

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE)
APPLICATION BY CROCKER WIND)
FARM, LLC FOR A PERMIT OF A)
WIND ENERGY FACILITY AND A 345)
KV TRANSMISSION LINE IN CLARK)
COUNTY, SOUTH DAKOTA, FOR)
CROCKER WIND FARM)

EL 17-028

DIRECT TESTIMONY OF

DEAN SATHER

ON BEHALF OF

CROCKER WIND FARM, LLC

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1 **Q. Please state your name and business address for the record.**

2 A. My full name is Dean Thomas Sather. My business address is 800 Washington Avenue
 3 North, Suite 315, Minneapolis, MN 55401.

4 **Q. Can you briefly describe your education and experience?**

5 A. I have a Bachelor of Arts Degree in Anthropology from Moorhead State University in
 6 Moorhead, Minnesota. I also have a Master of Arts Degree in Archaeology from the University
 7 of Kansas in Lawrence, Kansas. I have ten years of experience permitting various infrastructure
 8 at the federal, state, and local levels.

9 **Q. Have you attached a resume or CV.**

10 A. Yes.

11 **Q. Have you previously submitted or prepared testimony in this proceeding in South
 12 Dakota?**

13 A. No.

14 **Q. What is the purpose of your direct testimony?**

15 A. To support and further explain the portions of the application for which I am responsible.

16 **Q. Which sections of the application are you responsible for?**

17 A. I drafted the following sections:

- 18 • Section 11.0 Effect on Physical Environment;
- 19 • Section 11.1 Existing Physical Environment;

- 20 • Section 11.1.1.1 Regional Landforms/Surficial Geology;
- 21 • Section 11.1.1.2 Bedrock Geology;
- 22 • Section 11.1.1.3 Economic Deposits;
- 23 • Section 11.1.2 Soil Types – Wind Farm;
- 24 • Section 11.1.3 Soil Types – Transmission Line Route;
- 25 • Section 11.1.4 Seismic Risks – Wind Farm Project Area and Transmission Line
- 26 Route;
- 27 • Section 11.1.5 Subsidence Potential – Wind Farm Project Area and Transmission
- 28 Line Route;
- 29 • Section 11.2.1 Potential for Impacts to Geologic and Soil Resources – Wind
- 30 Farm;
- 31 • Section 11.2.2 Potential for Impacts to Geologic and Soil Resources –
- 32 Transmission Line Route;
- 33 • Section 11.2.2.1 Erosion, Slope, Stability, and Sedimentation – Wind Farm;
- 34 • Section 11.2.2.2 Erosion, Slope, Stability, and Sedimentation – Transmission
- 35 Line Route;
- 36 • Section 11.2.3 Geological Constraints on Design, Construction and Operation –
- 37 Wind Farm Project Area and Transmission Line Route;
- 38 • Section 15.1 Existing Land Use – Wind Farm and Transmission Line Route;
- 39 • Section 15.2 Existing Recreation – Wind Farm and Transmission Line Route;
- 40 • Section 15.4 Existing Visual Resources – Wind Farm and Transmission Line
- 41 Route;
- 42 • Section 15.5.1 Displacement – Wind Farm and Transmission Line Route;

- 43 • Section 15.5.2 Recreational Impacts – Wind Farm and Transmission Line Route;
- 44 • Section 15.5.3 Visual Impacts – Wind Farm and Transmission Line Route;
- 45 • Section 20.1.1 Communities;
- 46 • Section 20.1.2 Commercial, Industrial, and Agricultural Sectors;
- 47 • Section 20.2.3 Agricultural Impacts.

48 **Q. Please describe the information provided in Section 11.0 – Effect on Physical**
49 **Environment.**

50 A. Section 11.0 provides a brief introduction of the subsections in the Section 11.0.

51 **Q. Please describe the information provided in Section 11.1 – Existing Physical**
52 **Environment.**

53 A. Section 11.0 provides a brief introduction of the existing physical environment.

54 **Q. Please describe the information provided in Section 11.1.1.1 – Regional**
55 **Landforms/Surficial Geology.**

56 A. Section 11.1.1.1 provides a summary of the surficial geology of the Wind Farm Project
57 Area and Transmission Line Route. The regional landform and surface geology descriptions are
58 based on information obtained from a 1999 document authored by Karl J. Krueger for United
59 States Department of Agriculture, Natural Resources Conservation Service (NRCS), in
60 cooperation with the South Dakota Agricultural Experiment Station at South Dakota State
61 University titled “*Soil Survey of Clark County*”. According to the information provided in that
62 publication, the entire Wind Farm Project Area and Transmission Line Route are situated along
63 the western margins of the Coteau des Prairies, a broad, flat-iron shaped glacial derived highland
64 exhibiting a gently rolling to undulating surface. The Coteau des Prairies is an approximately
65 400-foot-thick mantle of till consisting of loamy and silty sediments derived of glacial deposits

66 associated with the Wisconsin glacial age that were deposited as lateral and terminal glacial
67 moraine.

68 **Q. Please describe the information provided in Section 11.1.1.2 – Bedrock Geology**

69 A. Section 11.1.1.2 provides a summary of the bedrock geology of the Wind Farm Project
70 Area and Transmission Line Route. The description of the bedrock geology is based on
71 information obtained from a 2009 document authored by Layne D. Schultz and Martin J. Jarret
72 for the Akeley-Lawrence Science Center in Vermillion, South Dakota titled “*Bulletin 40:
73 Geology of Brookings and Kingsbury Counties, South Dakota*”. According to the information
74 provided in that publication, the entire Wind Farm Project Area and Transmission Line Route is
75 underlain by the Pierre Shale, which is a Cretaceous age deposit consisting of light-gray to black
76 shale which may contain iron or manganese concretions, marl, and bentonite.

77 While this publication is focused on the geology of Brookings and Kingsbury Counties, it
78 provides a robust description of the Pierre Shale, the bedrock formation that underlies the Wind
79 Farm Project Area and the Transmission Line Route.

80 **Q. Please describe the information provided in Section 11.1.1.3 – Economic Deposits.**

81 A. Section 11.1.1.3 provides a summary of the economic deposits identified within the Wind
82 Farm Project Area and Transmission Line Route. Information was collected from the South
83 Dakota Department of Environment and Natural Resources (“SDDENR”) Minerals and Mining
84 Program and a review of United States Geological Survey (“USGS”) 7.5-minute quadrangles
85 covering the Wind Farm Project Area and Transmission Line Route. Based on this data, there
86 are two sand and gravel operations located within the Wind Farm Project Area. Both are located
87 in the east-central portion of the Wind Farm Project Area. There are no economic deposits along
88 the Transmission Line Route.

89 Based on the SDDENR Oil and Gas Initiative Program GIS Website, the Crocker Wind
90 Farm Project Area and Transmission Line Route are not situated within oil or gas fields.
91 Additionally, there,are no other active or historic economic mineral deposits within the Project
92 Area.

93 **Q. Have you included a map of bedrock geology?**

94 A. Yes – Figures 3a-3d. Additionally, cross sections of bedrock and surficial geology were
95 provided to the PUC in a supplemental filing.

96 **Q. Please describe the information provided in Section 11.1.2 – Soil Types – Wind
97 Farm.**

98 A. Section 11.1.2 provides a summary of the soil type identified within the Wind Farm
99 Project Area. Information was collected from the Natural Resources Conservation Service
100 (NRCS) Soil Survey Geographic (SSURGO) database for Clark County, South Dakota.
101 According to that data source, the soils within the Wind Farm Project Area are predominantly
102 level to steep loamy and silty soils derived from till and moraine deposits and are suitable for
103 both crop production and grassland vegetation for livestock grazing. These soils have a low
104 potential for corrosive impacts to buried steel and concrete. The majority (76%) of soils are well
105 drained, and only approximately 1 percent of the soils have a hydric component. Approximately
106 15 percent of the soils are considered to have a high potential for frost action. A table listing all
107 of the soil types identified within the Wind Farm Project Area was included in the facility
108 permit.

109 **Q. Please describe the information provided in Section 11.1.3 – Soil Types –
110 Transmission Line Route.**

111 A. Comparable to the previous response, Section 11.1.3 provides a summary of the soil type

112 identified within the Transmission Line Route. Information was collected from the Natural
113 Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database for Clark
114 County, South Dakota. According to that data source, the soils within the Transmission Line
115 Route are predominantly level to steep loamy and silty soils derived from till and moraine
116 deposits and are suitable for both crop production and grassland vegetation for livestock grazing.
117 These soils have a low potential for corrosive impacts to buried steel and concrete. The majority
118 (76%) of soils are well drained, and approximately 5 percent of the soils are considered to have a
119 high potential for frost action. A table listing all of the soil types identified within the
120 Transmission Line Route was included in the facility permit.

121 **Q. Have you included a map of soils?**

122 A. Yes – Figures 4a-4d.

123 **Q. Please describe the information provided in Section 11.1.4 – Seismic Risks – Wind**
124 **Farm Project Area and Transmission Line Route.**

125 A. Section 11.1.4 provides a summary of the potential for seismic activity within the Wind
126 Farm Project Area and Transmission Line Route. According to the USGS 2014 Seismic Hazard
127 Map for South Dakota, the risk of seismic activity in the vicinity of the Wind Farm Project Area
128 and Transmission Line Route is extremely low to negligible. The USGS Earthquake Hazards
129 Program estimates a less than 1.0 percent probability that a Magnitude 5 or greater earthquake
130 event will occur within 50 kilometers of the Project within the next 20 years. According to the
131 USGS Earthquake Hazards Program that there are no active or inactive faults in the vicinity of
132 the Wind Farm Project Area and Transmission Line Route.

133 **Q. Please describe the information provided in Section 11.1.5 – Subsidence Potential –**
134 **Wind Farm Project Area and Transmission Line Route.**

135 A. Section 11.1.5 provides a summary of the potential for subsidence within the Wind Farm
136 Project Area and Transmission Line Route. According to geologic and soils data referenced
137 above, the potential for subsidence within the Wind Farm Project Area and Transmission Line
138 Route is negligible. The Pierre Shale bedrock does not exhibit karst topography or contain
139 subsurface geologic layers or members susceptible to dissolution by water. There are no
140 documented historic underground mining operations within the Project vicinity, which could be
141 indicative of subsidence risk.

142 **Q. Please describe the information provided in Section 11.2.1 – Potential for Impacts to**
143 **Geologic and Soil Resources – Wind Farm.**

144 A. Section 11.2.1 provides a summary of the potential for impacts to geologic and soil
145 resources within the Wind Farm.

146 The Wind Project will have no impact to geologic/economic mineral resources.

147 Project staging and construction activities associated with wind turbine foundations,
148 access roads, collector lines, substation, and O&M facilities are estimated to result in
149 approximately 996 acres of temporary soil disturbance and up to approximately 243 acres of
150 permanent impacts to soils within the Wind Farm Project Area. During construction, existing
151 ground cover vegetation would be removed in construction work areas which may increase
152 erosion potential. The Applicant will implement BMPs to minimize soil erosion.

153 **Q. Please describe the information provided in Section 11.2.2 – Potential for Impacts to**
154 **Geologic and Soil Resources – Transmission Line Route?**

155 A. Section 11.2.2 provides a summary of the potential for impacts to geologic and soil
156 resources within the Transmission Line Route. The Transmission Line Route will have no
157 impact to geologic/economic mineral resources.

158 Temporary impacts associated with construction of the transmission line will be
159 associated with accessing the transmission structure locations along the right-of way. Permanent
160 impacts will be limited to the transmission structure foundations, which generally range from 6
161 to 11 feet in diameter. During construction it is anticipated that existing ground cover vegetation
162 may be removed in construction work areas which may increase erosion potential. The
163 Applicant will implement BMPs to minimize soil erosion.

164 **Q. Please describe the information provided in Section 11.2.2.1 –Erosion, Slope**
165 **Stability, and Sedimentation – Wind Farm.**

166 A. Section 11.2.2.1 provides a summary of the potential for impacts resulting from erosion,
167 slope stability, and sedimentation within the Wind Farm Project Area. The Wind Farm Project
168 design placed turbines at higher elevations to maximize access to wind resources. The current
169 layout situates access roads and collection lines away from steep slopes to the extent possible to
170 minimize cut and fill work and avoid construction in steep slope areas.

171 A General Permit for Storm Water Discharges Associated with Construction Activities
172 will be obtained from the South Dakota Department of Environment and Natural Resources
173 (SDDENR) which will a Storm Water Pollution Prevention Plan (SWPPP) which will be
174 implemented from the start of construction through restoration to minimize negative impacts
175 caused by storm water discharges. Temporary impacts will be restored to pre-construction
176 contours and revegetated to match the surrounding landscape. During operation of the facility,
177 erosion and sedimentation impacts to surface water and ground water resources are not
178 anticipated to change from pre-construction conditions.

179 **Q. Will you describe the information provided in Section 11.2.2.2 –Erosion, Slope**
180 **Stability, and Sedimentation – Transmission Line Route?**

181 A. Section 11.2.2.2 provides a summary of the potential for impacts resulting from erosion,
182 slope stability, and sedimentation within the Transmission Line Route. Comparable to the
183 approach to the Wind Farm Facilities, the Transmission Line Route has been designed to
184 minimize construction episodes of cut and fill work and avoid construction in steep slope areas
185 to the highest degree possible.

186 Because construction of the transmission line will occur simultaneously with the wind
187 farm, the Project will utilize one SWPPP.

188 **Q. Please describe the information provided in Section 11.2.3 - Geological Constraints**
189 **on Design, Construction and Operation – Wind Farm Project Area and Transmission Line**
190 **Route.**

191 A. Section 11.2.3 provides a summary of the geological constraints on design, construction
192 and operation in the Wind Farm Project Area and Transmission Line Route. Geologic conditions
193 in the Project Area are well-suited for the construction of the proposed wind facility and
194 associated transmission line. Construction and operation of the Wind Farm Project Area and
195 Transmission Line Route are not anticipated to be affected by a geologic constraint.

196 Geotechnical soil borings will be conducted at wind turbine foundation and transmission
197 line structure locations prior to construction to determine the soil suitability to support turbine
198 foundations and transmission line structures. Crocker will update the Project design if
199 unfavorable soil conditions or geologic constraints are present.

200 **Q. Please describe the information provided in Section 15.1 Existing Land Use – Wind**
201 **Farm and Transmission Line Route.**

202 A. Section 15.1 provides a summary of the existing land use in the Wind Farm Project Area
203 and Transmission Line Route. Based on National Land Cover Database (NLCD) data, the

204 Project Area is predominantly cultivated crops, hay/pasture, and grassland/herbaceous.

205 **Q. Have you included a map of land use?**

206 A. Yes – Figures 6a-6d show land cover/land use. A supplemental land use map set was
207 provided to PUC in a data request that more clearly shows land used for row and non-row crops
208 in rotation; irrigated lands; pasturelands and rangelands; undisturbed native grasslands; existing
209 and potential extractive nonrenewable resources; other major industries; rural residences and
210 farmsteads, family farms, and ranches; residential; public, commercial, and institutional use;
211 municipal water supply and water sources for organized rural water systems; and noise sensitive
212 lands.

213 **Q. Please describe the information provided in Section 15.2 Existing Recreation –**
214 **Wind Farm and Transmission Line Route.**

215 A. Section 15.2 provides a summary of the public recreation lands in the Project Area.
216 There are Waterfowl Production Areas (WPAs), Game Production Areas (GPAs), Walk In Areas
217 (WIAs) hunting areas, South Dakota Game, Fish, and Parks (SDGFP) Game Production Areas
218 (GPAs) and School and Public Lands located in the vicinity of the Project. There are two GPAs,
219 one WIA, and one School and Public land parcel within the Wind Farm Project Area. The
220 Transmission Line Route is located adjacent to the WIA and does not intersect with any other
221 recreational locations.

222 **Q. Have you included a map of recreation lands?**

223 A. Yes – Figures 7a-7d show public recreation lands in the Project Area. The maps were
224 updated in a supplemental filing to show the Reid Lake State Waterfowl Refuge, which is
225 associated with Reid Lake southwest and adjacent to the Wind Farm Project Area.

226 **Q. Please describe the information provided in Section 15.4 Existing Visual Resources**

227 – **Wind Farm and Transmission Line Route.**

228 A. Section 15.4 provides a summary of the existing visual resources in the Wind Farm
229 Project Area and Transmission Line Route. Visual impacts are defined as the human response to
230 visual contrasts resulting from introduction of elements into a viewshed. Contrasts interact with
231 viewer perceptions of the landscape and may cause either a negative or positive response to the
232 changes in the viewed landscape. Sensitive viewsheds are generally associated with scenic
233 resources and can include state or national parks, monuments, and recreation areas or historic
234 sites and landmarks. Visual impacts from the Project would depend on the extent to which the
235 existing landscape is already altered from its natural condition and the degree to which state
236 agencies address landscape quality. Recreational users in the Project vicinity may include
237 hunters accessing WPAs, GPAs, or WIAs.

238 **Q. Please describe the information provided in Section 15.5.1 Displacement – Wind**
239 **Farm and Transmission Line Route.**

240 A. Section 15.5.1 provides a summary of potential displacement impacts associated with the
241 Wind Farm Project Area and Transmission Line Route. As designed, the proposed Project
242 layout of turbines, access roads, collector lines, and associated facilities will not cause
243 displacement of residences or businesses due to construction of the Project.

244 **Q. Please describe the information provided in Section 15.5.2 Recreational Impacts –**
245 **Wind Farm and Transmission Line Route.**

246 A. Section 15.5.2 provides a summary of recreational impacts associated with the Wind
247 Farm Project Area and Transmission Line Route. The wind farm and transmission line will
248 avoid all WPAs and GPAs. There is one turbine and associated access road and collection line
249 proposed on a WIA parcel. WIAs are private land open to the public for hunting. Crocker will

250 work with the landowner of the WIA and SDGFP to address safety issues associated with the
251 WIA. No impacts to land use are expected.

252 **Q. Please describe the information provided in Section 15.5.3 Visual Impacts – Wind**
253 **Farm and Transmission Line Route.**

254 A. Section 15.5.3 provides a summary of visual impacts associated with the Wind Farm
255 Project Area and Transmission Line Route. The construction and operation of the proposed
256 Project will not introduce new or unique visual components into the region. Several other wind
257 farm projects have been permitted and constructed in the region. The nearest scenic resource is
258 the Waubay National Wildlife Refuge which is located over 20 miles to the south and west of
259 this NWR.

260 Adverse visual impacts are not anticipated. While the Project turbines and transmission
261 line structures may be visible, they would not cause visual contrasts in the landscape.

262 **Q. Please describe the information provided in Section 20.1.1 Communities.**

263 A. Section 20.1.1 provides a summary of demographics of the communities in the vicinity of
264 the Wind Farm Project Area and Transmission Line Route. The Wind Farm Project Area and
265 Transmission Line Route are located in Clark County. The county had an estimated population
266 of 3,659 in 2015. The largest city in the county is Clark which, in 2010, had an estimated
267 population of 1,139 (31% of Clark County). Crocker, a town of 19 people in 2010 is located
268 adjacent to the Wind Farm Project Area. An additional seven municipalities are located within
269 10 miles of the Project Area.

270 The median household income in Clark County was \$30,208 according to the 2010
271 Census; slightly higher than the median household income for the State (\$35,282). Nearly eleven
272 percent (10.9%) of the population in Clark County are living at or below the poverty level.

273 The largest employers in the county are involved in manufacturing, retail trade, and
274 health care and social assistance. The unemployment rate in the county in 2016 was 2.7%;
275 slightly higher than the unemployment rate in the state (2.4% percent).

276 **Q. Please describe the information provided in Section 20.1.2 Commercial, Industrial,**
277 **and Agricultural Sectors.**

278 A. Section 20.1.2 provides a summary of commercial, industrial, and agricultural sectors in
279 the region of the Wind Farm Project Area and Transmission Line Route. The land within the
280 Wind Farm Project Area and Transmission Line Route are predominantly agricultural
281 (pasture/hay and cultivated crops). According to the 2012 Census of Agriculture, Clark County
282 had 597 farms that covered 608,805 acres, with an average farm size of 1,020 acres. These
283 farms produced \$249.4 million in agricultural products of which 64% of sales were crop sales
284 and 36% were livestock sales. The majority of crop acreage was soybean and corn. Cattle and
285 calves was the largest livestock component in the county. There are no commercial, industrial,
286 mining, or institutional land uses are located within the Wind Farm Project Area or Transmission
287 Line Route.

288 **Q. Please describe the information provided in Section 20.2.3 Agricultural Impacts.**

289 A. Section 20.2.3 provides a summary of agricultural impacts of the Wind Farm Project
290 Area and Transmission Line Route. A minimal amount of agricultural land would be taken out
291 of production by the proposed Project. Permanent impacts would be limited to wind turbine
292 foundations, access roads, interconnection facilities, and transmission structures. Approximately
293 978 acres of agricultural land (including cultivated crops, hay/pasture, and grassland/herbaceous)
294 would be temporarily impacted by Project construction. Approximately 237 acres of agricultural
295 land would be permanently impacted. The sum of the total impacts represents less than 1% of all

296 the land included in the Project Area. Approximately 128 acres of prime farmland would be
297 permanently impacted. Project areas temporarily disturbed during construction would be re-
298 vegetated with vegetation types matching the surrounding agricultural landscape. Landowners
299 would be compensated by the Applicant for losses to crop production during construction.
300 Agricultural activities can occur up to the edge of access roads and turbine pads. The buried
301 underground collection system would not affect agricultural activities.

302 **Q Have you reviewed the list and map of proposed tower locations in the application?**

303 A. Yes.

304 **Q Do your comments and conclusions apply to each of those turbine locations
305 individually?**

306 A. Yes

307 **Q Would your answers change for any of the locations?**

308 A. Possibly. My answer would only be changed if a significant change of the turbine
309 location had been proposed and the environmental evaluation of that location indicated that there
310 were issues that did not comply with the established setbacks or environmental criteria.

311 **Q If yes, which locations and why?**

312 A I cannot speak to specific locations as I have not been presented with potential altered
313 locations. For the sections that I have prepared, the environmental features are consistent, fixed
314 on the landscape, and in some cases, as with bedrock geology, ubiquitous in the Project Area.

315 **Q Do you have any specific concerns about moving tower locations?**

316 A No. As mentioned above, if there are proposed alterations in the location of turbines, or
317 any associated wind farm facilities, those locations would be subjected to the same level of
318 review as all previously proposed locations included in the application. They would need to

319 meet the same setback standards and environmental compliance levels.

320 **Q If the applicant later moved any tower locations, what would be the effects?**

321 A See my previous answer. Any proposed alteration of any facilities would be reviewed to
322 the same standards.

323 **Q. Does this conclude your written pre-filed direct testimony?**

324 A. Yes.

325 Dated this 26th day of September, 2017.

326

A handwritten signature in black ink, appearing to read "Dean T. Sather". The signature is stylized with large, looped letters.

327

328 DEAN T. SATHER

329