BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

DOCKET NO. HP14-002

IN THE MATTER OF THE REVISED APPLICATION OF DAKOTA ACCESS, LLC FOR AN ENERGY FACILITY PERMIT TO CONSTRUCT THE DAKOTA ACCESS PIPELINE

Rebuttal Testimony of Michael E. Timpson, Ph.D.
On Behalf of the Staff of the South Dakota Public Utilities Commission
August 14, 2015

Q: Please state your name and business address.

A: Michael E. Timpson, Ph.D., Natural Resource Group, LLC (an ERM Group Company), 1500 SW 1st Ave, Suite 885, Portland, OR, 97201.

Q: Describe your educational background.

A: I received a Bachelor's degree in 1982 from the University of Rhode Island in Kingston, RI with a major in Natural Resources (soil science concentration). I received a Master's degree in 1985 from North Dakota State University in Fargo, ND, majoring in soil science, with a minor in geology. I received a Doctorate of Philosophy in 1992 from the University of Tennessee-Knoxville in Knoxville Tennessee, with a major in Plant and Soil Science and a minor in Environmental Engineering. I conducted post-doctoral research at Oak Ridge National Laboratory in 1993 and 1994, focusing on remediation of uranium-contaminated soils.

Q: By whom are you now employed?

A: I have been employed by Natural Resource Group, LLC (an ERM Company) since 2001. I currently hold the position of Principal Consultant in our Regulatory Group and serve as the office manager of the Portland, Oregon office.

Q: What work experience have you had that is relevant to your involvement on this project?

A: While pursuing my doctorate I was employed full time by the Department of Plant and Soil Science, part of the agricultural experiment station system of the University of Tennessee. As such, I conducted field work and operated a laboratory that analyzed soils in support of the agricultural experiment station's research program and also supported the United States Department of Agriculture, Natural Resources Conservation Service soil survey program. Prior to joining Natural Resource Group, I worked for a smaller consulting firm conducting soils and wetlands evaluations in support of natural gas pipeline projects. Since joining Natural Resource Group I have conducted soils and agricultural impact and mitigation assessments for more than 3,000 miles of natural gas and petroleum pipelines across the United States, including three recent natural gas pipelines in North Dakota. As a third-party contractor to the Federal Energy Regulatory Commission, I've assisted in the preparation of soils and agricultural impact assessments related to natural gas pipelines for 13 Environmental Impact Statements and Environmental Assessments under the National Environmental Policy Act and/or applicable state programs.

Q: What Professional Credentials do you hold?

A: I am a Licensed Professional Soil Scientist in the State of Wisconsin (License No. 174-112). My current license expires in July 2016.

Q: What is the purpose of your rebuttal testimony?

A: My rebuttal testimony is being provided to address specific concerns identified in direct testimony provided by intervening landowners. That testimony is specifically related to: the potential for trench excavation to bring dormant weed seeds to the surface from deeper soil layers; the potential for soil compaction related to construction to impact post-construction crop yields; and, the potential for soil temperature changes that may occur over the pipeline due to pipeline operations to impact post-construction crop yields.

Q: What methodology did you employ?

A: I reviewed the information provided in Sections 14.5 and 16.1 of Dakota Access' Revised Application as well as the information provided in the Agricultural Impact Mitigation Plan (AIMP, Exhibit D of Dakota Access' Revised Application). I also reviewed existing publications and environmental review documents prepared for federal and state permits for similar projects in the upper Midwest. In addition, I applied my knowledge of soil characteristics and limitations as well as my knowledge of the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) to determine if soils were properly classified by their limitations and if the appropriate mitigation measures were proposed for implementation to avoid or minimize potential construction impacts on agricultural soils (as defined in the project AIMP).

Q: In pre-filed direct testimony, intervening landowners raised concerns about the possibility of impacts on crop yields due to heat generated during operation of the pipeline. Based on your experience and research, do you believe that heat-related impacts on crop yields could occur?

A: Yes, heat-related effects on plant growth and crop yields have been identified as a result of pipeline operations for natural gas and oil pipelines. Published reports of impacts on plant growth and crop yields resulting from soil heating caused by pipeline operations are limited, however, a recent assessment of pipeline temperature effects on vegetation was conducted for the Alliance Pipeline, a natural gas transmission pipeline that crosses portions of North Dakota, Minnesota, Iowa and Illinois (TERA Environmental Consultants, 2004). Measurements of soil temperature, plant available soil moisture, and spring wheat and barley yields were recorded upstream and downstream of a compressor station on the Alliance Pipeline in 2002, 2003, and 2004. Data were collected from four sites downstream of the compressor station (at distances ranging from 0.5 to 52 miles downstream) and compared with a site 0.5 mile upstream of the compressor station. Data collection took place at points directly over the trench, 6 feet way from the pipeline, and 43 feet away from the pipeline, and at different soil depths. Soil temperature was highest directly over the pipeline (as documented in previous studies, e.g., Naeth et al., 1993) and decreased with increasing distance from the pipeline. No significant differences were noted in plant available soil moisture or crop yield at any site with the exception that mean plant available soil moisture was significantly greater over the trench in 2002 than in adjacent areas. Data were collected under the drought conditions that existed in 2002, while precipitation and plant available soil water were normal to above normal in 2003 and 2004, respectively. The authors anticipated that soil temperatures above the pipeline might lead to increased soil drying, however, this effect was not documented. Increased soil temperature above the pipeline did not significantly affect plant available soil moisture or crop yield. Although the operational parameters of the Alliance natural gas pipeline may vary from the proposed Dakota Access oil pipeline, similar temperature effects on plant growth, soil moisture parameters, and crop yield may be expected from operation of the Dakota Access pipeline project.

References:

Naeth, M.A., D.S. Chanasyk, W.B. McGill and A.W. Bailey. 1993. Soil temperature regime in mixed prairie rangeland after pipeline construction and operation. Can. Agriculture Engineering. 35(2): 89-95.

TERA Environmental Consultants. 2004. Effects of heat from a pipeline on crop growth – interim results. Proceedings of the 8th International Symposium on Environmental Concerns in Rights-of-Way Management, Saratoga Springs, NY.

Q: If reduced crop yields are expected as a result of heat generated during operation of the pipeline, are there any mitigation measures that can be implemented? If so, please explain.

A: Reduced crop yields may result from heat added to soils from pipeline operations; however, the majority of studies published to date have demonstrated a neutral to positive effect on crop yields as a result of the heat effects from pipeline operation. Further, there are no mitigation measures that can be implemented to change the heat effects on soils surrounding an operating pipeline.

Q: If there are ways to mitigate the impacts, what measure(s) do you recommend the PUC should consider in order to mitigate the impacts of crop yield loss due to heat generated during operation of the pipeline?

A: Data regarding crop yields near buried pipelines indicate that most effects of heat added to soils from pipeline operations have neutral to positive effects on crop yields. As a result, no mitigation measures would be required to address heat effects from pipeline operations.

Q: In pre-filed direct testimony, intervening landowners raised concerns about the possibility of impacts on crop yields due to the increased emergence of noxious weeds resulting from trenching and other soil disturbance during construction of the pipeline. Based on your experience and research, do you believe that impacts from an increased occurrence of noxious weeds could occur?

A: Yes

Q: If reduced crop yields or other impacts are expected as a result of the spread of noxious weeds resulting from construction of the pipeline, are there any mitigation measures that can be implemented? If so, please explain.

A: There are a variety of mitigation measures that can be implemented to minimize the potential for spreading noxious and other weeds during pipeline construction.

Section 16.1 of Dakota Access' Revised Application describes the preconstruction survey effort employed to document the presence of noxious weeds along the proposed pipeline route in South Dakota. Section 16.1.1 describes the mitigation measures that may be employed to minimize the potential for spreading noxious weeds along the pipeline route during construction. The AIMP does not include a section describing the potential to spread noxious or other weed species as a result of construction, and includes no mention of mitigation measures that would be employed to avoid or minimize the spread of weeds of any sort along the right-of-way.

Q: If there are ways to mitigate the impacts, what measure(s) do you recommend the PUC should consider in order to mitigate the impacts resulting from the spread of noxious weeds resulting from pipeline construction?

A: Section 16.1.1 of the Revised Application states that Dakota Access would consult with the South Dakota Department of Agriculture regarding appropriate Best Management Practices (BMPs) to implement to minimize the spread of noxious weeds during construction. The mitigation measures described in that Section, if used in combination, would be sufficient to minimize the potential spread of noxious weeds as a result of construction. However, the success of the mitigation measures should be documented through post-construction weed surveys for at least 2 years following the completion of construction.

Additional mitigation measures should be employed to minimize the potential for propagation of other common agricultural weeds as a result of construction. In areas of rotated cropland, typical weed control measures reduce the growth of weeds, minimizing competition between agricultural crops and weed species for nutrients and water. However, deeper portions of the topsoil in most agricultural lands also act as a seed bank for long-lived weed seeds located below the depth of most common pre-emergent herbicide treatments. Topsoil segregation, performed to preserve topsoil productivity and eliminate the potential for rutting due to construction traffic resulting in mixing of topsoil and subsoil, will result in a mixing of the soil to the depth of the topsoil segregated from the construction workspace. For example, in areas with 12-inches or more of topsoil, Dakota Access proposes to segregate 12-inches of topsoil from the ditch and spoil storage areas of the construction right-of-way. Moving this volume of topsoil across the construction workspace will mix the soil. This mixing action brings dormant weed seeds to the surface of the stored topsoil piles and can result in significant growth of weeds. To minimize the potential for this new weed growth to result in new weed infestations following construction and restoration of the right-of-way, monitoring and controlling the growth of weeds on topsoil storage piles should be employed. To implement this additional weed control mitigation, the environmental inspector or agricultural inspector should be capable of identifying multiple species of weeds at a number of life stages, and be able to recommend and implement weed control measures early enough in the life cycle of the weed species in question to minimize or prevent the plants from setting seeds.

In pre-filed direct testimony, intervening landowners raised concerns about the possibility of long-term impacts on crop yields due to the compaction of soil occurring during construction of the pipeline. Based on your experience and research, do you believe that soil compaction impacts on crop yields could occur?

A: Yes.

Q: If reduced crop yields are expected as a result of soil compaction during construction of the pipeline, are there any mitigation measures that can be implemented?

A: There are mitigation measures that can be implemented to minimize the potential for compaction of soils to impact post-construction crop yields.

Q: If there are ways to mitigate the impacts of soil compaction, what measure(s) do you recommend the PUC should consider in order to mitigate the impacts of crop yield loss due to soil compaction during construction of the pipeline?

A: Section h of the AIMP describes the mitigation measures that would be implemented to alleviate compaction of soils resulting from construction traffic. Soil compaction is typically greatest on the “working side” or “travel lane” portion of the construction right-of-way, and largely results from the use of rubber-tired trucks used for hauling pipe segments and transporting other heavy items along the right-of-way. Little if any compaction typically occurs on the spoil storage side of the right-of-way, and virtually no compaction occurs over the trench line.

The deep tillage methods described in Section h of the AIMP will likely be adequate to alleviate soil compaction that will result from construction. However, the approach for implementing the deep tillage methods and a means to determine if the proposed 3 passes of the tillage equipment have been sufficient to remediate the compacted soils is insufficient. The industry standard for judging whether decompaction measures are adequate is a comparison of soil density, as measured with a tool called a penetrometer, on the right-of-way with undisturbed soils in adjacent off-right-of-way areas of the same field. Dakota Access' AIMP contains no provisions for making these comparisons, it simply assumes that 3 passes of the deep tillage equipment will be sufficient to alleviate the level of compaction induced by construction traffic. Natural Resource Group recommends that the PUC include requirements for compaction testing of areas on and off the construction right-of-way, using a penetrometer or other equivalent measuring device, to provide an appropriate means of determining whether deep tillage operations have reduced compaction to levels similar to adjacent sections of cropland undisturbed by construction activities.

Q: Does this conclude your testimony?

A: Yes.