

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF NORTH DAKOTA**

**In the Matter of the Application of)
OTTER TAIL CORPORATION, d/b/a)
Otter Tail Power Company, for an)
Advance Determination of Prudence)
for the Big Stone II Generating Plant)**

Case No. PU-06-481

DIRECT TESTIMONY

OF

KERMIT E. TROUT, JR.

VICE PRESIDENT – SENIOR PROJECT MANAGER

BLACK & VEATCH CORPORATION

DECEMBER 1, 2006

1 **BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION**

2 **DIRECT TESTIMONY OF ROBERT BRAUTOVICH**

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

4 A: My name is Kermit E. Trout, Jr. My business address is 11401 Lamar Avenue,
5 Overland Park, Kansas 66211.

6 **Q: By whom are you employed, and in what capacity?**

7 A: My title is Vice President – Senior Project Manager for Black & Veatch (“B&V”)
8 Corporation. Black & Veatch has been retained as the owner’s engineer and construction
9 manager for the Big Stone Unit II Project. As B&V’s project manager on Big Stone Unit
10 II, my responsibilities include directing and managing all of B&V’s efforts on the project
11 as well as all reporting to the Big Stone Unit II Co-Owners.

12 **Q: What is your educational background?**

13 A: I am a graduate engineer with a B.S. degree in aerospace engineering from
14 Pennsylvania State University in 1969. I received a Masters degree in aerospace
15 engineering from Purdue University in 1970. I received a second Masters degree in
16 systems management from the University of Southern California in 1973. I am licensed
17 as a professional engineer in several states, including Kansas.

18 **Q: What is your employment history?**

19 A: I have been employed at B&V for 31 years in it power generation services group
20 (now the Energy Group). I have held various positions from design engineer to vice
21 president. For the last 12 years I have been responsible for the project management on
22 various power generation assignments including turnkey (engineer, procure and
23 construct) projects as well as owner’s engineering services. Prior to joining B&V, I was

1 a design engineer with Combustion Engineering, a power plant equipment supplier. I
2 joined B&V in 1975. The principal positions and responsibilities I have held with B&V
3 have included; senior engineer, responsible for conceptual studies, specifications and
4 evaluations of turbine island equipment for various pulverized coal power plants;
5 specialty project manager, responsible for managing B&V's specialty group responsible
6 for conceptual design of turbine island equipment on all of B&V's pulverized coal power
7 plants; senior project manager, responsible for conceptual design, engineering and
8 procurement support on a 250MW oil-fired power plant; and project manager for
9 numerous power plants around the globe.

10 **Q: What work experience have you had that is relevant to your testimony?**

11 A: As a project manager, I am involved with all aspects of project development,
12 including the process of developing project cost estimates and cost reporting activities.
13 These activities are important components of the services B&V provides to its clients,
14 and are completed in a consistent manner for projects of comparable size and complexity
15 to Big Stone Unit II. In addition to my engagement on the Big Stone Unit II project, I
16 have been involved with power project cost estimates on many similar projects. Thus, I
17 am quite familiar with the process used to complete these cost estimates.

18 In addition to serving as Project Manager on the Big Stone Unit II project, I am
19 managing B&V's work on a 2 x 250 MW coal-fired power plant for Bhilai Electric in
20 India, and on a 2 x 300 MW coal project for Reliance Energy Ltd., which is also located
21 in India. B&V is the Owner's consultant on both projects.

22 In 2001, I began serving as Project Manager on an EPC 525 MW combined cycle
23 project for Mirant Delta LLC in Antioch, California known as Contra Costa Unit 8.

1 Black & Veatch is completing this project on an open-book EPC approach (which means
2 “Engineering/Procurement/Construction”). From 2003-2005, I served as Project
3 Manager in connection with a 300 MW coal-fired project in Western Australia. During
4 the same time period, I served as Project Manager on other B&V coal-fired plant
5 opportunities in Germany and Australia. Between 1998 and 2003, I managed power
6 plant projects for US electric utilities and developers, including Coyote Springs Unit 2, a
7 250 MW combined cycle project for Avista Corp. in Boardman, Oregon that went
8 commercial in June 2003; the Energy Center Peaking Project in Sarcoxie, Missouri, a 100
9 MW simple cycle project that went commercial in May 2003; the State Line Combined
10 Cycle project for Empire District Electric Company, a 500 MW facility in Joplin,
11 Missouri that went commercial in mid-2001. I have also managed power plant projects
12 in China, England, Singapore. Before 1998, I served as senior project engineer on
13 numerous other U.S. power plant development projects. From 1979 to 1988, I was
14 responsible for managing B&V’s specialty group responsible for conceptual design of
15 turbine island equipment on all of B&V’s pulverized coal power plants.

16 **Q: What is the purpose of your testimony?**

17 A: The purpose of my testimony is to summarize the July 2006 Big Stone Unit II
18 project cost estimate and provide the basis for how the cost estimate was developed. I
19 will also explain (1) B&V’s role in the Big Stone Unit II project, (2) the process that led
20 to B&V’s development of the report that was delivered to the Big Stone Unit II owners
21 on July 7, and (3) the status of the project capital cost estimates

22 **Q: Please describe B&V and the types of projects in the electrical generation**
23 **and transmission industry B&V has been involved with.**

1 A: Black & Veatch Corporation is a wholly-owned subsidiary of Black & Veatch
2 Holding Company, a global engineering, consulting and construction firm, which has
3 approximately 90 domestic and international companies and subsidiaries and over 7,000
4 employees. The company was founded in 1915, and specializes in infrastructure
5 development in energy, water, telecommunications, federal and governmental services,
6 management consulting and environmental markets. B&V has offices in 23 different
7 countries around the world. In the U.S., B&V has 53 offices in 27 different states,
8 including Minnesota.

9 B&V has provided and continues to provide services in connection with projects
10 involving coal-fired power plants, combustion turbines, combine cycle gas turbines,
11 integrated gasification combine cycle plants (“IGCC”), all forms of renewable generating
12 sources, hydro-electric plants, and transmission projects, including substations, overhead
13 and underground transmission lines. B&V is also involved in the design, procurement
14 and installation of air quality control equipment and systems, and in gas processing
15 projects such as sulphur recovery, gasification and liquefied natural gas technologies.

16 B&V has been involved in new design engineering and the retrofit of supercritical
17 pulverized coal power plant projects since the 1970’s. In addition, B&V has provided
18 consulting services to multiple client interests in supercritical coal technology.

19 Exhibit No. _____ (KET-1) is a listing of B&V’s major projects since 2001. The
20 projects listed represent an aggregate of approximately 20,000 megawatts.

21 **Q: What does B&V rely on to forecast the future construction and operating**
22 **costs of power generation resources?**

1 A: B&V maintains, updates and utilizes related data from B&V's own projects as
2 well as from trade publications and third party information available in the public
3 domain. B&V also relies on data obtained from its construction partners and
4 subcontractors. B&V applies its own institutional knowledge, judgment and experience
5 to these data for estimating future construction and operating costs.

6 **Q: How was B&V's cost information compiled?**

7 A: B&V's Energy Group includes an Estimating Specialty Group. The cost
8 estimators in this group regularly mine cost and other economic data from both public
9 and private sources. The most accurate and current sources of cost data are the projects
10 B&V is engaged on. B&V's cost data and cost estimates are developed by B&V's cost
11 estimators and personnel assigned as a team to execute specific projects.

12 B&V obtains cost data from our own ongoing and completed projects as well as a
13 host of other sources, mentioned previously. In addition, we obtain cost data from
14 equipment suppliers through competitive bidding of equipment and components. For
15 example, when issuing competitive bidding packages, we request pricing information
16 from equipment suppliers which is used to update our cost data.

17 **Q: Would you please explain B&V's involvement in the Big Stone Unit II**
18 **project?**

19 A: Yes. B&V commenced work on the Big Stone II project in the fall of 2005 as a
20 result of being the successful bidder in the Big Stone Unit II Co-Owners' Request for
21 Proposals for Engineering Services.

22 As part of our scope of services, B&V prepared a "bottoms-up" detailed cost
23 estimate. A preliminary cost estimate template was developed early in the project to

1 allow the Co-Owners to prepare internal documentation necessary to track and monitor
2 project costs to the level of detail required.

3 **Q: Would you please describe the Big Stone II Project cost estimate provided in**
4 **Exhibit No. _____ (KET-2)?**

5 A: Yes. The project cost estimate, as also summarized in Exhibit 1 of the
6 Application, was prepared after the definition of plant arrangements and configuration
7 was developed in sufficient detail and after the design criteria for all equipment and
8 material was developed and agreed to by the Co-Owners. The project will be executed on
9 a multiple contract basis meaning that the plant equipment and construction will be
10 broken-down into approximately 1xx specific contracts. Costs are summarized into major
11 categories based on how equipment and construction including furnish & erect contracts
12 will be administered. Cost monitoring will be to this level also.

13 Equipment costs include materials and services for all plant components.
14 Construction contracts include labor and materials and services necessary to erect the
15 plant equipment. Indirect costs include Owner's costs including engineering and
16 construction management as well as escalation and reserves allocation. The cost estimate
17 was based on the following:

- 18 • Pricing of all major equipment and systems including receipt of
19 detailed competitive bids for five major components and indicative
20 price quotes for approximately 19 other major pieces of equipment
21 and systems.
- 22 • Estimates of cost and quantity of individual construction
23 commodities.

- 1 • Estimates of cost and quantity of individual construction labor
2 hours. Local labor rates for the various union crafts (building
3 trades) were obtained and used.
- 4 • Estimates of project indirect costs including engineering,
5 construction management, unit startup, property tax, financing,
6 insurance, contingencies and others as required (some of these
7 included Co-Owner related and provided estimates).
- 8 • Inclusion of all other Co-Owner costs including transmission costs
9 as well as for the Big Stone Unit II personnel and other indirect
10 costs.

11 The detailed cost estimate was formatted into a cost report summary that
12 will be updated on a monthly basis to reflect the actual costs as they are incurred
13 (which B&V and the project managers will use as a forecasting and monitoring
14 tool).

15 **Q: Was a cash flow profile developed that reflects how and when project costs**
16 **will be incurred?**

17 A: Yes, B&V prepared a cash flow profile showing the expected expenditures to be
18 incurred on a monthly basis throughout the project. The project cash flow was developed
19 using the “bottoms up” capital cost estimate and the project schedule. Exhibit No.
20 _____ (KET-3) includes a flow diagram and work plan that describes the major
21 activities that were completed between September 2005 and July 2006 when the cost
22 estimate was presented to the Big Stone Unit II Owners. B&V’s initial role in the project
23 was to take the project from the status of a theoretical generic power plant, and perform

1 the planning and design of the actual plant and ancillary systems. As noted, part of that
2 process involved assisting the Big Stone Unit II Co-owners perform a “sanity check” in
3 October 2005 to determine whether, among other things, the preliminary cost estimate
4 formulated by Burns & McDonnell and the project management team in connection with
5 the feasibility study was and remained reasonable. The B&V project team that I manage
6 concluded that the cost estimate was, in fact, within a reasonable range of costs for a
7 comparable project and remained valid.

8 **Q: What role did B&V play in quantifying and assessing the projected**
9 **construction and operating costs of Big Stone Unit II?**

10 A: B&V had the lead responsibility for developing the estimated construction costs
11 for the project based on support from the Big Stone Unit II project team.

12 B&V had a limited role in developing the estimated operating costs. B&V’s role
13 was limited to: (1) suggesting the plant staffing necessary to successfully operate and
14 maintain the plant and (2) developing the efficiency of the plant as measured by the net
15 plant heat rate (the amount of energy produced as electricity as compared to the amount
16 of the energy available from the fuel).

17 **Q: Please explain the source of the cost information underlying the projections**
18 **reflected in Exhibit No. _____ (KET-2).**

19 A: The source of the cost information is derived from our B&V cost and related data
20 from our own projects, as discussed previously. Supplementing this in-house information
21 is data from trade publications and third party information available in the public domain.
22 Information is also obtained and used from our construction partners where we team with
23 others to complete projects.

1 **Q: Please explain which cost items reflected in Exhibit No. _____ (KET-2) are**
2 **derived from contemporaneous bids on other relevant projects?**

3 A: As mentioned previously, actual bids were received for five major components:
4 the boiler, turbine, fabric filter, wet scrubber and chimney. In addition, budgetary quotes
5 were obtained for the following equipment and systems:

- 6 • Coal handling system
- 7 • Bottom ash handling system
- 8 • Fly ash handling system
- 9 • Cooling Tower
- 10 • Condenser
- 11 • Feedwater Heaters
- 12 • Circulating Water Piping
- 13 • Boiler Feed Pumps and Turbines
- 14 • Circulating Water Pumps
- 15 • Induced Draft and Flue Gas Desulfurization Booster Fans
- 16 • Cable Bus
- 17 • Transformers – Generator Step-up and Auxiliary
- 18 • Distributed Control System
- 19 • Ammonia Storage and Supply Equipment
- 20 • Condensate Polishing System
- 21 • Steam Cycle Sampling and Analysis System
- 22 • Waste Water Treatment System

1 **Q: Please explain which cost items reflected in Exhibit No. _____ (KET-2) are**
2 **derived from government and/or professional economists' projections of future**
3 **prices, interest rates, economic growth and similar projected economic data.**

4 A: None of the specific line items in the cost report are derived directly from
5 published data. B&V reviews, evaluates, and then applies judgment to the cost
6 information from various public sources. These include government-based indices that
7 track various commodities, labor rates and other Bureau of Labor Statistics information.
8 Exhibit No. _____ (KET-4) includes representative commodity indices as a comparison
9 between 2004 and 2006.

10 **Q: Does B&V utilize information regarding trends in economic data and**
11 **economic indicators in connection with the services it provides to energy project**
12 **developers?**

13 A: Yes. These are reviewed and applied as appropriate.

14 **Q: Does B&V have confidence in the accuracy of the cost estimates it provided**
15 **to the Big Stone Unit II Co-owners?**

16 A: Yes. The rate for future escalation and the basis for the reserve allocation
17 assigned to the current day-dollar-estimate are quantified. We have confidence that these
18 are as accurate as possible for the given set of assumptions. While future cost changes are
19 becoming more dependent on outside forces, the estimate provides a reasonable basis for
20 cost projections.

21 **Q: Does this conclude your testimony?**

22 A: Yes.