



MONTANA-DAKOTA UTILITIES CO.

Before the Public Service Commission of North Dakota

Case Nos. PU-19-306 and PU-19-307

Joseph E. Geiger

Adopted Direct Testimony

of

Alan L. Welte

1 Q. Please state your name and business address.

2 A. My name is Joseph E. Geiger and my business address is 400
3 North Fourth Street, Bismarck, North Dakota 58501.

4 Q. By whom are you employed and in what capacity?

5 A. I am the Director of Generation in the power production department
6 of Montana-Dakota Utilities Co. (Montana-Dakota).

7 Q. Please describe your duties and responsibilities with Montana-
8 Dakota.

9 A. I have overall responsibility for the day-to-day operation of
10 Montana-Dakota's electric generation facilities, represent Montana-
11 Dakota's interests in jointly owned generation facilities operated by other
12 companies, and I am also responsible for new generation development.

13 Q. Please outline your educational and professional background.

14 A. I hold a Bachelor's Degree in Electrical Engineering from the
15 University of North Dakota. My work experience includes four years as a
16 plant engineer, ten years in various supervisory/managerial roles in coal
17 fired and natural gas fired generating facilities, and I have recently

1 transitioned into my current position which includes the oversight of
2 generation development and operational responsibilities for coal fired,
3 natural gas fired, and renewable generation facilities.

4 **Q. What is the purpose of this testimony you are now filing in this**
5 **proceeding?**

6 A. I am adopting the testimony originally filed by Alan L. Welte on
7 August 28, 2019 in this proceeding regarding the Heskett 4 combustion
8 turbine project (Project) identified as part of the Montana-Dakota's 2019
9 least cost generation expansion plan, including the benefits of locating
10 Heskett 4 on the existing Heskett 3 site, of selecting similar major
11 equipment to those used in Heskett Unit 3, and to build Heskett 4 in
12 conjunction with the retirement of the existing Heskett 1 and 2 coal-fired
13 units. I am also sponsoring the exhibit previously marked as Exhibit No.
14 ___(ALW-1) which is now marked as Exhibit No. ___(JEG-1) and attached
15 to this testimony.

16 **Q. Is your testimony and exhibit identical to the testimony and exhibit**
17 **submitted by Mr. Welte on August 28, 2019?**

18 A. Yes, it is.

19 **Q. Please describe Montana-Dakota's Heskett Unit 4 Project?**

20 A. The Project includes a simple cycle combustion turbine (SCCT) and
21 generator interconnected to Montana-Dakota's existing electric
22 transmission and natural gas systems. The Project will be located near
23 Mandan, North Dakota on Montana-Dakota's R.M. Heskett Station

1 property and on the existing Heskett 3 site. The timeline for construction
2 and commercial operation will be coordinated with the retirement of the
3 Heskett 1 and 2 coal-fired units to utilize the existing MISO transmission
4 system interconnection rights and to use the emissions reductions in the
5 air permitting for Heskett 4. Heskett 4 will be operated and maintained
6 with existing trained and experienced employees.

7 **Q. What is a SCCT electric generating facility?**

8 A. The purpose of a SCCT electric generating facility is to start up
9 quickly to serve peak capacity needs under higher electric market price
10 conditions or when there are transmission system reliability concerns. In
11 the SCCT, air is drawn in and is compressed using rows of rotating
12 blades. The compressed air is then sent to a combustion chamber where
13 it is mixed with fuel and the mixture is ignited. The hot combustion gas is
14 then expanded through rotating turbine blades delivering power through a
15 shaft connected to the generator where electricity is produced.

16 **Q. Please describe the major equipment that will comprise Montana-**
17 **Dakota's Project?**

18 A. The Project will include a nominal rated 88 MW heavy-duty frame
19 type combustion turbine and a totally enclosed water to air cooled
20 generator similar to those used in Heskett Unit 3. The SCCT will be
21 natural gas-fired, have a dry low NOx combustion system, and include
22 evaporative inlet air cooling for power augmentation. The generator will
23 connect to Montana-Dakota's 115kV transmission system through a

1 13.8kV to 115kV generator step up transformer. Station power will be
2 provided by a 13.8 kV to 4160 kV unit auxiliary transformer. Natural gas
3 equipment will include a pressure regulation station, a natural gas-fired
4 fuel gas heater and a final filtration skid. A closed cooling water system
5 will be included for cooling the turbine and generator lubricating oil, the
6 generator windings, and other smaller turbine support systems. A
7 continuous emissions monitoring system will be installed to measure NOx,
8 CO and O₂.

9 **Q. What Heskett Unit 3 design considerations, facilities and equipment**
10 **are anticipated to be utilized for the Heskett Unit 4 Project?**

11 A. Heskett 4 will benefit from Heskett 3 design considerations relating
12 to natural gas pipeline capacity and site layout. The existing natural gas
13 pipeline has enough capacity and will not require any additional pipeline
14 equipment to serve Heskett 4. The existing site, including the natural gas
15 yard and the construction parking and lay down area, were laid out to
16 accommodate the new Heskett 4 equipment. Additionally, Heskett 4 will
17 share the existing Heskett 3 fire protection loop, the storm water and
18 waste water systems, the oily drains tank, and the turbine water wash
19 system. Portions of the Heskett 3 service building, the underground
20 electric conduit, the control system, and spare parts will also be utilized for
21 Heskett 4. Exhibit No. __ (JEG-1) depicts a conceptual arrangement of
22 Heskett 4 on the existing site.

1 **Q. What potential savings and benefits can be realized by building the**
2 **Project at the Heskett site over a greenfield location?**

3 A. The full savings to be realized from site design considerations and
4 shared equipment are not available at this point in the preliminary design.
5 Three substantial cost savings that are anticipated relate to MISO
6 transmission system network upgrades, the electric transmission
7 interconnection, and the natural gas interconnection. If a greenfield
8 location required 15 miles of additional electric transmission and five miles
9 of additional natural gas pipeline, the added cost would be around \$14.5
10 million and \$7.4 million respectively. Assuming an average cost of
11 approximately \$113 per kW required for MISO transmission system
12 network upgrades for new generator interconnections in MISO's West
13 region, the savings realized by utilizing the existing Heskett 1 and 2
14 transmission interconnection rights through the MISO Generator
15 Replacement process would be \$11.0 million. Additionally, there are also
16 benefits to be achieved by netting the emission reductions from Heskett 1
17 and 2 against the Heskett 4 emissions in the air permitting process.

18 **Q. Please provide the estimated Project capital cost.**

19 A. The Heskett 4 Project capital cost is estimated to be \$73.0 million.
20 North Dakota's allocated share is approximately \$52 million.

21 **Q. Please describe Montana-Dakota's Project contracting approach.**

22 A. Montana-Dakota intends to hire an engineering consultant to
23 perform the detailed design, assist with the procurement process from bid

1 phase through administration of contracts after award, and manage on-
2 site construction, commissioning, and startup activities for Heskett 4. This
3 contracting approach is commonly referred to as an Engineer,
4 procurement support, and Construction Management (EpCM) contracting
5 approach, and is very similar to the multiple contracts approach used for
6 Heskett 3. Montana-Dakota expects that there will be at least seven major
7 equipment contracts, one or more major construction contracts, and
8 several smaller contracts for specialized equipment, construction, and
9 services for Heskett 4. Major contracts for equipment, construction, and
10 services will be directly between Montana-Dakota and the associated
11 vendor.

12 **Q. Please describe the Project activities undertaken at the time of the**
13 **Advance Determination of Prudence filing?**

14 A. Project activities include preliminary design and cost estimate
15 development, review of proposals for the air permit consultant, and filing of
16 the MISO Generator Replacement Process application.

17 **Q. What is the schedule for ceasing operation of Heskett Units 1 and 2?**

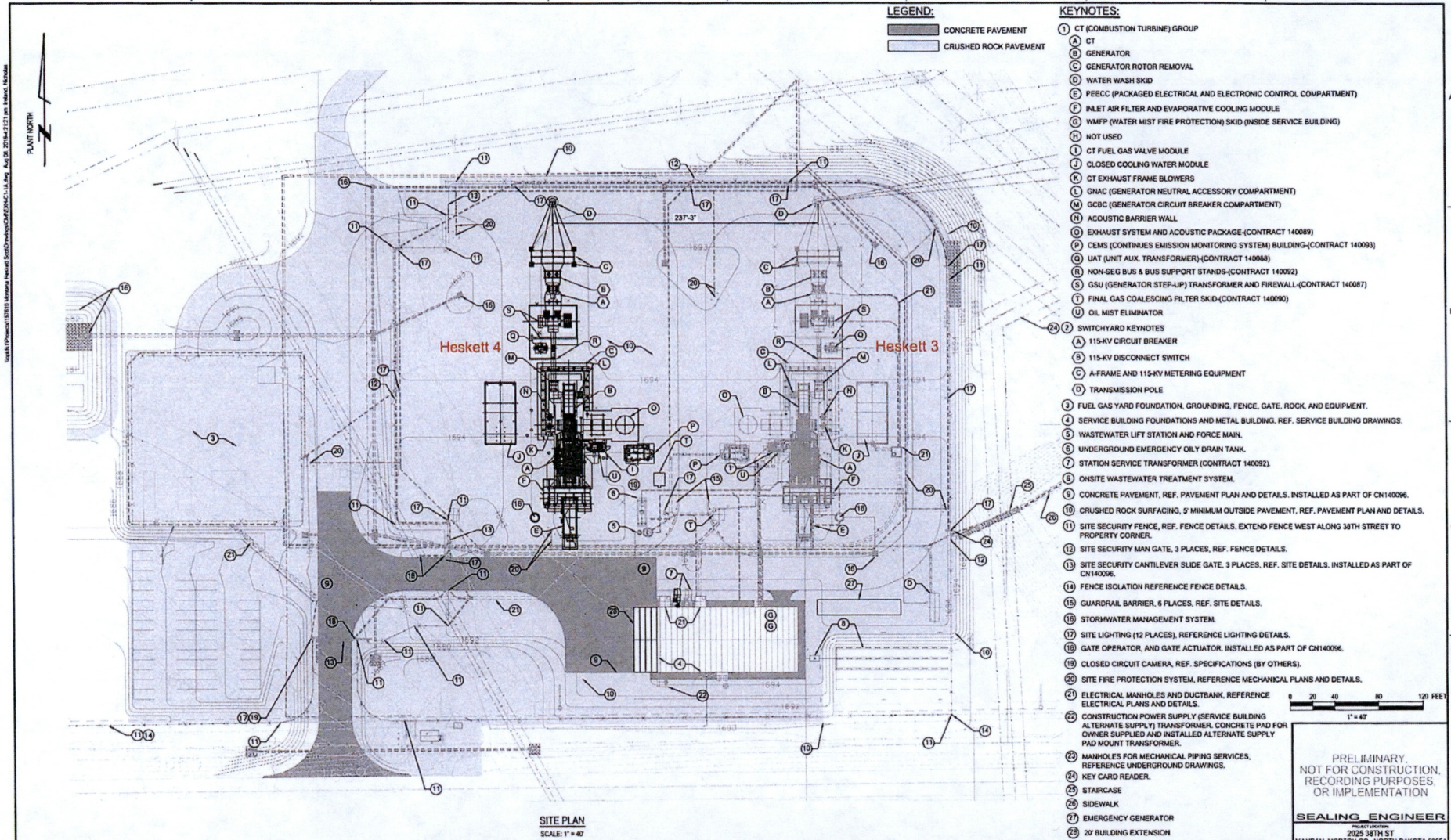
18 A. It is anticipated Heskett 1 and 2 operation will cease around March
19 31, 2022, following the end of the term of the existing coal supply
20 agreement and the cold winter months.

21 **Q. What is the anticipated schedule for commercial operation of the**
22 **SCCT?**

1 A. Project permit work began in 2019. Detailed engineering work is
2 anticipated to begin in January of 2021 and construction in March of 2022.
3 The unit is projected to be available for commercial operation in February
4 of 2023.

5 **Q. Does this conclude your direct testimony?**

6 A. Yes, it does.



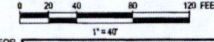
LEGEND:

- CONCRETE PAVEMENT
- CRUSHED ROCK PAVEMENT

KEYNOTES:

- 1 CT (COMBUSTION TURBINE) GROUP
- A CT
- B GENERATOR
- C GENERATOR ROTOR REMOVAL
- D WATER WASH SKID
- E PECC (PACKAGED ELECTRICAL AND ELECTRONIC CONTROL COMPARTMENT)
- F INLET AIR FILTER AND EVAPORATIVE COOLING MODULE
- G WMFP (WATER MIST FIRE PROTECTION) SKID (INSIDE SERVICE BUILDING)
- H NOT USED
- I CT FUEL GAS VALVE MODULE
- J CLOSED COOLING WATER MODULE
- K CT EXHAUST FRAME BLOWERS
- L GNAC (GENERATOR NEUTRAL ACCESSORY COMPARTMENT)
- M GCBC (GENERATOR CIRCUIT BREAKER COMPARTMENT)
- N ACOUSTIC BARRIER WALL
- O EXHAUST SYSTEM AND ACOUSTIC PACKAGE-(CONTRACT 140089)
- P CEMS (CONTINUOUS EMISSION MONITORING SYSTEM) BUILDING-(CONTRACT 140093)
- Q UAT (UNIT AUX. TRANSFORMER)-(CONTRACT 140098)
- R NON-SEG BUS & BUS SUPPORT STANDS-(CONTRACT 140092)
- S GSU (GENERATOR STEP-UP) TRANSFORMER AND FIREWALL-(CONTRACT 140087)
- T FINAL GAS COALESCING FILTER SKID-(CONTRACT 140090)
- U OIL MIST ELIMINATOR
- 20 SWITCHYARD KEYNOTES
- A 115-KV CIRCUIT BREAKER
- B 115-KV DISCONNECT SWITCH
- C A-FRAME AND 115-KV METERING EQUIPMENT
- D TRANSMISSION POLE
- 21 FUEL GAS YARD FOUNDATION, GROUNDING, FENCE, GATE, ROCK, AND EQUIPMENT.
- 4 SERVICE BUILDING FOUNDATIONS AND METAL BUILDING, REF. SERVICE BUILDING DRAWINGS.
- 5 WASTEWATER LIFT STATION AND FORCE MAIN.
- 6 UNDERGROUND EMERGENCY OILY DRAIN TANK.
- 7 STATION SERVICE TRANSFORMER (CONTRACT 140092)
- 8 ONSITE WASTEWATER TREATMENT SYSTEM.
- 9 CONCRETE PAVEMENT, REF. PAVEMENT PLAN AND DETAILS. INSTALLED AS PART OF CN140096.
- 10 CRUSHED ROCK SURFACING, 5" MINIMUM OUTSIDE PAVEMENT, REF. PAVEMENT PLAN AND DETAILS.
- 11 SITE SECURITY FENCE, REF. FENCE DETAILS. EXTEND FENCE WEST ALONG 34TH STREET TO PROPERTY CORNER.
- 12 SITE SECURITY MAN GATE, 3 PLACES, REF. FENCE DETAILS.
- 13 SITE SECURITY CANTILEVER SLIDE GATE, 3 PLACES, REF. SITE DETAILS. INSTALLED AS PART OF CN140096.
- 14 FENCE ISOLATION REFERENCE FENCE DETAILS.
- 15 GUARDRAIL BARRIER, 6 PLACES, REF. SITE DETAILS.
- 16 STORMWATER MANAGEMENT SYSTEM.
- 17 SITE LIGHTING (12 PLACES), REFERENCE LIGHTING DETAILS.
- 18 GATE OPERATOR, AND GATE ACTUATOR. INSTALLED AS PART OF CN140096.
- 19 CLOSED CIRCUIT CAMERA, REF. SPECIFICATIONS (BY OTHERS).
- 20 SITE FIRE PROTECTION SYSTEM, REFERENCE MECHANICAL PLANS AND DETAILS.
- 21 ELECTRICAL MANHOLES AND DUCTBANK, REFERENCE ELECTRICAL PLANS AND DETAILS.
- 22 CONSTRUCTION POWER SUPPLY (SERVICE BUILDING ALTERNATE SUPPLY) TRANSFORMER, CONCRETE PAD FOR OWNER SUPPLIED AND INSTALLED ALTERNATE SUPPLY PAD MOUNT TRANSFORMER.
- 23 MANHOLES FOR MECHANICAL PIPING SERVICES, REFERENCE UNDERGROUND DRAWINGS.
- 24 KEY CARD READER.
- 25 STAIRCASE
- 26 SIDEWALK
- 27 EMERGENCY GENERATOR
- 28 20' BUILDING EXTENSION

SITE PLAN
SCALE: 1" = 40'



PRELIMINARY.
NOT FOR CONSTRUCTION,
RECORDING PURPOSES,
OR IMPLEMENTATION

SEALING ENGINEER

EXH-C1-1A.DWG
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INTER-DISCIPLINE REVIEW					
DISC	ARCH	CIVIL	ELECT	MECH	STRUCT
DATE					
INIT					

REV	DATE	DRN	DSGN	CHKD	APPD
C	06/12/19	NLI	BHR	SMT	CMD
B	07/19/19	NLI	BHR	SMT	CMD
A	09/17/19	BLW	BHR	SMT	CMD
REV					

DSGN	BHR	06/17/19
DRN	BRG	06/17/19
CKD	SMT	06/17/19
SCALE:	1" = 40'	
FOR 2262 (DWG) ONLY		

MONTANA-DAKOTA UTILITIES CO.
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CERTIFICATE OF REGISTRATION NO. 340000

MONTANA-DAKOTA UTILITIES CO.	JOB NUMBER	REV
MONTANA-DAKOTA UTILITIES CO.	157610	C
HESKETT UNIT 4	DRAWING NUMBER	
OVERALL SITE PLAN	EXH-C1-1A	