

Exhibit No. _____
Issue: Capital Costs
Witness: Natalie Rolph
Type of Exhibit: Rebuttal testimony
Sponsoring Party: The Empire District
Electric Company
Case No.: ER-2001-299
Date Prepared: April 27, 2001

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

**REBUTTAL TESTIMONY
OF
NATALIE ROLPH
OF BLACK AND VEATCH, INC.
ON BEHALF OF
THE EMPIRE DISTRICT ELECTRIC COMPANY**

MAY 3, 2001

Exhibit No. 18
Date 5/29/01 Case No. ER-2001-299
Reporter KRM

1 **REBUTTAL TESTIMONY OF NATALIE ROLPH**
2 **OF BLACK AND VEATCH, INC.**
3 **ON BEHALF OF THE EMPIRE DISTRICT ELECTRIC COMPANY**

4
5 **CASE NO. ER-2001-299**
6

7 **I. INTRODUCTION AND PURPOSE**

8 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

9 A. My name is Natalie Rolph, and my business address is 11401 Lamar, Overland Park, KS
10 66211.

11 Q. WHO IS YOUR EMPLOYER AND WHAT POSITION DO YOU HOLD?

12 A. Black & Veatch is my employer. I hold the title of Senior Economist in the Energy Services
13 Division.

14 Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND.

15 A. I graduated from the University of Kansas in 1974 with a Bachelor of Science in
16 Economics. I graduated from the University of Missouri at Kansas City in 1978 with a
17 Masters in Economics.

18 Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

19 A. I joined Black & Veatch in 1974 as an economist conducting cost-of-service and rate design
20 studies for utility clients in the Economic and Finance Division as well as some of the first
21 socio-economic portions of environmental impact studies ever conducted in the U.S. I
22 transferred to the Power Division in 1981 where I directed all econometric load forecasts
23 and became a system planning consultant and project manager for increasingly large
24 domestic and international electric utilities and developers. In 1990, I joined R.W. Beck and
25 Associates as a Senior Consultant responsible for the solicitation and evaluation of
26 purchased power proposals concurrent with the evaluation of self-build options and

1 ultimately the acquisition of a Certificate of Need for three combustion turbine projects in
2 North Carolina. I returned to Black & Veatch in 1992 as head of the Generation Planning
3 Unit where I initiated Black & Veatch's Integrated Resource Planning practice and later
4 their deregulated electric market pricing practice. I currently hold the position of Chief
5 Economist in the Energy Services Division and I have authored numerous papers and
6 articles on planning and trends in the electric power industry.

7 Q. WHAT TYPE OF SERVICES DOES BLACK & VEATCH'S ENERGY SERVICES
8 DIVISION (ESD) PROVIDE?

9 A. Black & Veatch currently has about 400 full time equivalent employees working in ESD.
10 These employees provide engineering and consulting services to the power industry. The
11 group provides management consulting services, fuels management services, retrofit
12 engineering services, air quality control and environmental advisory services, all targeted to
13 the electric power industry.

14 Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

15 A. I was retained by The Empire District Electric Company to describe recent trends in
16 combined cycle combustion turbine plant capital costs and to compare these costs to the
17 capital costs of the combined cycle expansion at the State Line Combined Cycle Plant. I
18 was asked to do this in rebuttal to positions taken in the direct testimony of Staff witnesses
19 Cary Featherstone and Mark Oligschlaeger filed in this case regarding "cost overruns" at
20 State Line. The purpose of my rebuttal testimony is to make the Commission aware that
21 even with the "cost overruns" the total expected cost of the State Line Combined Cycle
22 Plant is reasonable when it is compared to other comparable projects on a nation-wide basis.

23 Q. PLEASE DESCRIBE THE STATE LINE PROJECT.

1 A. The State Line Project is a nominal 500 MW combined cycle plant consisting of two
2 Westinghouse 501 FD combustion turbine generators, two heat recovery steam generators
3 that use waste heat produced by the combustion turbines to generate steam and a steam
4 turbine generator. This combined cycle configuration is commonly known as a "2 on 1
5 combined cycle" configuration for the use of two combustion turbines and heat recovery
6 steam generators and one steam generator.

7 Q. HAS THERE BEEN ANY TREND IN COMBUSTION TURBINE CAPITAL COSTS IN
8 THE LAST FEW YEARS?

9 A. Yes. Capital costs have increased significantly for both simple and combined cycle
10 combustion turbine plants since late 1997 and early 1998. In that period, excluding plants
11 containing turbines sized below about 75 MW, capital costs of combined cycle power plants
12 have increased at least 60 percent.

13 Q. ARE YOU AWARE OF THE REASONS FOR THIS INCREASE IN PLANT CAPITAL
14 COSTS?

15 A. Yes. The primary reasons include increases in demand for the combustion turbine
16 generators and increases in the demand for skilled construction labor that have significantly
17 exceeded increases in the supply of both these key components. During the years 1992
18 through 1997, growth in the demand for electricity outstripped capacity additions more than
19 two to one.

20 At the same time, electric industry deregulation and restructuring trends put an end to
21 many previous capacity sharing agreements, and in 1998, low reserve margins combined
22 with high demand and the threat (or promise) of deregulation culminated in supply
23 interruptions and large spikes in the cost of wholesale power.

1 In response to the decline in the demand for generating equipment prior to 1998, the
2 major equipment manufacturers ceased to increase and in some cases decreased -- their
3 turbine production capacity. In 1998 and 1999, when disruptions occurred in the wholesale
4 market, many generating companies decided to add new generators. When that occurred, the
5 turbine manufacturers could not keep up with the sudden increase in demand for their
6 equipment, and turbine prices began to rise. Schedule NR-1 which I have attached
7 illustrates the significant increase in F Class (150-160 MW) turbine prices from below \$25
8 million in February 1998 to \$38 million in November 2000.

9 Along with the increase in turbine prices, lead times for F Class turbine deliveries
10 increased from eight to forty months, and changes in payment terms further increased
11 turbine costs by at least 10 percent. Because of shared turbine production facilities, the
12 changes in the market for F Class turbines soon spilled over to the D and E Class (80 to 110
13 MW) turbine market as well.

14 Q. YOU MENTIONED INCREASED DEMAND FOR SKILLED CONSTRUCTION
15 LABOR. PLEASE EXPLAIN.

16 A. While the trend in the overall labor market in the United States during the last two to three
17 years has been one of an ever tightening supply, the power plant construction market has
18 been even tighter. Labor costs for combustion turbine projects in construction over the last
19 few years have increased 40 to 60 percent beyond initial projections. These increases are
20 due both to unanticipated increases in labor wage rates for skilled workers and decreases in
21 overall productivity as the mix of experienced- to lesser-experienced workers declines.
22 Because the pace of generator additions is not expected to decline for at least the next few
23 years, and because the demand for labor for retrofit pollution control projects is just

beginning, power plant construction labor costs are likely to continue to increase significantly.

Q. ARE THERE OTHER FACTORS THAT INFLUENCE THE CAPITAL COSTS OF NEW COMBUSTION TURBINE POWER PLANTS?

A. Yes, inlet cooling, water injection and auxiliary firing are measures that increase the capital costs of combustion turbine projects by varying degrees; but, they are intended to increase plant output as well. Combustion turbines experience decreases in output as ambient temperatures rise and the density (and therefore mass) of the air used for the combustion process decreases. One way to reduce the loss of output during hot weather is to cool the inlet air through an evaporation or chilling process (which increases mass flow). Another way is to inject water in the form of spray into the turbine.

Still another way to maintain output for combined cycle generators during hot weather is auxiliary firing, where additional natural gas is burned in the heat recovery steam generators to generate additional steam, so that increased output from the steam turbine offsets combustion turbine output losses. The identification of the optimal level of these various measures to supplement summer output levels is inexact since the payback analysis depends on projections of future power market prices. What is certain, however, is that all of these measures complicate comparisons of combustion turbine capital costs.

In addition to the summer output measures described above, utilities with an obligation to serve retail customers have additional considerations of price stability and reliability of supply. For these utilities, reliability of supply is more than just a business issue. As a result of the wholesale power price spikes in 1998 and 1999, utilities like Empire

1 have a significant impetus to rely on their own generation to serve their retail customers and
2 thereby avoid extraordinarily high market prices during hot weather.

3 The issues of reliability of supply are impacted by the reliability of generating plants,
4 and plant reliability considerations affect the capital cost of any new generation project
5 including combustion turbine projects. Reliability considerations, therefore, further
6 complicate comparisons of projects owned by independent power producers and regulated
7 utilities. As a vertically integrated utility with an obligation to serve the customers of its
8 franchise service area, Empire has overall system reliability concerns that surpass those of
9 merchant power developers who invest in reliability only to the point of diminishing
10 business returns.

11 Q. GIVEN ALL THE FACTORS YOU HAVE JUST DESCRIBED THAT HAVE
12 IMPACTED RECENT TRENDS IN COMBUSTION TURBINE POWER PLANT
13 CAPITAL COSTS, CAN YOU DETERMINE IF THE CURRENT ESTIMATED COSTS
14 OF THE STATE LINE COMBINED CYCLE PLANT ARE REASONABLE AND
15 COMPARABLE WITH THE COSTS OF SIMILAR COMBUSTION TURBINE
16 COMBINED CYCLE PROJECTS?

17 A. Yes, given Black & Veatch's significant participation in the new generation business in the
18 US, we have monitored each of the trends described above. As a result, we know it is
19 difficult if not impossible to exactly peg the monthly market price for labor or turbines or
20 the guaranteed turbine output levels. Therefore, we know it is impossible for anyone to peg
21 the exact market price of a particular power plant going on-line last summer or next.
22 However, through our exposure to a multitude of engineer, procure and construct (EPC)
23 projects Black & Veatch has won, and through our market intelligence on other projects, we

1 have developed a range of typical capital costs for similar projects with similar commercial
2 operation dates.

3 To make a valid comparison to the State Line F Class combined cycle Project, I added
4 the owner's indirect costs including AFUDC as estimated by Empire to a typical range of
5 EPC capital costs for 2 on 1 F Class (500 MW) plants to come on line for the summer of
6 2001. The result is a range of all-in capital costs of \$480 to \$560 per kW. The cost of the
7 State Line Project included in this rate filing is \$520 per kW. In addition, a comparison of
8 the all-in costs of the State Line Project to the total project cost, including all interest during
9 construction and owner costs, for a merchant 2 on 1 combined cycle plant to come on line
10 six months after State Line indicates an approximate \$90/kW advantage for State Line.
11 Based on this analysis, the current cost estimates for the State Line Combined Cycle project
12 are reasonable and certainly in a comparable range with the cost of similar units
13 nation-wide.

14 Q. GIVEN THE COST TRENDS YOU DESCRIBED ABOVE, HAD EMPIRE WAITED
15 ANOTHER YEAR TO PROCURE TURBINES AND CONSTRUCT PLANTS, WHAT
16 WOULD HAVE BEEN THE IMPACT ON THE CAPITAL COSTS OF THE PROJECT?

17 A. I believe the cost of the State Line project would easily have been 10 percent higher.

18 Q. DO YOU AGREE WITH THE POSITION OF THE STAFF AS EXPRESSED IN THE
19 DIRECT TESTIMONY OF MR. FEATHERSTONE AND MR. OLIGSCHLAEGER THAT
20 RATEPAYERS SHOULD NOT HAVE TO PAY FOR THE COST OVERRUNS THEY
21 HAVE IDENTIFIED?

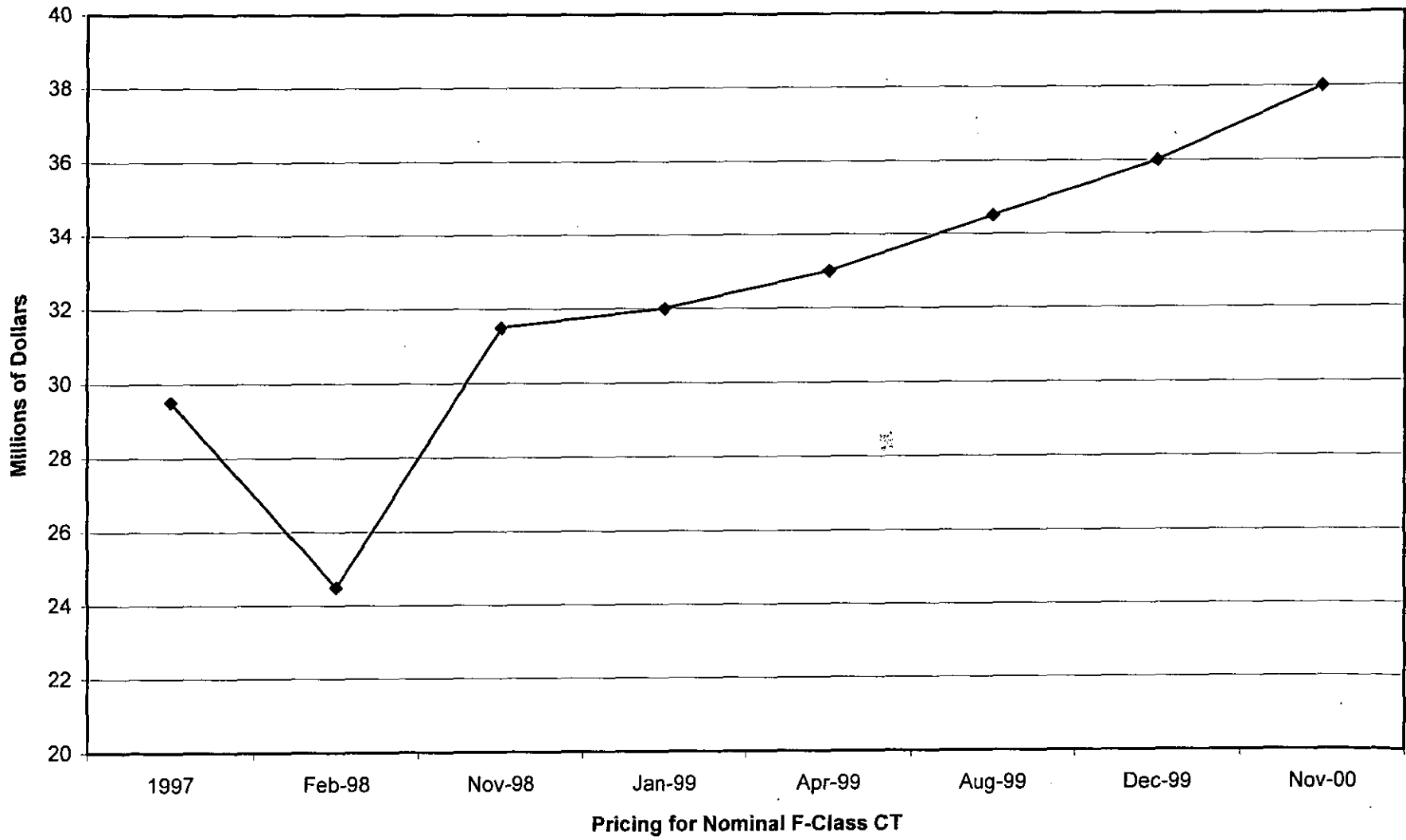
22 A. No. I do not believe that either Mr. Oligschlaeger or Mr. Featherstone identify any specific
23 amounts that they say were imprudently incurred as a result of mismanagement by Empire.

1 They have simply identified amounts that have exceeded original estimates or bids. It is
2 certainly not unusual for actual costs to be greater than estimated costs without any
3 imprudence on management's part, especially when the original estimate was developed at
4 the start of a significant shift in the industry as happened in 1998. By 1999, the demand for
5 the crafts needed to build power plants nation-wide and in the Midwest increased greatly,
6 making it improbable that earlier original cost estimates would be realistic. I believe a
7 more relevant measure is whether the entire project can be shown to have been constructed
8 within an objective range of reasonable and comparable costs for plants of the same vintage.
9 I have clearly demonstrated that State Line has been constructed within a reasonable range
10 of costs, and therefore there should be no basis for the Commission to make the
11 shareholders of Empire absorb costs for which they were not the cause.

12 Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

13 A. Yes, at this time.

Schedule NR-1 Supply & Demand Impacts on CT Cost



	1997	Feb-98	Nov-98	Jan-99	Apr-99	Aug-99	Dec-99	Nov-00
CT Cost	29.5	24.5	31.5	32	33	34.5	36	38

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AFFIDAVIT OF NATALIE ROLPH

COUNTY OF Johnson)
 Kansas) ss
STATE OF ~~MISSOURI~~)

Natalie Rolph, being first duly sworn, states that she has participated in the preparation of the accompanying testimony in question and answer form and that the answers she provides are true and correct to the best of her knowledge, information and belief.

Natalie Rolph
Natalie Rolph

Subscribed and sworn to before me this 1st day of May, 2001

Deborah A. Fendorf
Notary public

(Notary Seal)

