



16 implementing best management practices in the Big Sioux River watershed. I work on  
17 wetland identification and regulations, ensuring that my clients remain in compliance  
18 with local, State and Federal regulations while still improving water management on their  
19 land. I also assist the City of Sioux Falls with their Nutrient Management planning by  
20 identifying suitable fields and taking soil samples for the Cities BioSolid application  
21 program.

22 During 2011 and 2012, I worked for Hefty Seed Company as a Soil Improvement  
23 Specialist. I identified wetlands and designed water management plans while ensuring  
24 compliance with regulations. I worked with agronomists and researchers on various  
25 projects and spoke at various company events and seminars.

26 Between 1986 and 2011, I was the District Conservationist for the US Department  
27 of Agriculture -- Natural Resources Conservation Service in the Minnehaha County  
28 office. I supervised 4-6 employees and implemented all USDA conservation programs  
29 including the CRP (Conservation Reserve Program) and WRP (Wetland Reserve  
30 Program). I was responsible for wetland and highly erodible land compliance  
31 requirements. I implemented USDA cost share programs such as the EQIP  
32 (Environmental Quality Incentive Program). I gained extensive field knowledge  
33 regarding soils and plant resources, and gave recommendations on cover crops, weed  
34 control and native plant establishment. I worked with Minnehaha County Planning and  
35 Zoning office to ensure that the County Drainage Ordinance was implemented well.

36 My education in these fields began at South Dakota State University, where I  
37 earned a Bachelor of Science degree in 1982, with an emphasis in soils and chemistry.

38 During my professional career, I have become familiar with farmland irrigation  
39 and drainage tile systems in eastern South Dakota. Specifically, I have accumulated

40 practical knowledge regarding the older drainage tile systems, such as clay or concrete  
41 systems which are found in eastern South Dakota, as well as implementation of modern  
42 plastic tile systems and their effects.

43  
44 **What is the purpose of your testimony?**

45 My clients are concerned with the subsequent condition of their farmland where  
46 the pipeline may be installed. The primary purpose of my testimony is to provide an  
47 opinion regarding drainage and crop productivity issues that may be experienced upon  
48 installation of the crude oil pipeline under cropland. Other agricultural-related issues  
49 may also be addressed in my testimony.

50  
51 **What Dakota Access or PUC case documents have you reviewed to prepare for this**  
52 **testimony?**

53 I have reviewed: (1) Dakota Access, LLC ("Dakota Access") South Dakota PUC  
54 Crude Oil Pipeline Application dated December 2014, as amended, and Exhibits thereto,  
55 including the Agricultural Impact Mitigation Plan - Section 6 (the "Application"); (2)  
56 Dakota Access' Answers to Peggy Hoogestraat's Interrogatories dated May 11, 2015; (3)  
57 Transcripts of public input hearings at Bowdle, Redfield, Iroquois, and Sioux Falls, South  
58 Dakota ("Public Hearing Transcripts"); and (4) Various other documents available on the  
59 PUC website for this matter. I have also met with Dakota Access Right-Of-Way  
60 Manager Susan Bergman and visited about the details of the pipeline installation.

61

62 **Please describe your professional experience regarding farmland drainage tile, both**  
63 **clay/concrete systems and modern plastic systems in Minnehaha County, Lincoln**  
64 **County or elsewhere.**

65 Plastic tile was installed on our family farm in 1971. My extensive professional  
66 experience with modern tile systems began in 1982 while working for the United States  
67 Department of Agriculture. We designed and helped install drainage tile in conjunction  
68 with other conservation practices such as waterways and terraces. Beginning in 1986 I  
69 was responsible for implementing the Conservation Compliance requirements of the 1985  
70 Farm Bill. One of the key provisions of the Farm Bill was limiting any new drainage of  
71 areas which USDA classified as wetlands. I was responsible for determining what areas  
72 were deemed as wetlands, along with what drainage work was acceptable while  
73 remaining eligibility for USDA program benefits. Maintenance of existing tile systems  
74 was an important concern, and therefore I looked at a large number of old clay and  
75 concrete tile systems which needed to be maintained. I was responsible for these  
76 provisions until I left USDA in 2011. At that time, I became employed with Hefty Seed  
77 Company. I continued to work with wetland identification and installation of drain tile  
78 systems, primarily for customers of Hefty Seed Company. In 2012 I began working as a  
79 private consultant doing similar work for my independent clients, which I have continued  
80 until the present. My emphasis has shifted to the mitigation of impacted wetlands by  
81 creating or restoring wetlands within the same watershed. I also am contracted by the  
82 Minnehaha Conservation District to work with their customers by helping install other  
83 conservation practices.

86

87

**With respect to clay/concrete drainage tile systems in Minnehaha or Lincoln**

88

**Counties, please describe any concerns you have regarding: (1) the excavating and**

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**removal of such drainage facilities; (2) the proposed depth of the pipeline; (3) the**

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**replacement of such drainage facilities; (4) the subsequent integrity and**

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**performance of such drainage facilities; (5) the damages and expenses a landowner**

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**may incur as a result of non-performing drainage tile after pipeline installation; and**

93

**(4) other concerns regarding disturbance of such drainage facilities.**

94

The excavation of old clay/concrete tile systems brings up several areas of

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concern. First of which is landowners are often unaware that these old systems exist.

96

Many of these tile lines were installed but were never recorded. We do not know where

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they were installed or how extensive they are, so my first concern is that we are able to

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find all the tile lines that are damaged by the construction.

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These old tile lines are often fragile. I have frequently seen clay tile which only had the

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bottom one half of the original still in place. The upper portion of the tile pieces has been

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dissolved by the surrounding soil, while the lower portion was protected from this by the

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flowing water. Obviously, it will be more difficult to repair these lines because of their

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fragile status.

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106

The proposed depth of the pipeline along with the 24 inch (which is indicated in the

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verbage, although a 12 inch setback is indicated in the diagram in appendix A...) setback

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from the pipeline will make it very difficult to repair these lines to a functional system. A

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majority of the clay tile was placed at a depth of 30-48 inches, but I have witnessed it

110 being located at the ground surface (due to erosion) and I have also seen lines 15 feet  
111 deep. The proposed 30 inch pipeline will be placed a minimum of 48 inches deep  
112 according to Ms. Bergman. In that scenario with a 24 inch setback, the tile line would  
113 need to be less than 2 feet deep if placed above the pipeline, and more than 8.5 feet deep  
114 if placed below the pipeline. The chances of this tile system being a fully functioning  
115 system is very small.

116  
117 The integrity of the tile line repair is a concern. DAPL recognizes that there will be  
118 settlement of soil material around the pipeline, and they are correct. That also means the  
119 corresponding tile repair will settle and the tile system may fail or function at a reduced  
120 capacity. A "tile bridge" will help (but not guarantee) that this settlement will not  
121 happen, and the cost of a tile bridge is estimated at \$1200.00 per site. The contractor may  
122 try to avoid using these costly bridges in order to save money, but they should be  
123 required at all repaired sites.

124  
125 The cost to a landowner if the tile line does not function could be significant. Some  
126 systems may service many acres of land and the land could possibly be located on  
127 multiple farms. An example would be if a tile system servicing 50 acres of land would  
128 fail, and subsequently these 50 acres were to drown out and be a complete loss, the cost  
129 of losing that crop on 50 acres is estimated to be \$40,000.00 at today's crop prices. Some  
130 systems service areas much larger than 50 acres, so the yearly cost of the system failing is  
131 very significant.

132

133           **With respect to modern plastic drainage tile systems in Minnehaha or Lincoln**  
134           **Counties, please describe any concerns you have regarding: (1) the excavating and**  
135           **removal of such drainage facilities; (2) the proposed depth of the pipeline; (3) the**  
136           **replacement of such drainage facilities; (4) the subsequent integrity and**  
137           **performance of such drainage facilities; (5) the damages and expenses a landowner**  
138           **may incur as a result of non-performing drainage tile after pipeline installation; and**  
139           **(4) other concerns regarding disturbance of such drainage facilities.**

140  
141           Modern plastic tile which has been installed within the last 50 years is not as  
142           fragile as the older clay/cement tile discussed in the previous question, but some of same  
143           concerns persist. The rerouting of these lines could be difficult if the pipeline prohibits  
144           the option of splicing within the same route.

145  
146           The repairs of these lines will be easier and have a higher chance of success, but the  
147           concerns about the fill around the tile lines settling is still a large concern. Therefore, a  
148           tile bridge should also be used when these lines are damaged and subsequently repaired.

149  
150           Again, the cost of these tile lines not functioning well is very high. With gross sales from  
151           an acre of cropland calculated at \$800.00/acre, a large tile system which is not  
152           functioning well can significantly damage a farmer's income.

153  
154           Related to this concern is the restrictions on future tile drainage systems. DAPL has  
155           indicated that they will try to accommodate any future tile systems that are planned. This  
156           is not easily attainable. Landowners do not know where these systems will be installed or

157 at what depth they will need to be installed at. In order to accurately get this information,  
158 landowners would need to complete expensive tile system surveys and designs. It is not  
159 realistic that this can be accomplished prior to the pipeline being designed and installed,  
160 therefore any future tile drainage systems would be severely restricted by the pipelines  
161 route, elevation, and easement.

162

163 **Please describe your professional experience regarding soil removal, replacement,**  
164 **and compaction, in Minnehaha County, Lincoln County or elsewhere, with regard**  
165 **to installation of underground utility facilities.**

166 I have personally witnessed and installed many land disturbing projects. These  
167 have involved utilities, conservation practices, tile installation and other activities.

168

169 **Please describe your primary concerns about soil removal and replacement relating**  
170 **to pipeline installation in Minnehaha or Lincoln Counties.**

171 Soil in this area has been formed over thousands of years since the last glaciers  
172 receded. In general, there is eight to fourteen inches of topsoil, but certain areas could  
173 have more or less. This topsoil is vital to productivity due to its high levels of organic  
174 matter, nutrients, michorizae, fungi, bacteria and other organisms critical to plant growth.  
175 The mixing of these plant growth factors will have a negative effect on plant growth,  
176 although it will be temporary since good quality topsoil is very adaptable. DAPL states  
177 an intention of stockpiling the topsoil and replacing eight to twelve inches after the  
178 pipeline is installed. This process needs to be done in a careful manner in order for the  
179 land to recover as soon as feasible, and carefully monitored by the landlord.

180

181 Another critical concern is the mixing of the soil below the topsoil commonly referred to  
182 as subsoil. This too was formed over thousands of years and has large and small pores  
183 which allow water to percolate down into the soil profile. These pores will be destroyed  
184 during construction and it will take many years to rebuild them through plant root and  
185 earthworm activities. The parent material which was left by the glaciers is often very  
186 restrictive to water movement, and is sometimes relatively shallow in the soil profile.  
187 This material will be mixed in with the other subsoil and cause issues with plant growth  
188 and compaction after the pipeline is installed.

189  
190 I am not implying that these disturbed areas will never be productive again, but it will  
191 take a long time. To imply that they will be back into full production after three growing  
192 seasons is unrealistic. My professional opinion is that it will take at least 10 years and  
193 possibly much longer for these sites to return to full production. The length of time will  
194 vary with site and soil conditions.

195  
196 **Please describe your primary concerns about soil compaction relating to pipeline**  
197 **installation in Minnehaha or Lincoln Counties.**

198 Compaction will be significant with the heavy equipment, especially when  
199 working in wet areas. DAPL plans on mitigating for this by deep tillage, but the damage  
200 to the soil structure will not be repaired with a few passes with a deep tilling machine.  
201 Resolving this will take many years of freezing and thawing along with the plant roots  
202 and earthworms to slowly offset the damage done by compaction. University studies  
203 indicate that negative impacts from compaction can last twenty or more years.

204

205 **With regard to crop yield and productivity on land which will be excavated and**  
206 **replaced above the pipeline (i.e., pipeline easement areas), is it your opinion that**  
207 **crop yield will be diminished? If so, (1) describe the factors associated with lost**  
208 **yield during the first 3 years after pipeline installation; (2) describe the factors**  
209 **associated with lost yield beyond the first 3 years after pipeline installation.**

210 See the previous two answers. In general, there will be diminished production on  
211 these areas for approximately ten years, but the length will vary greatly with site  
212 conditions. Some sites may be back to full production after three years, and some sites  
213 may never return to there former level of production.

214  
215 **Are you concerned that the heat generated by the pipeline (i.e., transporting 62-**  
216 **degree crude oil) will negatively impact the soil or crop yield in the easement area?**  
217 **If so, please explain in detail.**

218 I have concerns about insects and diseases which could survive the winter in the  
219 area, which would normally not be able to survive, but are allowed to do so because of  
220 this change in the micro-climate surrounding the pipe. I do not feel completely qualified  
221 to answer this question.

222  
223 **Would you expect that cost of farming expenses (inputs, cultivation, etc.) relating to**  
224 **the easement area will higher than non-easement areas? If so, please explain in**  
225 **detail.**

226 Yes. The disturbed areas will need to have higher levels of organic matter and  
227 nutrients applied. These inputs may be expensive and difficult to obtain for some

228 producers. There will be a need for additional tillage to try reduce the damage from  
229 compaction.

230

231 **With regard to grazing areas or feed lots, do you have any concerns regarding the**  
232 **depth of the pipeline or any negative impact the pipeline easement area would have**  
233 **on such land uses?**

234 Native grass roots can extend fifteen feet or more into the ground, and the  
235 pipeline will obviously disturb this root system and limit the species which will be  
236 available to revegetate. Therefore, species may not match the existing ecosystem.

237

238 There will be restrictions on any permanent structures and tree plantings in the Right of  
239 Way area, which will affect future land use and shelterbelt establishment.

240

241 Feedlots will have to be avoided in the Right of Way. There is extensive disturbance,  
242 excavations and heavy equipment traffic associated with a feedlot and therefore this land  
243 use will not be allowed within the project area. This is another restriction on future land  
244 use.

245

246 **In the event of an oil release event (leak or spill) underneath or upon crop land,**  
247 **please describe the long-term impact on the ability to farm such land and related**  
248 **crop yield.**

249 I was a member of the task force to assess damages following the Williams  
250 Pipeline leak near Renner South Dakota in the early 1990s. Tens of thousands of gallons  
251 of gasoline were recovered, but many acres of land still contained contaminated soil. The

252 South Dakota Department of Environment and Natural Resources approved "farming"  
253 the contaminants out of the soil by frequently tilling the soil and allowing the  
254 contaminants to evaporate. This process was done for several years with no crop  
255 production in these areas. Eventually, an attempt was made to begin growing crops  
256 which would return organic matter to the soil and allow the plant roots to form pores for  
257 water to infiltrate. After many years, the restoration of this area was declared a success,  
258 although I speculate that it is far from being completely restored twenty plus years later.

259

260 **Please state any other concerns you have regarding the Dakota Access Pipeline.**

261 I assume that the trench will need to be dewatered during construction to prevent  
262 the pipe from floating. This dewatering could overwhelm existing drainage patterns with  
263 this additional water.

264

265 **Do you believe that the Dakota Access Pipeline will pose a threat of serious injury to**  
266 **the environment or the inhabitants within the siting area? If so, why?**

267 Yes. The environment within the siting area will be seriously impacted by the  
268 long-lasting effects of construction and permanently injured in case of a leak of spill.

269

270 **Do you believe that the Dakota Access Pipeline will substantially impair the health,**  
271 **safety and welfare of the inhabitants of the siting area? If so, why?**

272 Yes. The welfare/economic impact will be substantially impaired in the manner  
273 set forth above.

274

275 **Would you be available to present testimony and respond to questions during the**  
276 **formal hearing scheduled for September 29 through October 8, 2015?**

277 Yes.

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279 **Does that conclude your testimony?**

280 Yes.

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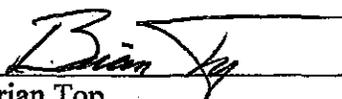
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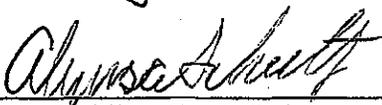
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Brian Top

Subscribed and sworn before me this 2<sup>nd</sup> day of July, 2015.

  
\_\_\_\_\_  
Notary Public – South Dakota  
My Commission Expires: 7/13/17

