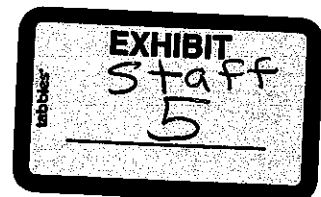


**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**

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

DOCKET NO. HP14-002

**Direct Testimony of Derric L. Iles
On Behalf of the Staff of the South Dakota Public Utilities Commission
July 6, 2015**



1 **Q: Please state your name and business address.**

2

3 A: Name: Derric Iles

4 Business address: Geological Survey Program, DENR

5 Akeley-Lawrence Science Center

6 414 East Clark Street

7 Vermillion, SD 57069-2390

8

9 **Q: Describe your educational background.**

10

11 A: 1977: Master of Science degree in Geology, Iowa State University

12 1975: Bachelor of Arts degree in Geology, University of Northern Iowa

13

14 **Q: By whom are you now employed?**

15

16 A: Geological Survey Program, South Dakota Department of Environment and

17 Natural Resources

18

19 **Q: What work experience have you had that is relevant to your involvement on**

20 **this project?**

21

22 A: I have been the State Geologist and Administrator of the Geological Survey
23 Program, South Dakota Department of Environment and Natural Resources,
24 since January 1998. In that capacity, I am responsible for planning, organizing,
25 and directing activities conducted by the Geological Survey Program staff
26 designed to locate, describe, map, and evaluate the natural resources of South
27 Dakota.

28 Prior to that, beginning in 1977, I was a geologist/hydrologist with the Geological
29 Survey Program and am the geologist of record on more than 800 test
30 holes/wells in eastern South Dakota. During my time with the Geological Survey
31 Program prior to January 1998, I performed the following functions.

32

- 33 • Designed and directed hydrogeologic investigations focused on water
34 quantity, water quality, and the vulnerability of certain aquifers to surface
35 sources of contamination.
- 36 • Planned and directed research on the movement of ground water through low
37 permeability glacial till. Utilized test drilling, well installation, laboratory and
38 field testing of sediment permeability, general water chemistry, stable
39 isotopes, lithologic description, water levels, and hydraulic gradients to
40 characterize hydrogeologic conditions.
- 41 • Directed drilling, well installation, and water sampling activities.
- 42 • Produced maps and written scientific reports.
- 43 • Reviewed and evaluated consultants' reports on hydrogeologic
44 characterizations of future landfill sites. Assisted consultants in preparing
work plans to gather hydrogeologic information necessary for the permitting

1 process related to solid waste disposal facilities in low-permeability geologic
2 settings.

- 3 • Designed and implemented a statewide ground water quality monitoring
4 network for South Dakota that is focused on long-term monitoring of the
5 ambient quality of water in 25 of the state's surface aquifers.
- 6 • Provided expert witness testimony regarding the hydrology and geology of
7 potential landfill sites on behalf of the South Dakota Department of
8 Environment and Natural Resources.
- 9 • Compiled and evaluated existing hydrologic and geologic information in
10 preparation for the planning of drilling and well installation projects.
- 11 • Planned field investigations based on existing information. Investigations
12 were conducted in (1) highly variable glacial sediments (including buried and
13 surficial glacial outwash aquifers), (2) Cretaceous age geologic units of
14 Niobrara Formation, Carlile Shale, Greenhorn Formation, Graneros Shale,
15 Dakota Formation, and Split Rock Creek Formation, and (3) Precambrian age
16 Sioux Quartzite.
- 17 • Directed drilling and well installation for ground-water resource investigations
18 wherein the extent, thickness, and water quality of various aquifers were
19 studied. Investigations were performed to locate new or supplemental
20 sources of drinking water for cities and rural water systems. Drilling and well
21 depths ranged from very shallow to greater than 800 feet. The primary drilling
22 method employed was the forward mud rotary method. Auger drilling (solid
23 stem and hollow stem) was also used but to a much lesser extent.
- 24 • Planned and directed drilling and well installation activities to characterize the
25 hydrogeology at potential or existing landfill sites.
- 26 • Planned and directed the investigation of sites contaminated with petroleum
27 products (gasoline, diesel, fuel oil). Directed test drilling, well installation, and
28 performed sampling of water and contaminants.
- 29 • Spent extensive time in the field with drilling projects as the well-site geologist
30 and project director; logged and interpreted drill cuttings.
- 31 • Performed and interpreted results of geophysical logging of test holes (single-
32 point resistivity, spontaneous potential, and natural gamma) to define
33 subsurface geology.
- 34 • Used isotopic analysis of ground water to interpret paleo-hydrogeologic
35 environment and age of the ground water.
- 36 • Interpreted surface and subsurface geology and hydrology in order to
37 construct aquifer maps. The process included reconstruction of geologic
38 history and an evaluation of all available hydrologic parameters.
- 39 • Developed wells, commonly using compressed air, and sampled wells for
40 water quality analysis using a variety of methods (air lift, bailer, centrifugal
41 pump, bladder pump).
- 42 • Collected water levels and used them to construct water table maps and
43 potentiometric surface maps.
- 44 • Prepared maps, cross sections, and written reports for projects lasting a few
45 months to several years.

- 1 • Made presentations of project results to city councils, rural water system
2 boards of directors, consultants, other government officials, and the general
3 public.

4 Additionally, I have experience as a Senior Hydrologist/Project Manager from
5 November 1984-January 1986 with Twin City Testing Corporation, St. Paul,
6 Minnesota, during which time I performed the following functions.

- 7 • Designed and directed investigations of sites having petroleum contamination
8 in the subsurface. Field methods employed were drilling of test holes,
9 installation of monitoring wells, collection of sediment and ground-water
10 samples, and collection of water-level data.
11 • Worked on project sites ranging geographically from West Virginia to
12 California encompassing bedrock, alluvial, and glacial geologic settings.
13 • Hired and directed subcontractors for project sites remote from the
14 Minneapolis, Minnesota, area.
15 • Evaluated aquifer test data to assist in the understanding of subsurface
16 hydrologic conditions.
17 • Used geologic, hydrologic, and contaminant data to interpret subsurface
18 conditions, and to predict future environmental impacts of contamination.
19 • Designed and implemented remedial action at project sites to mitigate
20 environmental impacts and to protect human health and safety.
21 • Prepared maps, cross sections, and written reports.

22
23 **Q: What Professional Credentials do you hold?**

24
25 A: I am a Certified Professional Geologist (CPG) through the American Institute of
26 Professional Geologists

27
28 **Q: On whose behalf was this testimony prepared?**

29
30 A: I prepared this testimony on behalf of the Staff of the South Dakota Public
31 Utilities Commission.

32
33 **Q: Have you reviewed the Application and its amendments?**

34
35 A: I have reviewed the portion of the Application that is relevant to my area of
36 expertise.

37
38 **Q: What methodology did you employ?**

39
40 A: I looked at the proposed route of the pipeline and compared it to the surface
41 geology that would be crossed. I also looked at maps showing shallow glacially
42 derived aquifers that may be present along the proposed path of the pipeline.

43
44 **Q: When would your agency have jurisdiction over Dakota Access?**

45

1 A: The Geological Survey Program, South Dakota Department of Environment and
2 Natural Resources, does not have regulatory authority. The Geological Survey
3 Program would most likely become involved at the request of regulatory
4 Programs in the Department and would provide interpretation of geologic and
5 hydrologic conditions as requested.
6

7 **Q: Did you provide any recommendations to Dakota Access during route
8 development?**
9

10 A: No
11

12 **Q: Does the proposed pipeline route cross any areas where shallow aquifers
13 have been identified?**
14

15 A: Yes, I will mention them beginning in Campbell County, which contains the
16 northwest end of the proposed route in South Dakota, and progress
17 southeastward to Lincoln County.

- 18 • In Campbell County, the pipeline route crosses areas where the Spring Creek
19 aquifer and the Selby aquifer have been mapped. Experience gained since
20 the report that named these aquifers was published in 1970 leads me to
21 suspect that these two aquifers are very likely much smaller than indicated in
22 the report. Nevertheless, there are data from drill holes near the pipeline route
23 that show some shallow sand and gravel to be present.
- 24 • In southwestern Spink County, the pipeline route crosses an area where the
25 Tulare aquifer has been mapped. Recent work by the Geological Survey
26 Program corroborates the presence of this shallow sand and gravel aquifer.
- 27 • In western Lake County, the pipeline route crosses the East Fork Vermillion
28 River. A sand and gravel aquifer named the Vermillion-East-Fork has been
29 mapped to occur in the river valley but the presence of shallow sand and
30 gravel within the mapped aquifer area is not ubiquitous as demonstrated by
31 maps of surface geology and test-hole data.
- 32 • At the southeastern end of the proposed pipeline route in South Dakota, the
33 valley of the Big Sioux River is crossed. A sand and gravel aquifer named the
34 Big Sioux aquifer is mapped in the valley. Although there are no test holes
35 which have been drilled at the exact location of the proposed pipeline
36 crossing, a nearby test hole and the presence of a nearby gravel pit indicate
37 that shallow sand and gravel is likely in the river valley.
38

39 **Q: Does this conclude your testimony?**
40

41 A: Yes

Derric L. Iles

Work Experience

- Jan. 1998 – Present **State Geologist and Administrator**, *Geological Survey Program, South Dakota Department of Environment and Natural Resources, Vermillion, South Dakota*
- Plan, organize, and direct the activities of the South Dakota Geological Survey to locate, describe, map, and evaluate the natural resources of South Dakota.
 - Provide scientific advice and expertise to the South Dakota Department of Environment and Natural Resources, other governmental agencies, consultants, and the public.
- 1986 – 1993 **Adjunct Instructor**, *Department of Earth Sciences and Physics, University of South Dakota, Vermillion, South Dakota*
- Taught a 3-credit Environmental Earth Science course.
 - Taught introductory earth science laboratories.
- Feb. 1986 – Dec. 1998 **Hydrologist**, *Geological Survey Program, South Dakota Department of Environment and Natural Resources, Vermillion, South Dakota*
- Designed and directed hydrogeologic investigations focused on water quantity, water quality, and the vulnerability of certain aquifers to surface sources of contamination.
 - Planned and directed research on the movement of ground water through low permeability glacial till. Utilized test drilling, well installation, laboratory and field testing of sediment permeability, general water chemistry, stable isotopes, lithologic description, water levels, and hydraulic gradients to characterize hydrogeologic conditions.
 - Directed drilling, well installation, and water sampling activities.
 - Produced maps and written scientific reports.
 - Reviewed and evaluated consultants' reports on hydrogeologic characterizations of future landfill sites. Assisted consultants in preparing work plans to gather hydrogeologic information necessary for the permitting process related to solid waste disposal facilities in low-permeability geologic settings.
 - Designed and implemented a statewide ground water quality monitoring network for South Dakota that is focused on long-term monitoring of the ambient quality of water in 25 of the state's surface aquifers.
 - Provided expert witness testimony regarding the hydrology and geology of potential landfill sites on behalf of the South Dakota Department of Environment and Natural Resources.
- Nov. 1984 – Jan. 1986 **Senior Hydrogeologist/Project Manager**, *Soil Exploration Company, Twin City Testing Corporation, Huntingdon Engineering and Environmental Inc., St. Paul, Minnesota*
- Designed and directed investigations of sites having petroleum contamination in the subsurface. Field methods employed were drilling of test holes, installation of monitoring wells, collection of sediment and ground water samples, and collection of water level data.
 - Project sites ranged geographically from West Virginia to California and encompassed bedrock, alluvial, and glacial geologic settings.
 - Hired and directed subcontractors for project sites remote from the Minneapolis, Minnesota, area.
 - Evaluated aquifer test data to assist in the understanding of subsurface hydrologic conditions.

- Used geologic, hydrologic, and contaminant data to interpret subsurface conditions, and to predict future environmental impacts of contamination.
- Designed and implemented remedial action at project sites to mitigate environmental impacts and to protect human health and safety.
- Prepared maps, cross sections, and written reports.

June 1977 – Oct. 1984

Geologist/Hydrologist, Geological Survey Program, South Dakota Department of Environment and Natural Resources, Vermillion, South Dakota

- Compiled and evaluated existing hydrologic and geologic information in preparation for the planning of drilling and well installation projects.
- Planned field investigations based on existing information. Investigations were conducted in (1) highly variable glacial sediments (including buried and surficial glacial outwash aquifers), (2) Cretaceous age geologic units of Niobrara Formation, Carlile Shale, Greenhorn Formation, Graneros Shale, Dakota Formation, and Split Rock Creek Formation, and (3) Precambrian age Sioux Quartzite.
- Directed drilling and well installation for ground-water resource investigations wherein the extent, thickness, and water quality of various aquifers were studied. Investigations were performed to locate new or supplemental sources of drinking water for cities and rural water systems. Drilling and well depths ranged from very shallow to greater than 800 feet. The primary drilling method employed was the forward mud rotary method. Auger drilling (solid stem and hollow stem) was also used but to a much lesser extent.
- Planned and directed drilling and well installation activities to characterize the hydrogeology at potential or existing landfill sites.
- Planned and directed the investigation of sites contaminated with petroleum products (gasoline, diesel, fuel oil). Directed test drilling, well installation, and performed sampling of water and contaminants.
- Spent extensive time in the field with drilling projects as the well-site geologist and project director; logged and interpreted drill cuttings.
- Performed and interpreted results of geophysical logging of test holes (single-point resistivity, spontaneous potential, and natural gamma) to define subsurface geology.
- Used isotopic analysis of ground water to interpret paleo-hydrogeologic environment and age of the ground water.
- Interpreted surface and subsurface geology and hydrology in order to construct aquifer maps. The process included reconstruction of geologic history and an evaluation of all available hydrologic parameters.
- Developed wells, commonly using compressed air, and sampled wells for water quality analysis using a variety of methods (air lift, bailer, centrifugal pump, bladder pump).
- Collected water levels and used them to construct water table maps and potentiometric surface maps.
- Prepared maps, cross sections, and written reports for projects lasting a few months to several years.
- Made presentations of project results to city councils, rural water system boards of directors, consultants, other government officials, and the general public.

Education

1975-1977
1971-1975

Master of Science, Geology, Iowa State University, Ames, Iowa
Bachelor of Arts, Geology, University of Northern Iowa, Cedar Falls, Iowa

Additional Training

- 24-hour Mine Safety & Health Administration training, November 2006 and January 2009
- Legal Arena, SD Bureau of Personnel training
- various OSHA 8-hour refresher courses for hazardous materials
- Source Water Protection Workshop, December 1997
- Introduction to ArcView, March 1997
- Recognizing & Identifying Hazardous Materials Train-the-Trainer Course, December 1990
- Introduction to AutoCAD, August 1990
- Wellhead Protection Area Delineation, October 1988
- Sampling for Hazardous Materials (165.9), August 1988
- Safety at Hazardous Materials Sites: A Hands-On Workshop, May 1998
- Risk Based Corrective Action Training, December 1995
- Drug and Alcohol Detection Training Course for Supervisors, June 1995
- Personnel Protection and Safety (165.2), March 1988
- Incident Mitigation & Treatment Methods, September 1986
- Intermediate Hazmat Safety, April 1985

Memberships American Institute of Professional Geologists, CPG 10986
 Association of American State Geologists
 National Ground Water Association

Awards

2005 John Paul Gries "Geologist of the Year" Award, *American Institute of Professional Geologists, South Dakota Section*

2001 Agency Person of the Year Award, *Black Hills Resource Conservation and Development, Inc.*

1998 Environmental Achievement Award, *U.S. Environmental Protection Agency, Region 8*

Publications/Reports

Iles, D.L. and Barari, A., 1978, *Ground-water study for the city of Redfield*: South Dakota Geological Survey Open-File Report UR-22, 23 P.

Iles, D.L. 1979, *Ground-water study for southern Union County*: South Dakota Geological Survey Open-File Report UR-28, 63p.

Iles, D.L., 1979, *Ground-water study for the city of Huron*: South Dakota Geological Survey Open-File Report UR-24, 37 p.

Iles, D.L. 1979, *Sanitary landfill investigations for the city of Huron*: South Dakota Geological Survey Open-File Report UR-26, 30 p.

Ludvigson, G.A. McKay, R.M., Iles, D.L., and Bretz, R.F., 1981, *Lithostratigraphy and sedimentary petrology of the Split Rock Creek Formation, late Cretaceous, of southeastern South Dakota*, in Brenner and others, *Cretaceous stratigraphy and sedimentation in northwest Iowa, northeast Nebraska, and southeast South Dakota*: Iowa Geological Survey Guidebook Series 4.

Hedges, L.S., Burch, S.L., Iles, D.L. Barari, R.A., and Schoon, R.A., 1982, *Evaluation of ground-water resources in eastern South Dakota and upper Big Sioux River, South Dakota and Iowa, Task 1: Bedrock topography and distribution; Task 2: Extent of aquifers; Task 3: Ground-water storage; Task 4: Computerized data base*: Department of Water and Natural Resources, Division of Geological Survey, Vermillion, South Dakota, Prepared for Planning Division, U.S. Army Corps of Engineers, Omaha, Nebraska, Contract DACW 45-80-C-0185.

- Iles, D.L. 1984, *Platte petroleum spill*: (revised 1989), South Dakota Geological Survey Open-File Report UR-39, 38p.
- Iles, D.L. 1984, *Pleistocene recharge to the Dakota Formation in Lincoln County, South Dakota*, in *Proceedings of the First C.V. Theis Conferences on Geohydrology; Geohydrology of the Dakota Aquifer*: held October 5-6, 1982, Lincoln, Nebraska, p. 135-146; published by the National Water Well Association.
- Hedges, L.S., Burch, S.L., and Iles, D.L., 1985, *Evaluation of groundwater resources eastern South Dakota and upper Big Sioux River South Dakota and Iowa, Task 6: Average annual ground-water use in eastern South Dakota*: Department of Water and Natural Resources, Division of Geological Survey, Vermillion, South Dakota, Prepared for Planning Division, U.S. Army Corps of Engineers, Omaha, Nebraska, Contract DACW 45-80-C-0185.
- Allen, J.C., Iles, D.L., and Petres, A.K., 1985, *Analysis of groundwater and streamflow data western Dakotas region of South Dakota, Tasks 3A. B. C. and 4A. B.: Groundwater resource inventory*: Department of Water and Natural Resources, Division of Geological Survey, Vermillion, South Dakota, Prepared for Planning Division, U.S. Army Corps of Engineers, Omaha, Nebraska, Contract DACW 45-82-C-0151.
- Hedges, L.S., Burch, S.L., and Iles, D.L., 1985, *Evaluation of groundwater resources eastern South Dakota and upper Big Sioux River South Dakota and Iowa, Task 11: Artificial recharge potential*: Department of Water and Natural Resources, Division of Geological Survey, Vermillion, South Dakota, Prepared for Planning Division, U.S. Army Corps of Engineers, Omaha, Nebraska, Contract DACW 45-80-C-0185.
- Iles, D.L. 1986, *Gregory petroleum leak*: South Dakota Geological Survey Open-File Report UR-38, 21 p.
- Iles, D.L. 1986, *Tripp petroleum leak*: South Dakota Geological Survey Open-File Report UR-37, 17 p.
- Iles, D.L., 1988, *Investigation of petroleum contamination at Washington High School, Sioux Falls, South Dakota*: South Dakota Geological Survey Open-File Report UR-53, 27 p.
- Iles, D.L. and Dawson, P.M., 1988, *Hydrogeologic investigation for an alternate water source for the Brookings-Deuel Rural Water System near Clear Lake, South Dakota*: South Dakota Geological Survey Open-File Report UR-51, 79 p.
- Iles, D.L., Meyer, M.R., Baron, L.R. and Markley, W.E., 1988, *Assessment of hydrogeologic and ground water contamination data in the vicinity of the Hayward Elementary School, West 12th Street, Sioux Falls, South Dakota*: South Dakota Geological Survey Open-File Report UR-44, 231 p.
- Barari, A., Cowman, T.C., and Iles, D.L. 1988, *Evaluation of data on nitrate concentrations in the Big Sioux aquifer*: South Dakota Geological Survey Open-File Report UR-54, 30 p.
- Iles, D.L., 1989, *Investigation of the Sioux Falls sanitary landfill*: South Dakota Geological Survey Open-File Report UR-58, 69p.
- Barari, A., Iles, D.L., and Cowman, T.C., 1989, *Assessment of water resources and conceptual evaluation of a regional water supply for southeastern South Dakota*: South Dakota Geological Survey Open-File Report UR-60, 18 p.
- Barari, A., Cowman, T.C., and Iles, D.L., 1989, *A summary of current hydrologic conditions in the Dolton aquifer*: South Dakota Geological Survey Open-File Report UR-59, 11 p.
- Frykman, L.J., and Iles, D.L., 1990, *Hydrologic investigation of the Dakota Formation to identify additional municipal well sites for the city of Canton, South Dakota*: South Dakota Geological Survey Open-File Report UR-62, 79 p.
- Iles, D.L. and Frykman, L.J., 1991, *Hydrogeology of the southern Skunk Creek management unit of the Big Sioux aquifer*: South Dakota Geological Survey Open-File Report UR-63, 171 p.
- Iles, D.L., Hammond, P.D., and Schulz, L.D., 1992, *Effects of sampling methods on inorganic water chemistry results* in *Proceedings of National Groundwater Sampling Symposium*: held November 30, 1992, Washington, DC, p. 41-68; published by Grundfos Pumps Corporation, Environmental Products Division.
- Barari, A., Iles, D.L., and Cowman, T.C., 1993, *Wellhead protection and monitoring options for the Sioux Falls airport wellfield, South Dakota* in Moore, B.A., editor, *Case studies in wellhead protection area delineation and monitoring*: Environmental Monitoring Systems Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Las Vegas, Nevada, Contract number 68-CO-0049.
- Holly, D.E., Iles, D.L., and Barari, A., 1993, *Ground-water study for the TM Rural Water District in the vicinities of Dolton and Parker, South Dakota*: South Dakota Geological Survey Open-File Report UR-65, 112 p.
- Iles, D.L., 1996, *Investigation of the Dakota Formation for the Lincoln County Rural Water System*: South Dakota Geological Survey Open-File Report UR-71, 12 p.
- Iles, D.L., Barari, A., and Hedges, L.S., 1996, *Ground-water movement within till in Lincoln County, South Dakota*: South Dakota Geological Survey Open-File Report BAS-04, 82 p.

- Frykman, L.J., and Iles, D.L., 1996, *Investigation of nitrate-nitrogen contamination in ground water in the vicinity of Alcester, South Dakota*: South Dakota Geological Survey Open-File Report UR-76, 50 p.
- Davis, R.K., Iles, D.L., Schaefer, V.R., Kortran, J.M., Koch, B., and Peterson, E.W., 1997, *Hydrogeology and hydrochemistry of clayey till at the Sioux Falls landfill, Sioux Falls, South Dakota*: South Dakota Geological Survey Open-File Report BAS-09, 186 p.