

MONTANA-DAKOTA UTILITIES CO.  
A Division of MDU Resources Group, Inc.

Before the Public Service Commission of North Dakota

Case No. PU-13-\_\_\_\_

Direct Testimony  
of  
Alan L. Welte

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

2 A. My name is Alan L. Welte and my business address is 400 North  
3 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), a Division of MDU  
7 Resources Group, Inc.

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

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

14 **Q. Please outline your educational and professional background.**

15 A. I hold a Bachelor's Degree in Mechanical Engineering from North  
16 Dakota State University. My work experience at Montana-Dakota includes  
17 eight years of experience as a plant engineer, twelve years of experience

1 as a plant manager, and nine years of generation development and  
2 operational responsibilities in my current position which includes coal-  
3 fired, gas-fired, and renewable generation.

4 **Q. What is the purpose of your testimony in this proceeding?**

5 A. The purpose of my testimony is to describe the U.S. Environmental  
6 Protection Agency's (EPA) Mercury and Air Toxics Standards (MATS)  
7 Rule requiring Montana-Dakota's Lewis & Clark Station to comply with  
8 mercury, non-mercury trace metals, and acid gas emissions limits. I will  
9 also describe the analysis performed to determine the optimal emissions  
10 control strategy, as well as the additional pollution controls equipment and  
11 modifications necessary for compliance, and the estimated cost required  
12 to demonstrate compliance with the MATS Rule.

13 **Q. Please describe Montana-Dakota's Lewis & Clark Station.**

14 A. Lewis & Clark is an existing single-unit, 50-MW lignite-fired facility  
15 located near Sidney, Montana. Lewis & Clark is currently equipped with  
16 low-NOx burners and close-coupled overfire air for NOx control, multiple-  
17 cyclone (multiclone) mechanical particulate collectors, as well as a flooded  
18 wet disk particulate scrubber. The flooded wet disk scrubber is primarily  
19 designed for particulate matter pollution control but also removes sulfur  
20 dioxide (SO<sub>2</sub>) from the flue gas. For mercury (Hg) control, the unit uses  
21 fuel additives as well as activated carbon injection (ACI). The Lewis &  
22 Clark Station is a low cost baseload resource critical in meeting Montana-  
23 Dakota's customers' energy and capacity requirements.

1 **Q. Would you please describe the MATS Rule?**

2 A. The MATS Rule, published as a final rule on February 16, 2012,  
3 regulates hazardous air pollutant (HAP) emissions from coal- and oil-fired  
4 electric generating units. The rule became effective on April 16, 2012, and  
5 compliance with the MATS emission limits is required by April 16, 2015,  
6 with the opportunity for a one- year extension if required for the installation  
7 of the selected air pollution control systems.

8 The rule includes emissions standards for Hg, non-Hg trace metals,  
9 and acid gas emissions from existing coal-fired boilers such as at the  
10 Lewis & Clark Station. Work practice standards are also included for  
11 control of organic HAP emissions. For the non-Hg metals, the rule  
12 includes alternative emission limits for FPM, total non-Hg HAP metals, and  
13 individual HAP metals. For the acid gases, the rule includes alternative  
14 emission standards for either hydrochloric acid (HCl) or SO<sub>2</sub> as a  
15 surrogate to demonstrate compliance for all acid gas emissions.

16 **Q. What analysis was performed to determine the pollution controls  
17 equipment additions and modifications that are required for  
18 compliance with the MATs Rule?**

19 A. Several diagnostic stack emissions tests were performed to  
20 determine the Lewis & Clark Station's baseline emissions. The stack test  
21 results and continuous emissions monitoring data were compared to the  
22 applicable MATS emission limits to determine emissions not meeting  
23 compliance with the existing suite of pollution control equipment. Sargent

1 & Lundy was retained by Montana-Dakota to evaluate emission control  
2 technology strategies that would provide a cost effective means to  
3 demonstrate compliance with the MATS Rule.

4 **Q. What was the result of comparing actual emissions to the MATS  
5 emission limits?**

6 A. The results indicated that Lewis & Clark is already meeting the  
7 MATS limits for mercury, and acid gases as demonstrated by HCL. The  
8 2011 diagnostic test results for total non-mercury hazardous air pollutant  
9 metals indicated that the Lewis & Clark Station could meet the MATS limit  
10 with the current suite of pollution controls equipment, but a portion of the  
11 test results were later determined to be questionable. The subsequent  
12 measured emissions for filterable particulate matter, total non-mercury and  
13 individual non-mercury hazardous air pollutant metals from the 2012  
14 diagnostic testing all exceeded the respective MATS limits.

15 **Q. Why did Montana-Dakota exclude the stack test results from June  
16 2011 when determining the need for additional non-mercury trace  
17 metals control equipment?**

18 A. Diagnostic stack testing conducted in June 2011 showed total non-  
19 Hg HAP metal emissions from the Lewis & Clark Station were below the  
20 MATS standard of 50 lb/TBtu with the current suite of pollution controls,  
21 however, stack testing conducted in June and September 2012 showed  
22 that total non-Hg metal emissions were above this MATS standard.  
23 Sargent & Lundy reviewed the 2011 and 2012 stack test reports and test

1 methods, as well as the Lewis & Clark Station fuel characteristics, and  
2 concluded that the 2012 test results are more representative of actual  
3 non-Hg HAP metal emissions. In addition, further stack testing was  
4 completed in late 2012 for non-mercury metals and the preliminary review  
5 of those results appears to further support the June and September 2012  
6 stack testing results. Therefore, manganese is expected to consistently  
7 prevent the unit from being compliant with either the individual or total  
8 non-Hg HAP metals emission limits with the existing suite of air pollution  
9 control technologies.

10 **Q. What emissions control strategy was recommended in the Sargent &**  
11 **Lundy evaluation as the most cost effective for non-mercury**  
12 **hazardous pollutant metals compliance?**

13 A. The recommended control strategy is to install and operate  
14 additional filterable particulate matter control equipment including a  
15 baghouse and modifications to the existing mist eliminators.

16 **Q. Please provide a detailed description of the Project.**

17 A. The optimal compliance strategy option (Project) includes taking  
18 the existing mechanical particulate collectors out of service and using a  
19 baghouse for particulate control, while maintaining the floating disk  
20 scrubber in operation to continue to achieve SO<sub>2</sub> and HCL removal.  
21 Additionally, modifications to the mist eliminators will be made to eliminate  
22 filterable particulate matter carryover from the scrubber slurry and a stack  
23 platform and enclosure will be installed to allow for quarterly emissions

1 testing. The abandon-in-place chimney will be demolished to provide the  
2 optimal tie-in location for the baghouse, the induced draft fan will be  
3 modified or replaced to account for a net increase in pressure drop caused  
4 by the baghouse, and ash handling equipment will be added to convey fly  
5 ash from the baghouse to the storage silo.

6 **Q. What is the estimated capital cost for the Project?**

7 A. The Project capital cost estimate provided by Sargent and Lundy,  
8 before construction loadings and allowance for funds used during  
9 construction (AFUDC) is \$26.142 million (2013 dollars). The cost estimate  
10 is considered to be a conceptual cost estimate with an accuracy of  $\pm 20$   
11 percent. The total Project cost estimate including construction loadings  
12 and AFUDC provided by Montana-Dakota's System Operations and  
13 Planning department for inclusion with other alternatives in the resource  
14 expansion modeling was \$27.7 million. Mr. Brian Giggee will discuss the  
15 results of the least-cost modeling analysis which included the selection of  
16 the Lewis & Clark baghouse project in his testimony.

17 **Q. What is the anticipated Project schedule?**

18 A. Montana-Dakota anticipates the Project to be completed within 23  
19 months from the time it is approved. The Project milestones include  
20 completion of the preliminary engineering and equipment procurement in  
21 January 2014, the detailed engineering and contract awards in September  
22 2014, civil construction in November 2014, general construction and tie-in  
23 outage in October 2015, and commercial operation in December 2015.

1 The project design layout will allow the foundations and the baghouse to  
2 be constructed while Lewis & Clark remains in operation. A 45 day outage  
3 is needed to install final ductwork tie-ins, mist eliminator modifications, and  
4 modifications to the induced draft fan.

5 **Q. Will the project schedule require the one-year extension of the**  
6 **compliance date provided in the MATS Rule to complete the Project**  
7 **installation?**

8 A. Yes, Montana-Dakota is in discussions with the Montana  
9 Department of Environmental Quality (MDEQ) and plans to seek and  
10 obtain timely approval from the MDEQ for a one-year extension due to the  
11 complexity and length of time required to implement the Project.

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

13 A. Yes, it does.