

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

FILED

JUN 30 1997

MISSOURI
PUBLIC SERVICE COMMISSION

In the Matter of The Empire District Electric)
Company for authority to file tariffs)
increasing rates for electric service provided)
to customers in its Missouri)

Case No. ER-97-81

STAFF'S IN-SERVICE STATUS REPORT ON STATE LINE UNIT 2

1. On April, 4, 1997, all of the parties in this case filed a Unanimous Stipulation and Agreement (Stipulation). The Stipulation was presented to the Commission at a hearing on April 30, 1997.
2. The Stipulation provided, among other things, for isolated adjustments to the test year for a generating facility known as State Line Unit 2 (SL2) if SL2 met certain in-service criteria by May 31, 1997.
3. SL2 did not meet the specified in-service criteria by the May 31, 1997 deadline.
4. On June 23, 1997, Empire, OPC and the Staff filed a First Amendment to the Unanimous Stipulation and Agreement (Amendment). The document, among other things, extends the in-service deadline to June 21, 1997. Paragraph 8A of the Amendment states:

If, on or before midnight on June 21, 1997, State Line Unit 2 ("the plant") meets the in-service criteria contained in the prepared direct testimony of C. Bruce Deering, the increase shall be \$13,941,377, which is the revenue requirement shown on Schedule 2 of David Winter's supplemental true-up testimony. (Exhibit TU-2). The \$13,941,377 is subject to downward adjustment based on the items in paragraphs 6,7, and 8 of schedule 1HC to Mr. Deering's testimony. If the plant does not meet the in-service criteria, as may be adjusted as set out above, the increase shall be \$10,589,364 which is the amount shown on Schedule 1 of Exhibit TU-2.

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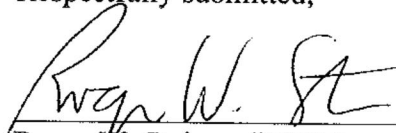
5. On June 24, 1997, the Commission advised the parties that advice to the Commission regarding this case should be filed on or before June 30, 1997.

6. Staff witness C. Bruce Deering was present during the testing of SL2. According to the Verified Statement of Mr. Deering, attached hereto as Exhibit A, SL2 did not meet all of the in-service criteria by June 21, 1997.

7. As set out above, Empire, OPC and the Staff agreed in the Amendment to a specified revenue increase if SL2 did not meet the in-service criteria. The Commission should adopt this agreement when setting rates in this case.

Wherefore, the Staff, requests that the Commission approve the Stipulation and the Amendment to the Stipulation.

Respectfully submitted,

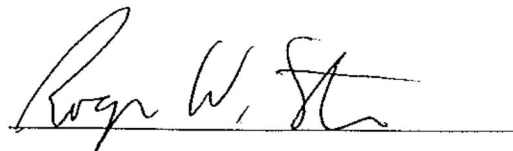


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CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing have been mailed or hand-delivered to all counsel of record as shown on the attached service list this 30th day of June, 1997.



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VERIFIED STATEMENT
OF
C. BRUCE DEERING
THE EMPIRE DISTRICT ELECTRIC COMPANY
CASE NO. ER-97-81

The purpose of this verified statement is to address the in-service test criteria for The Empire District Electric Company's (EDE) State Line Combustion Turbine 2, contained in my direct testimony in this case, and to report whether the criteria were satisfactorily met during unit testing. In summary, the generating unit is in operation serving native load as well as providing power for off-system sales to neighboring utility companies. In my opinion, all in-service test criteria regarding gas firing have been met although several criteria involving oil firing and NOx emissions were not met. Although all the specified criteria were not met, the unit is currently capable of producing its full capacity, when burning gas fuel. The specific criteria are stated below, in italics, followed by explanation as appropriate.

1. Criteria: *Construction and pre-operational testing shall have been completed. This shall be determined through:*
 - a) *Physical inspection conducted by a member or members of the Missouri Public Service Commission Staff (Staff).*
 - b) *The Company's plant manager, or responsible officer, attesting to the fact that all pre-operational testing has been successfully completed in accordance with written test procedures, and*

1 c) *Establishment that liability for final payment of equipment and*
2 *construction contracts is recorded on the books.*

3 These criteria have been met. Staff personnel have inspected the facilities and
4 confirm that physical construction has been completed. Further, the EDE project manager has
5 submitted to the Staff a letter indicating pre-operational testing was successfully completed.
6 Finally, Staff personnel have reviewed the EDE accounting books and determined for which
7 payments liability has been established.

8 2. Criteria: *The generating unit shall demonstrate its ability to start when*
9 *prompted only by a signal from a remotely located control center, once burning natural gas and*
10 *once while burning distillate oil.*

11 The unit was started remotely on natural gas on June 15, 1997. At 11:21 am the
12 unit was put on SCADA control and the operator at the EDE dispatch center, after
13 selecting "GAS" on the computerized control console at the dispatch center, started the machine.
14 The unit was synchronized with the transmission grid at 11:42 am when the generator breaker
15 closed. Had the dispatch center selected "OIL", rather than "GAS", control signals from the
16 dispatch center would have been telecommunicated to the machine and an attempt to start on
17 oil would have been made by the machine. No such remote start-up on oil was attempted
18 because a relatively small water injection pump needed for operating on oil, failed before the
19 attempt (see discussion below). Thus, this criteria was not met since the unit was not started
20 remotely while operating on oil.

21 3. Criteria: *The generating unit shall demonstrate its ability to smoothly and*
22 *successfully shut-down when prompted only by a signal from a remotely located control center.*

1 On June 19, 1997, the unit was shut-down by the dispatch center operator. At
2 7:43 pm the unit was placed under SCADA control. The "stop" command was transmitted at
3 7:55 pm, the machine went through its shut-down sequence, and the generator breaker was
4 opened at 7:57 pm. The unit successfully met the criteria.

5 4. Criteria: *The generating unit shall demonstrate its ability to accept a load*
6 *increase from zero Megawatts to 20 MW within ten minutes, starting from turning gear*
7 *operation.*

8 On June 21, 1997, a test was successfully performed demonstrating conformance
9 with the criteria. The engine received a signal to start at 7:00:03 pm. At 7:09:58 pm the
10 machine was at 20.33 MW. It is interesting to note that the machine was loaded in 76 seconds,
11 i.e., went from zero to 20.33 MW; the remainder of the time was spent in "prepping" the
12 machine, i.e., starting lube oil pumps, checking permissives, etc.

13 5. Criteria: *The generating unit shall demonstrate its ability to accept a load*
14 *increase from zero Megawatts to Base Capacity within thirty-two minutes, starting from turning*
15 *gear operation. This thirty-two minute test period may include the ten minute ascension test*
16 *to 20 MW, if the Company elects to integrate the two tests, or alternately the thirty-two minute*
17 *test to Base Capacity¹ can be run as a separate test.*

18 On June 21, 1997, a test was successfully performed. The unit was ready to start,
19 as indicated by the computer monitor, at 8:16 am. The generator breaker closed and the unit
20 was connected to the transmission grid at 8:33 am. By 8:45 am the unit had achieved Base
21 Capacity.

1 6. Criteria: *While burning natural gas, the generating unit shall run*
2 *continuously for four hours at or above Base Capacity*¹, ** _____

3 _____
4 _____
5 _____
6 _____
7 _____.

8 On June 21, 1997, the contractual test was performed to determine if the unit
9 output exceeded the contractual warranty obligation. On that date the unit demonstrated that
10 it could achieve an output of ** _____ **, when corrected for ambient air temperature and
11 other conditions stated in the test criteria. This is ** _____ **, or ** _____ **, above the
12 warranty condition and indicates that a bonus credit of ** _____ ** is due for use as an
13 offset to negative credits (penalties), if any. On June 16, 1997, at 7:04 pm, the unit ended a run
14 of four hour duration in which it did not drop below the warranty condition of ** _____
15 _____ **. The average power output during this period was ** _____ ** above the warranty
16 condition. Time has not permitted a detailed confirmation of these numbers, but in my opinion,
17 when final numbers are available, any deviation will not be material.

18 7. Criteria: *While burning natural gas and operating at the Base Capacity*¹
19 *condition, the generating unit shall achieve the warranted heat rate of* ** _____

1 _____

2 _____**

3 On June 21, 1997, the contractual heat rate test was performed. Preliminary
4 results of this test indicate that the unit achieved a heat rate of **_____, which is
5 **_____ better than the warranty condition. The demonstrated heat rate indicates a credit
6 of **_____ is due to be used as an offset to negative credits, if any. It must be noted that
7 results from the fuel analysis laboratory have not yet been received and the figures herein might
8 vary somewhat. It is my opinion any variation will not be material.

9 8. Criteria: While burning natural gas and operating at the Base Capacity¹
10 condition, the generating unit shall achieve the warranted NOx emission level of **__** parts
11 per million (volumetric), **_____

12 _____

13 _____

14 _____

15 _____

16 __. **

17 Due to lack of time, EDE was not able to complete the NOx emissions tests,
18 before the deadline of midnight June 21, 1997. Thus, this criteria was not met. On June 17,
19 1997, EDE had an independent testing company on site collecting NOx emissions data during
20 the 72 hour run. At Base load during the 72 hour test, NOx emissions were measured to be
21 **_____ parts per million. In order to complete the emissions tests, EDE would have had to
22 "trim" the machine, i.e., adjust the percentages of gas flowing through the pilot burners and

1 through Stage A and Stage B burners. These adjustments might have created an upset, tripping
2 the machine; EDE elected not to "trim" the burning process but to go ahead with other tests that
3 required less time. When EDE resumes testing, which it may have already done, the machine
4 may be "trimmed" relatively soon and may achieve the target objective of **__** parts per
5 million; and then it may not. To recognize this possibility, a penalty of **____** , should
6 be assessed. This penalty is offset by the bonus credits from capacity and heat rate performance.

7 9. Criteria: *The generating unit shall demonstrate consistency in its ability*
8 *to operate at or above a pre-defined minimum load by running for three days (72 hours) at or*
9 *above 40 MW while under control of the system dispatcher. This test shall be conducted while*
10 *burning natural gas, except that a transition to distillate oil shall be made sometime during the*
11 *three-day period, after which, for an eight (8) hour period, only distillate oil shall be burned.*
12 *The transition from natural gas to distillate oil fueling shall be made while the unit is in*
13 *operation. If the unit drops below 20 MW when the fuel transition is made, then credit will be*
14 *given for successful testing on natural gas, if successfully completed previously, and an*
15 *extended rerun on natural gas will not be necessary before attempting the transfer to oil.*
16 *However, the rerun must be started on gas, followed by a successful transition to distillate oil*
17 *and an 8 hour run on oil. If the Company elects, the four hour run at Base Capacity¹ can be*
18 *included in this 72 hour run to demonstrate consistency in holding minimum load.*

19 In my opinion the unit clearly demonstrated consistency in its ability to carry
20 minimum load, but this criteria was not met. On June 16, 1997, at 2:05 pm, the unit went above
21 40 MW and was above 40 MW until 3:26 pm on June 19, 1997, with one exception that
22 occurred shortly after midnight June 16, 1997. During the night, a storm occurred which caused

1 circuit breakers to open in two substations; further a line became isolated and a major customer
2 lost power supply. This system disturbance, probably caused by lightning or a tree limb in the
3 line, caused the real power output of State Line 2 to drop to 39.74 MW for one second, i.e., at
4 12:23:08 am, June 17, 1997. (The circuit breakers both opened at 12:22:58 am.) One second
5 after the real power sagged, the reactive power from State Line 2 almost tripled. This surge in
6 reactive power succeeded the sag in real power by one second. This disturbance was not a
7 consequence of the generating unit's capability but a manifestation of a system disturbance
8 created by a storm. The disturbance was over in four seconds, with the output of the unit back
9 at 44-45 MW where it had been previously.

10 The unit was not able to demonstrate the ability to transition from natural gas to
11 distillate oil. Operation during the entire 72 hour run was on gas; no transfer to oil was
12 attempted during the 72 hour run. Subsequently, but before the unit was shut down, the transfer
13 from gas to oil was attempted unsuccessfully, although several hours (8-9 hours) of operation
14 on oil had occurred on June 11, 1997. The failure to make a successful gas-to-oil transfer was
15 caused by failure of a relatively small water injection pump which is required to purge the fuel
16 lines when transferring from gas to oil. This pump is not a large pump with a capacity of only
17 220 g.p.m. and differential pressure of 1300 psi. A pump like this might be expected to cost
18 \$10,000 to \$20,000. The pump is required however, when burning oil and had run
19 approximately 30 hours previously when the unit was burning oil. The unit had generated
20 approximately 1480 Mwhr of energy while burning oil, prior to the failure of the pump. If a
21 replacement impeller had been available on site, the repair could probably have been made in two

1 days and testing might have been completed before June 21, 1997, the expiration deadline for
2 testing.

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NOTES:

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¹Base capacity is defined to be **

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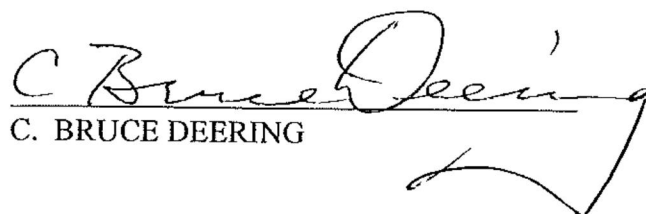
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Company.)

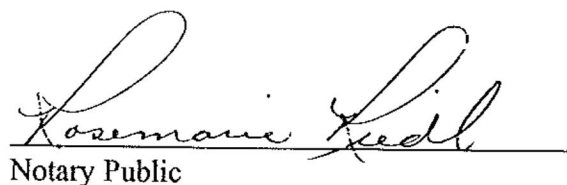
AFFIDAVIT OF C. BRUCE DEERING

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

C. Bruce Deering, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Verified Statement including Notes consisting of 9 pages to be presented in the above case; that the foregoing Verified Statement was given by him; that he has knowledge of the matters set forth in such statement; and that such matters are true and correct to the best of his knowledge and belief.


C. BRUCE DEERING

Subscribed and sworn to before me this 30th day of June, 1997.


Notary Public

My Commission Expires: June 1, 2001

Service List
Case No. ER-97-81
Revised: June 30, 1997

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