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Audit Report

Fayette Power Project Scrubber Costs

October 3, 2006

Office of the City Auditor
Austin, Texas

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To: Mayor and Council Members

From: Stephen L. Morgan, City Auditor

Date: October 3, 2006

Subject: Fayette Power Project (FPP) Scrubber Costs

I am pleased to present this report on the FPP scrubber project. This audit was included in our FY 2006 Service Plan.

Background

The FPP, located at La Grange, Texas, consists of three coal-fired generating units with an output of nearly 1,750 MW. Austin Energy (AE) and Lower Colorado River Authority (LCRA) own equal shares of Units 1 and 2, which have a combined output of 1,272 MW. LCRA owns one-hundred percent of Unit 3, with an output of 475 MW.

The LCRA and AE plan to install new pollution control technology (“scrubbers”) on FPP Units 1 & 2. The technology is expected to control sulfur dioxide (SO₂) emissions and help FPP meet the U.S. Environmental Protection Agency’s Clean Air Interstate Rule (CAIR), which calls for electric utilities to reduce SO₂ emissions by 50 and 65 percent by 2010 and 2015, respectively.

In 2004 the Office of the City Auditor (OCA) analyzed the total cost of operation for FPP based on actual costs for 2000-2003 and projected costs through 2007 (“Fayette Efficiency and Safety Report”). The analysis showed projected increases in costs in 2004-2007, driven mainly by increased capital costs. A further review highlighted that the costs were mainly related to the new scrubbers to be installed on FPP Units 1 and 2. Therefore, OCA determined that these costs should be included in the scope of any future audit work related to costs at the plant.

Objective, Scope, & Methodology

The objective for this project was to review the LCRA’s estimated cost for the scrubbers at FPP to determine whether it is reasonable. Our scope of work included FPP estimated major costs for future periods (2006-2011). We hired an engineering firm with expertise

in analyzing power plants to assess the FPP estimates of these future costs for reasonableness. The firm interviewed FPP and AE staff involved in the scrubber project and analyzed project specifications from LCRA's Request for Proposal. This audit was conducted in accordance with generally accepted government auditing standards.

Findings

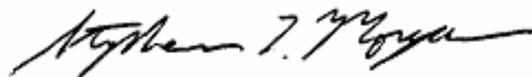
The LCRA estimated cost for new scrubbers to be installed on Units 1 and 2 is reasonable, although at the high end of the range of reasonable costs. The LCRA's estimate for the City of Austin's 50 percent portion of the scrubber project cost is \$142.5 million. To assess the accuracy of LCRA's estimate, OCA hired a consultant to independently develop a second estimate.

The consultant developed the second estimate based upon a comparison to construction costs at other coal-burning generation units. The consultant's estimate is based on projects of similar scope to FPP and ranges from \$240 million to \$284 million with a 50 percent portion range of \$120 million to \$142 million. The LCRA's estimate for the City of Austin's 50 percent portion is at the high end of this range. The details of the cost estimate developed by the consultant are attached to this report.

The consultant provided our office with studies, research papers, and articles to support their analysis of LCRA's estimated cost for the new scrubbers. OCA reviewed this information and found the results of their work to be adequately supported.

We appreciate the opportunity to assist Austin Energy in evaluating the scrubber project cost estimates. If you have any questions about this audit, please do not hesitate to call.

Sincerely,



Stephen L. Morgan CIA, CGAP, CFE, CGFM
City Auditor

ATTACHMENT A
SCRUBBER COST ESTIMATE REVIEW



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Austin, TX 78701
512/493-5400 (ph)
512/472-7721 (fax)

September 2, 2006

Mr. Clyde Canady
Austin Energy
721 Barton Springs Rd
Austin, TX 78702

Dear Mr. Canady:

Fayette Units 1 & 2 FGD Cost Estimate Review

Navigant Consulting Inc. ("NCI") is pleased to submit this Letter Report on our review of the LCRA's \$142.5 million budget estimate for Austin Energy's 50 percent portion of the proposed Fayette Units 1 & 2 FGD Project. NCI's review is based on information provided by the Austin Energy, publicly available information, and the experience of our consultants within the allowed time limits. We have also reviewed the updated information forwarded to us by the Office of the City Auditor on July 11 and 31 and August 30, 2006 by email.

FGD system estimates are sensitive to a number of factors including fuel heating values, sulfur content, and sulfur removal percentage. Retrofit estimates also bring system sharing, original plant design basis, and site specifics into play. To precisely validate such an estimate would require an assessment in much greater detail than this evaluation allows. NCI has attempted to develop an opinion regarding the reasonableness of the Fayette 1 & 2 total FGD Project estimate by a more general validation based on FGD system costs from previous studies and published data. NCI developed both a generic retrofit cost range estimate and a more specific independent estimate. The details of these approaches and results are included in this letter report.

Background

Units 1 & 2 at the Fayette Station are two 600-MW coal-fired electric generating plants originally installed in 1979 and 1980. Ownership of these units is 50% by the Austin Energy and 50% by Lower Colorado River Authority (LCRA). Each unit is a sub-supercritical (2400 psig) design with a Combustion Engineering (now Alstom) boiler and a General Electric (4-flow) steam turbine. Units are reported to be burning coal with a heating value of 8,000 – 9,000 Btu/lb and a sulfur content of up to 1 percent.



Documents Reviewed

NCI has performed a brief review of the following documents provided by the Austin Energy:

- LCRA Specification C101
- LCRA00400.101
- LCRA19000.101
- LCRA19100.101
- LCRA19200.101
- Scrubber Worksheet
- Fayette Units 1 & 2 Plot Plan
- Excerpts from COA 2005 Business Plan
- S&L Project 09290-123 FGD Report
- LCRA Burns & McDonnell Rev3 Estimate
- LCRA Absorber Contract Evaluation
- FY 2007 Spending Plan Budget

LCRA Specification C101 Scope of Work

The project is retrofitting a wet LSFO (Limestone Forced Oxidation) FGD Project to units 1 & 2. The scope of the FGD specification (LCRA C101) is for supply of FGD equipment only and does not include:

- Construction Labor
- New stack
- Concrete foundations & floors
- Existing gypsum dewatering system modifications
- Process & Interconnecting Piping
- Electrical wiring, conduit, cable trays, and motor starters
- FGD controls and instruments
- Traction elevator
- Heat tracing and insulation

It is assumed that these remaining components will either be included in future specifications and RFP's, or existing facilities at the plant site, with some retrofit, will be used.

Current Fayette FGD Project Budget Estimate

The LCRA and Burns & McDonnell have established a budget for the Fayette Units 1 & 2 FGD Project of approximately \$142.5 million, which would represent 50 percent of the total project estimate. Austin Energy has performed some external research and suggests that a review of current FGD costs and the budget is warranted.

NCI Opinion Methodology

NCI used two approaches to develop an opinion of the \$142.5 million budget estimate (50 percent of total project) for the Fayette Units 1&2 FGD Project. The first using published generic retrofit total cost ranges with project specific adjustments and the second developing an independent estimate.

Generic FGD Costs

New wet FGD costs are reported to be in the range of \$100/kW - \$175/kW. NCI believes there are several adjustments for a comparative Austin Energy FGD project estimate. These include:

1. New to Retrofit adjustment
2. PRB Coal Adjustment
3. Hurricane Katrina Construction Labor impacts
4. Increased FGD Industry Activity Impacts

New to Retrofit Adjustment

Retrofit projects typically are expected to run between 10 percent and 25 percent higher due to dealing with existing structures and underground issues. There have been cases where the combination of sulfur content, site specifics, and other unusual circumstances have reportedly increased project costs by up to 60%.

PRB Coal Adjustment

The previously published ranges of new costs were for a wide range of projects. However, many of the earlier new and retrofit projects were eastern Appalachian coal projects with high BTU fuel values and high sulfur contents. Projects with western fuels (moderate BTU contents and lower sulfur contents) might increase project costs by up to 10 percent.

Hurricane Katrina Construction Labor Impacts

Due to the Hurricane Katrina rebuilding efforts in Louisiana a greater than normal amount of construction labor crafts are being used in the Louisiana area. This could have a slight impact on construction costs. Such an impact might be in the range of 2-3 percent of project costs.

Increased FGD Industry Activity Impacts

The 2005 EPA changes to the Acid Rain Program will result in increased SO₂ emissions reductions between 2010 and 2014. This has generated an increase in FGD Industry activity, which may make manufacturers less aggressive in pricing projects than when the industry was less active. This might increase pricing by up to 5 percent.

Based on these four adjustment factors NCI has prepared the table below which reflects low medium and high \$/kW values for a generic western fuels FGD project:

Description	Low Range \$/kW	Mid Range \$/kW	High Range \$/kW
New FGD Estimates	\$100	\$150	\$200
Retrofit Adjustment (10-25%)	\$10	\$26.3	\$50
PRB Fuel Adjustment (0-10%)	\$0	\$7.5	\$20
Construction Labor Adjustment (0-4%)	\$0	\$2	\$5
Increased FGD Activity Adjustment (0-5%)	\$0	\$0	\$0
Expected PRB Retrofit Estimates	\$110	\$185.8	\$275

Based on these adjusted FGD retrofit project \$/kW estimates, the Fayette Units 1&2 FGD (1200 MW) project low, mid, and high estimates would be approximately \$132 million, \$223 million, and \$330 million retrofit, Austin Energy’s portion of the FGD project range of costs would be \$66 million to approximately \$165 million.

The Austin Energy’s budget estimate of \$142.5 million is within this range.

NCI Independent Estimate of Fayette

As a second approach to validating the Austin Energy budget estimate of \$142.5 million, NCI has developed a total project estimate of similar scope to that of the Fayette Project.

A summary of the revised estimate is provided below.

Description	Revised Independent NCI Summary Estimate
Process Capital Reagent Feed System SO2 Removal System Flue Gas System Solids/Byproduct Handling General Support Equipment Electrical New Chimney Water Treatment Plant Balance Draft Conversion	By Others
Subtotal Process Capital	\$134.7
Contractor Markup, Contingency & Profit General Facilities Engineering & Startup Technical Direction & Support for Erection Contractor	
2002 NEW FGD CAPITAL COST	\$183.8
Escalation between proposal and equipment delivery (8%)	\$14.8
2005 NEW FGD CAPITAL COST	\$198.6
Limited Retrofit Factor (+10%)	\$19.9
Extensive Retrofit Factor (+30%)	\$59.6
Fayetteville Limited Retrofit Estimate	\$218.5
Fayetteville Extensive Retrofit Estimate	\$258.2
Limited Retrofit Estimate 10% Contingency	21.9
Extensive Retrofit Estimate 10% Contingency	25.8
Total Fayetteville Supply Only Limited Retrofit Budget	\$240.4
Total Fayetteville Supply Only Extensive Retrofit Budget	\$284.0
Austin 50% Portion of Supply Only Limited Retrofit Budget	\$120
Austin 50% Portion of Supply Only Extensive Limited Retrofit Budget	\$142

The NCI independent total cost estimate range was \$240 million - \$284 million with a 50 percent portion range of \$120 million - \$142 million. These estimates are present day estimates of supply and construction only and do not include other owner's costs or financing charges.

The Austin Energy (\$142.5 million) 50 percent portion of the project budget estimate is adequate to support this range.

Analysis of Additional Data

Drafts of these NCI results were reviewed with the Office of the City Auditor.

On July 10th and 13th, 2006 the Office of the City Auditor provided a Sargent & Lundy (S&L) assessment of the LCRA Rev 3 project estimate and the LCRA Rev 3 estimate respectively. The LCRA Rev 3 estimate, prepared by Burns & McDonnell (B&M), indicates a revised project estimate of \$285,267,780.

S&L noted changes and provided comments regarding the increases including higher labor rates. S&L also provided two independent estimate summaries based on their data and experience. These estimate summaries ranged from \$268 to \$278 million for the Fayette project.

NCI Observations and Opinions

Based on NCI's independent assessment and review of the S&L assessment and the LCRA Rev 3 estimate, NCI offers the following observations and opinions:

1. The LCRA Rev3 estimate is approximately \$285 million.
2. S&L's review of the LCRA Rev3 estimate comments on changes and provides independent estimates of \$268-\$278 million for FGD projects of similar scope
3. NCI prepared generic low, mid, and high range estimates of \$132 million, \$223 million, and \$330 million respectively, which suggests a 50 percent portion of \$66 million to \$165 million. The Austin Energy budget of 142.5 million is adequate to support most of that range.
4. NCI also prepared an independent estimate range for the Fayette project of \$240-\$284 million, which suggests a 50 percent portion of \$120 million to \$142 million. The Austin Energy budget estimate of 142.5 million is adequate to support that range.



NCI's opinions are based on the documents indicated above that were provided by the Office of the City Auditor, publicly available information, and the experience of our consultants within the allowed time limits. From NCI's document review it is not clear what recent engineering has been done on this project or the details supporting the LCRA estimate prepared by Burns & McDonnell for the Austin Energy. Review of this material might afford NCI greater insights into this project and better support NCI's opinion. However, such a review would be beyond the scope of our current assignment.

We appreciate the opportunity to assist the Austin Energy with this important effort. Should you have any questions, please call me at (978) 578-4821 or Dan Stathos at (512) 493-5415.

Sincerely,

A handwritten signature in cursive script that reads "Brian E. Feldmann".

Brian E. Feldmann
Associate Director