrmas, Lee & Jackson, January 2011"). The Class II inventory resulted in the identification of 12 previously unrecorded cultural resources within their study area. However, MDU engineered and designed the transmission line to avoid all cultural resources identified. Concurrence of "No Historical Properties Affected" and "No Significant Sites Affected" was received from SHPO on 10 January 2011. The Class III Inventory of the Merricourt substation found no cultural resources in the study area. Wenck did not observe any cultural resource locations which were near the transmission line, and based on conversations with the MDU representative, no sites were impacted by the Project (Tom Crary, pers. comm. 2012).

4.0 Issues to Resolve and Recommendations

4.1 WRITTEN VERIFICATION OF PROJECT IMPLEMENTATION

As noted in Section 2.0, several components of the Project were asserted in the plans or proposed during construction, but have not been documented by the PSC. Many of these components could be verified easily with copies of final construction reports or ongoing reports from the local operations office- any type of written documentation that the Project was indeed implemented or constructed as planned, or that particular impacts have not occurred. Wenck recommends that the PSC requests from MDU the list of items which, according to our review of PSC files, have not been documented in writing. This would include all items listed in Table 1 which have shaded boxes in the second column (Section 2.0). The PSC may be able to verify some of these items/issues from other records it has available.

4.2 FINAL RESTORATION AND RESEEDING

At the time of the site inspection, final restoration and reseeding had yet to occur on the Project site. Final restoration of debris surrounding structure poles, temporary staging areas, and other construction disturbances along the route needs to be completed upon Project completion to be considered in full compliance.

4.3 TREE AND SHRUB REPLACEMENT

The Tree and Shrub Inventory for the Project was completed on March 2011 and submitted to the PSC. However, the Tree and Shrub Replacement Plan dated March 2012 has not yet been submitted to the PSC. Conversations with the MDU representative indicate that trees and shrubs will be replaced according to the Tree and Shrub Replacement Plan, but have not been completed to date. Once plantings occur, survival monitoring for 3 years is required by the Order. Wenck

recommends the PSC continue to monitor the progress of implementing tree and shrub replacement.

4.4 AS-BUILTS

Within 3 months of Project completion, submission of as-builts to the PSC is required by the Order for the Project. This includes both electronic and hard copies of design specifications for construction, as well as ESRI GIS files of the final as-built drawings. Wenck suggests that the final submitted copy of the as-builts be signed and sealed by a registered engineer.

4.5 BIRD DETERRENTS

A line marking plan approved by the USFWS was submitted to the PSC on 12 May 2011. Additional documentation in the form of a purchase of service contract was shown to Wenck during the site inspection. Nevertheless, line marking had yet to occur at the time of the site inspection. The MDU representative indicated that flight diverters will be installed in May 2012 on areas nearby wetlands. The PSC should verify that flight diverters are indeed installed, and are in close proximity to wetland areas.

5.0 Conclusions

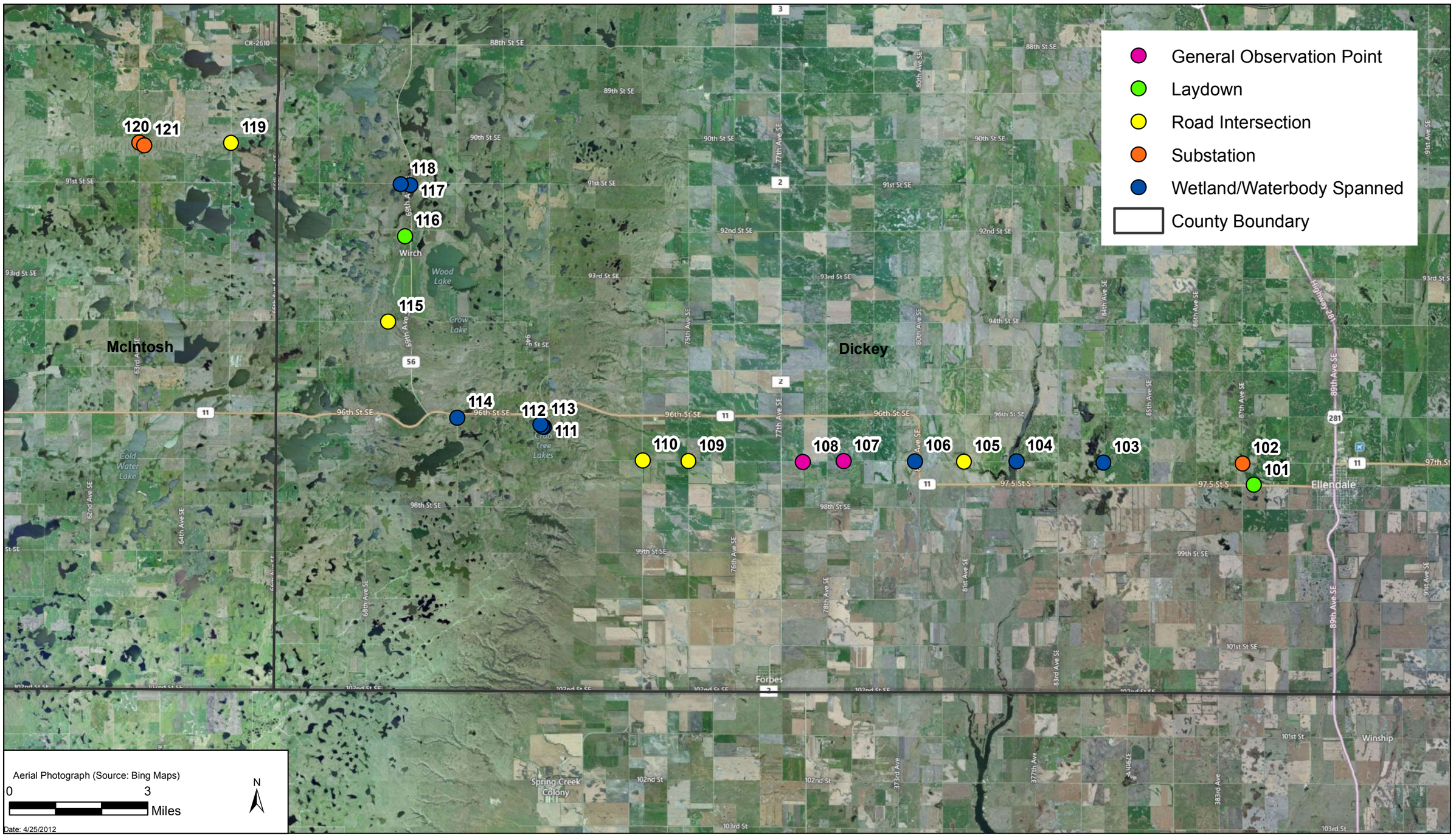
Overall, the Project appeared to be constructed as designed with minimal impacts to the surrounding natural and human environment. The Project site was in good condition with some minor restoration work still to be completed. Wenck observed several issues that needed to be resolved before the Project can be considered in full compliance. This includes provision of written documentation of particular aspects of the Project implementation, final restoration and removal of debris around structure posts, continued documentation of tree and shrub replacement, provision of final as-built drawings, and installation of bird deterrents. These issues should be reviewed by the PSC to determine what the company should comply with. It should be noted that the MDU representative was easy to work with during the construction inspection process. He was fully transparent and answered any questions we had during and after the site visit.

6.0 References

Crary, Tom. 2012. MDU Senior Transmission Line Engineer. Personal Communication: discussion during site visit.

North Dakota Public Service Commission (ND PSC). 2012. Online Case Search. Available from: http://www.psc.nd.gov/database/company_list.php. Accessed 15 March 2012.

FIGURES



North Dakota Public Service Commission

Site Overview and Field Observation Map

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Figure 1

APPENDIX A

Photo 1. Direction: North. Webster's laydown site (About 1.75 miles west of Ellendale) that was not used due to wet soil conditions early in the season. In good condition with no erosion or other impacts noted. Tracked vehicle in left background will be removed on completion.

Photo 2. Direction: Southeast. Approach to Webster's laydown area.

Photo 3. Direction: Northeast. Ellendale substation showing upgraded North bay at the east end of the transmission line. Substation was west of Ellendale in the NW ¼ of NW ¼ of Section 10, Township 129N, Range 63W, Dickey County. No erosion problems evident and station looked to be in order.

Photo 4. Direction: Southeast. Ellendale substation.

Photo 5. Direction: Northwest. New line leaving the Ellendale substation, which is located just behind where this photo was taken. Notice new line (larger structure on the left) parallels an existing line out of the substation.

Photo 6. Direction: West. Double circuit transmission line leaving substation traveling west.

Photo 7. Direction: Southwest. Transmission line crossing wetland about 3 miles west of the Ellendale substation. Notice poles are not located in water but on small island. Disturbance to wetlands was minimal, but still needed final restoration.

Photo 8. Direction: West. This is a closer picture of the wetland crossing shown in Photo 8. Note structure is not located in wetland, but on small island.

Photo 9. Direction: West. Transmission line crossing Pheasant Lake 5 miles west of Ellendale substation. Poles were about 20-30 ft. from water, with no visible disturbances to the shoreline.

Photo 10. Direction: West. Pheasant Lake crossing. Line jogs slightly to north, avoiding property to the south.

Photo 11. Direction: East. At Pheasant Lake crossing, looking back east toward the Ellendale substation.

Photo 12. Direction: West. Linemen repairing fences used for access during structure construction.

Photo 13. Direction: West. Transmission line spanning a cattail slough approximately 8 miles west of the Ellendale substation.

Photo 14. Example post hole filled with aggregate. Shale surrounding the hole was debris from underlying material as a result of post hole drilling. Upon final restoration, material will be cleaned, spread, or hauled away.

Photo 15. Direction: Southwest. Example H-Frame structure showing double circuit line. This structure is just north of where ND Highway 11 turns north.

Photo 16. Direction: West. Ridge in the distance is where transmission line turns to the northwest.

Photo 17. Direction: East. Example storm structure nearby a low wet area that was spanned by the line.

Photo 18. Direction: West. Example of post hole debris that still needs final restoration.

Photo 19. Direction: Northwest. Transmission line running northwest along ridge about 13 miles west of Ellendale substation.

Photo 20. Direction: Northwest. Line running northwest over ridge in the distance.

Photo 21. Direction: West. Crossing of wetland within the LSB WPA located in Section 6 of Township 129N Range 65W, Dickey County. Pole locations were outside of wetland areas and no disturbance to wetlands was noted.

Photo 22. Direction: East. Note the distance of the transmission line from the largest wetland in the LSB WPA in the far left of the photo.

Photo 23. Direction: Southwest. Another photo showing distance of transmission line from largest wetland in LSB WPA.

Photo 24. Direction: Southwest. One mile west of the LSB WPA at another wetland crossing. Note distance of transmission line poles from the water.

Photo 25. Direction: Linemen working on line approximately 17.2 miles from Ellendale substation. After this point, line is single circuit until it terminates at the Merricourt substation.

Photo 26. Direction: West. Laydown area leased from landowner Greg Brokaw located in the NE ¼ of the NE ¼ of Section 16, Township 130N, Range 166 W, Dickey county. Laydown area will be used through October 2012 for other line maintenance work nearby. Area seemed in good order without excessive disturbance or erosion present.

Photo 27. Direction: South. Transmission line crossing a water body about 1 mile north of Brokaw laydown area. Note distance of structures from water. No erosion into water body was noted.

Photo 28. Direction: West. Same location as Photo 29. Existing transmission line in photo, new line to the right. Transmission line spans wetlands with no poles in water and no erosion to water body evident.

Photo 29. Direction: South. On the far side of wetland crossing from Photo 30. Note lines have not yet been connected to structures from here to the Merricourt substation.

Photo 30. Direction: Southeast. Example span of line within 5 miles of Merricourt substation.

Photo 31. Direction: East. Final few structures being erected within sight of Merricourt substation. Photo was taken at southeast corner of Merricourt substation.

Photo 32. Direction: Northwest. The new Merricourt substation where the transmission line will terminate in Section 34, Township 131N, Range 67W, McIntosh county. No erosion or other issues were evident. During the inspection, final construction activities were ongoing at the substation.

Photo 33. Direction: North. Example of storm water and erosion control measures with culvert underneath access road to substation.

Photo 34. Direction: Northeast. Merricourt substation showing storm water control culverts and approaches. Substation appeared to be in good order with no erosion or other impacts noted.

APPENDIX B

Appendix B. Field Observation Points (GPS Coordinates)

Point	Feature	Latitude	Longitude	Observation Notes
101	Laydown	46.003262	-98.563494	Laydown area was not used due to wet soil conditions.
102	Substation	46.010000	-98.568446	Ellendale Substation and start of transmission line. Line generally parallel to ND Hwy 11 until point 114.
103	Wetland/Waterbody Spanned	46.010511	-98.631123	Wetland at 84th Ave.
104	Wetland/Waterbody Spanned	46.010951	-98.670342	Pheasant Lake crossing. No erosion problems going into lake.
105	Road Intersection	46.010963	-98.694070	Line crossing at intersection of 97th St. and 81st Ave.
106	Wetland/Waterbody Spanned	46.011105	-98.716216	Wetland at Structure #182 nearby intersection of 97th St. and ND Highway 11.
107	General Observation Point	46.011248	-98.748449	Structure #170 along 97th St.
108	General Observation Point	46.011033	-98.766874	Low area avoided along 97th St.
109	Road Intersection	46.011388	-98.818405	Intersection of 75th Ave. and 97th St.
110	Road Intersection	46.011589	-98.839049	Intersection of 74th Ave. and 97th St.
111	Wetland/Waterbody Spanned	46.022205	-98.883556	LSB WPA Crossing
112	Wetland/Waterbody Spanned	46.022339	-98.884172	LSB WPA Crossing
113	Wetland/Waterbody Spanned	46.022986	-98.885119	LSB WPA Crossing
114	Wetland/Waterbody Spanned	46.025150	-98.922674	Nearby intersection of line with 70th Ave.
115	Road Intersection	46.055409	-98.953899	Intersection of line with 94th St.
116	Laydown	46.082173	-98.946271	Laydown area. Will be used for maintence work through October 2012.
117	Wetland/Waterbody Spanned	46.098210	-98.943886	Intersection of 91st St. SE and 69th Ave.
118	Wetland/Waterbody Spanned	46.098545	-98.948175	Wetland crossing.
119	Road Intersection	46.111589	-99.024738	Intersection of line with 65th Ave.
120	Substation	46.111653	-99.066272	Merricourt Substation SW corner.
121	Substation	46.110846	-99.064048	Merricourt Substation SE corner.
Note: GPS Map Datum WGS 84				